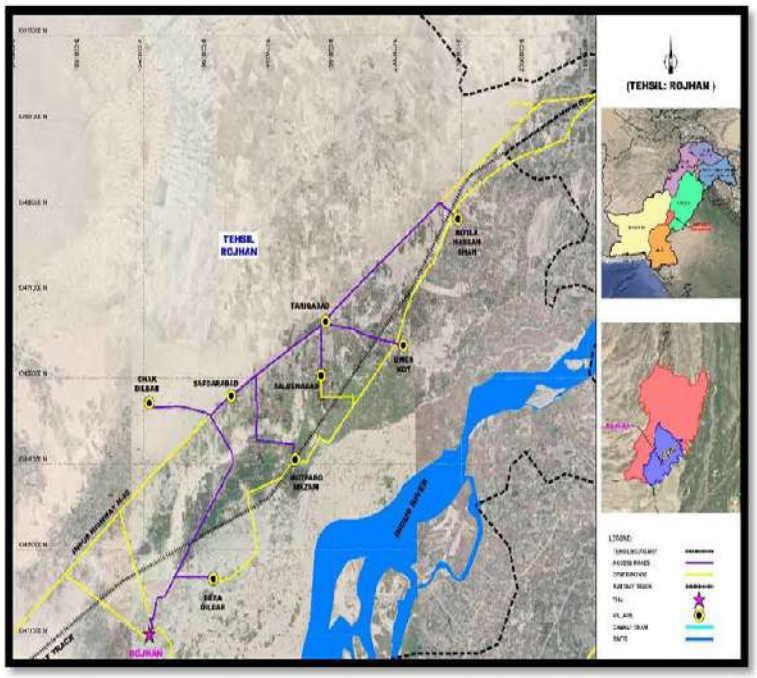
Punjab Rural Municipal Services Company (PRMSC)

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)











Draft Report

PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS) PILOT PHASE, CLUSTER SOUTH-III.

08 Villages of Tehsil Rojhan
(Kotla Hassan Shah, Umer Kot, Tariqabad, Saleemabad, Safdarabad, Mutfarq Mazari, Chak Dilber and Dera Dildar)

May 2023

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Executive Summary

1. Introduction

The Government of Punjab has launched a project for service improvement in rural areas of Punjab namely Punjab Rural Sustainable Water Supply and Sanitation Project (PRSWSSP). To implement this project Punjab Rural Municipal Services Company (PRMSC) has been established under Section 42 of Companies Act 2017. PRMSC has hired the services of National Engineering Services Pakistan (Pvt.) Ltd. (NESPAK) for the proposed project titled "Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster: South – III".

The goal of PRSWSSP is to improve sanitation conditions, provide clean drinking water, and improve living conditions through solid waste management, behavior change, and capacity building for the sustainability of the project in rural settlements of Punjab.

Through various studies, it has been proven that poor condition of Water, Sanitation, and Hygiene (WASH) not only affects the health of the masses but also adversely affects the economic growth of the region. Recently, a number of mega initiatives have been launched by the Government, and international organizations in the urban areas of all provinces of Pakistan for the improvement of water and sanitation but the rural areas still remain neglected. Rural settlements of Punjab, which hold 73% of the province's population living in 23,000 revenue villages, are in dire need of investments to improve WASH.

Outcomes of various studies and sector assessments, have identified requirements for improving climate resilience and planned economic growth of 2,000 villages that will be part of the project. Poverty, water contamination, stunting, and sanitation condition of the areas have been taken as basic parameters for the selection of project sites/tehsils.

As per Punjab Environmental Protection Agency (PEPA), review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations 2022, Schedule-II, EIA is required for 'Water Supply, Sewerage System and Treatment (Category F).

2. Policy, Legal and Administrative Framework

The national and provincial Government has promulgated laws/acts, regulations, and standards for the protection, conservation, rehabilitation, and improvement of the environment. Environmental Protection Department (EPD), Punjab is the regulatory authority, which has provided guidelines for conducting Environmental Impact Assessment (EIA) studies and has the authority to issue regulatory clearance/ No Objection Certificates (NOCs) for various projects.

3. Project Description

There are 08 selected Mouzas/ villages of Tehsil Rojhan, located approximately 12 to 40 km away from Rojhan city towards Rajanpur city. Indus Highway N-55 is the main access road from Rojhan city to these selected villages.

The villages in the project area are facing grave issues related to water supply and sewerage. The underlying issues related to water supply and sewerage in the all Eight (08) Mouzas/ villages are summarized below:

Water Supply Issues:

- Groundwater is brackish and not consumable;
- Brackish water is being used for domestic purposes;
- No water distribution system in the villages;
- Drinking water is being purchased through private RO plants or through donated RO plants; and
- People in most of the villages are facing health issues like hepatitis, kidney stones and joint pains.

Sewerage Issues:

- Sewerage system does not exist in Revenue Villages of Rajanpur except in some parts of Umer Kot which is not in working condition;
- Existing open drains are damaged and collect sewage only from some houses;
- No proper Disposal Point in all the villages;
- Sewage collected in soakage pits and open plots seeps into ground and contaminates groundwater; and
- Raw sewage ponds are a breeding ground for diseases.

The project is scheduled to be completed in 10 months. The estimated total cost for the construction of the proposed project is **1727.15** million PKR. This cost is tentative and will be finalized with the detailed technical design of the proposed project. The total man power required on site for proposed Project during construction will be approximately 110 workers per day.

4. Baseline Profile

A. Physical Environment

The proposed project sites are rural settlements comprising residential and agriculture areas. The elevation of study area generally ranges between 250 and 300 ft above mean sea level. It slopes towards the Indus River which runs along the eastern boundary. There are small sedimentary hills in the western and southwestern side that rises to an elevation of about 100 meters.

Geologically, this lands in the flood plains are lightly mantled with alluvial deposits transported from the Suleman Range. These areas contained energy, industrial and metallic mineral resources. Amongst, the main resources are Coal, Iron Ore, Gypsum, Dolomite, Fuller earth, Bentonite, Silica Sand and limestone etc. The project site is located on nearly horizontal flood plains covered by fine grained loamy soils.

The project area has extreme climate. It has hot summer and cold winters. The summer starts from May and lasts till September. June is the hottest month. The mean maximum and minimum temperature are 45 ºC and 29 ºC respectively for month of June. The winter seasons lasts from November to February. January is the coldest month. The mean maximum and mean minimum temperature are 24 ºC and 7 ºC in January.

Highest intensity of precipitation is also observed in the months of June, July and August ranges between 5-10 mm

Groundwater investigation study reveals that overall groundwater is brackish. Existing tube wells are pumping brackish water with TDS values 1480 to 4684 mg/lit for agriculture purpose. There is no groundwater-based water supply scheme in project area except outlived scheme of Dera Dilber and Safdarabad. The depth of water wells ranges from 80 to 130 ft BGL.

The Project Area is located in Seismic Zone 2A. The Zone 2A has Peak Ground Acceleration (PGA) in the range of 0.08 g to 0.16 g.

B. Biological Environment

The following section describes the biological environment of the project area.

Common animals found in the project area include camels, dogs, cats, house rats and bats. Domestic livestock observed during field visits include camels, buffaloes, cattle, goats, sheep, and donkeys that are used by the local residents for their livelihood.

Major crops ripen and cultivated is wheat. In few places, tobacco is also cultivated.

The flora of the Riverine forests along River Indus and the Panjnad River consists of lai (Tamarix dioca), pilchi (Tamarix gallica), babul or kikar (Acacia nilotica), shisham (Dalbergia sissoo), ber (Zizyphus jujuba), jand (Prosopis spicigera), mesquite (Prosopis juliflora), honey mesquite (Prosopis glandulosa), and bhan/poplar (Populus enphratica)

Trees of the inland areas include jand (Prosopis spicigera), karir (Capparis aphylla), vann (Salvadora oleoides), peelu (Salvadora persica), kikar (Acacia nilotica), lana (Suda ruiteesa), lani (Salsola fostida), and ber (Zizyphus jujube). Other plants of the inland areas are harmal (Paganum harmala), khardar (Alhaji camelorum), khabbal (Cynodon dactylona), datura (Datura alba), phog (Calligonum polygnoides), pohli (Argemone maxicana), malla (Zizyphus numularia), and date palm (Phoenix rubicola).

There are no endangered species of either flora or fauna in the project area. Neither any wetlands nor any wildlife is present in and around the project area.

C. Social Environment

Socioeconomic baseline was established using primary and secondary data. Detailed site visits were conducted by Social Experts to appraise the prevailing socioeconomic conditions and to assess the socioeconomic impacts of the proposed project. During the field surveys,

interviews and consultation meetings were held with the local representatives i.e., Numberdars, residents (Males & Females), shopkeepers, land owners, agriculturists, and their laborers, etc., in all Eight villages.

Primary data was collected through a socioeconomic survey with the help of a structured questionnaire. A sample size of 132 respondents was adopted for the social survey. Secondary data was collected from the Pakistan Bureau of Statistics (Census 2017), established literature, and research.

5. Public Consultation and Information Disclosure

Engagement with stakeholders and disclosure is an integral part of the project's environmental and social assessment. The methods used for public consultation with project stakeholders in order to ascertain their stakes regarding project implementation were general/public meetings, rapid participatory appraisal, and on-site meetings.

Different categories of interested parties including project staff, government officials, and local communities were consulted to predict the nature and scale of risks, challenges, and impacts of the project perceived by them.

6. Anticipated Environmental Impacts and Mitigation Measures

The construction activities would cause changes in topography, soil contamination, surface & groundwater pollution, air pollution, noise & vibration, solid waste generation, disturbance to flora and fauna, overburdening of resources, construction camps issues, health & safety issues, emergency situations, traffic disruption, and social issues.

Anticipated impacts during the operational stage will include water pollution, air pollution, soil contamination, ecological disturbance, solid waste generation, occupational health & safety issues, and emergency situations.

The positive impacts of the project include the provision of clean water at stand-post, improvement in public health, hygiene, and sanitation, landscape, economic development, employment generation, and development of deprived villages.

7. Environmental and Social Management and Monitoring Plan

Recommended mitigation measures to control potential adverse impacts are described in the Environmental and Social and Management Monitoring Plan (ESMMP). ESMMP shall become the part of construction contract agreement and shall be strictly enforced during the implementation of the proposed project.

The proponent PIMU-PRMSC will be responsible for compliance with environmental and social safeguard requirements of the proposed project.

The proposed project activities will be monitored and managed by the PIMU-PRMSC. The Environmental and Social Cell (ESC) staffed by qualified environmental and social specialists has already been established under PRSWSSP. The ESC will be the custodian of the ESMP.

ESC will support ensuring the compliance of ESMP. ESC will submit progress reports for the implementation of the ESMP to PEPA as per environmental approval/ NOC conditions for the PRSWSSP.

Grievance Redress Mechanism (GRM)

The overall objective of the GRM is therefore to provide a robust system of procedures and processes that provides for transparent and rapid resolution of concerns and complaints identified at the village level.

The PIMU at the Local Government & Community Development Department (LG&CDD) level will serve as the Secretariat for the Grievance Redressal Committee (GRC Directorate) that will be responsible for providing oversight on the entire GRM process at a strategic level and monitoring complaints management.

The complaints may be lodged through:

- Tracking complainant(s) from subprojects sites (field and community level) to PIMU;
- Dedicated staff to update the database routinely;
- Promote transparency, publicize how complaints are being handled, and periodically evaluate the overall functioning of the mechanism;
- Processes for informing stakeholders about the status of a case; and
- Procedures to retrieve data for reporting purposes, including the periodic reports, from Village and Tehsil, and document them into the monthly progress reports at PIMU.

GR (Village level) will be responsible to receive, log, and resolve complaints at the village level. The Grievance Redress Committee at the village Panchayats will review and identify actions to be taken to address the complaints at its weekly meeting. If not resolved timely then the complaint would be referred to GRC-Tehsil Level (SDU-TO) within 3 days after receiving.

GRC-SDU-TO will try to resolve the complaints in a satisfactory manner anyhow, if not satisfactorily resolved by the village panchayats/councils and Tehsil level, then the grievance will be referred for consideration by GRC at the PIMU/LG&CDD level within one week.

Every effort will be made to address or resolve grievances within the following fixed timelines, which will be an indicator of the performance of the handling system. Acknowledgment of a written submission will be issued to the complainant within three working days.

If the complainant is not satisfied, the complaint will have the option to seek redress through the court of law.

Environmental Budget

The total estimated cost for the implementation of ESMMP is worked out to be about **PKR 31.32 million.**

1 INTRODUCTION

1.0 General

The Government of Punjab has launched a project for service improvement in rural areas of Punjab namely Punjab Rural Sustainable Water Supply and Sanitation Project (PRSWSSP). To implement this project Punjab Rural Municipal Services Company (PRMSC) has been established under Section 42 of Companies Act 2017. PRMSC has hired the services of National Engineering Services Pakistan (Pvt.) Ltd. (NESPAK) for the proposed project titled "Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster: South – III".

The goal of PRSWSSP is to improve sanitation conditions, provide clean drinking water, improve living conditions through solid waste management, behavior change, and capacity building for the sustainability of the project in rural settlements of Punjab.

This Environmental Impact Assessment (EIA) has been prepared for the proposed project as per Punjab Environmental Protection Agency (PEPA). The current study covers various impacts of the design, construction, and operation of water supply, sewerage, and solid waste management facilities. It is to be noted that this EIA remains a live document, subject to modifications as the project design and technical specifications are finalized or modified prior to the implementation stage.

1.1 Project Background

Punjab is the most populous province of Pakistan with 110 million inhabitants out of which 70 million population resides in rural areas[1]. Despite being the largest province with reference to population, the people living in rural areas of Punjab have been deprived of improved water and sanitation facilities for so long.

Poverty and Shared Prosperity Report, 2020[2] reveals that 4 out of 5 people live below the international poverty line in rural areas. Studies conducted in different periods of time have linked improved water and sanitation facilities with the alleviation of poverty and urged governments to provide high-quality water and sanitation facilities in order to uplift the people from the marshes of poverty and devastating socio-economic conditions.

Despite making significant efforts by the people at the helm of the affairs in Pakistan to improve the prevailing situation, 44% population of Punjab still does not have access to improved water and sanitation facilities as per globally established standards. Reports show that 3 in 5 households in Punjab use E-Coli contaminated water and every 25th household in Punjab lacks access to the improved sources of drinking water. Similarly, the situation of sanitation is also immensely deplorable.

[1] https://pwd.punjab.gov.pk/population_profile
[2] https://www.worldbank.org/en/publication/poverty-and-shared-prosperity-2020

Through various studies, it has been proven that poor condition of Water, Sanitation and Hygiene (WASH) not only affects the health of masses, but it also adversely affects the economic growth of the region. Recently, a number of mega initiatives have been launched by the Government, and international organizations in the urban areas of all provinces of Pakistan for the improvement of water and sanitation but the rural areas still remain neglected. Rural settlements of Punjab, which hold 73% of the province's population living in 23,000 revenue villages, are in dire need of investments to improve WASH.

Outcomes of various studies and sector assessments, have identified requirements for improving climate resilience and planned economic growth of 2,000 villages that will be part of the project. Poverty, water contamination, stunting, and sanitation condition of the areas have been taken as basic parameters for the selection of project sites/tehsils.

The Government of Punjab, with the assistance of the World Bank, will finance complete detailed engineering designs through Engineering, Design & Supervision Consultancy Services (EDCS) under the pilot phase project in the revenue villages of Geographical based Cluster named "South – III" of selected districts. The services will assist in; (i) design documentation, including Sub-scheme/Project Document (PC-I), Bill of Quantities, for water supply and sanitation services to achieve economies of scale and desired results, and (ii) resident supervision of infrastructure development.

As per Punjab Environmental Protection Agency (PEPA), review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations 2022, Schedule-II, EIA is required for 'Water Supply, Sewerage System and Treatment (Category F).

1.2 Objective of EIA

The objective of this EIA is the identification of possible environmental and social impacts of the proposed project on both short and long-term bases. Based on the level and nature of these observations, the EIA delineates proper mitigation measures. As a planning tool, the EIA aims to ensure that environmental, socio-economic, and cultural issues throughout the entire project lifecycle are anticipated and considered by the project proponent. It also serves as a framework for establishing project controls to reduce or prevent adverse environmental or socio-economic impacts.

The specific objectives of this EIA are:

- To assess the existing environmental and socioeconomic conditions of the project area;
- To identify potential impacts of the proposed interventions on the environmental, ecological, and social aspects of the project area, to predict and evaluate these impacts and determine their significance;
- To propose appropriate mitigation measures that should be incorporated in the design of the project to avoid or minimize (if cannot eliminate) the potentially adverse impacts;
- To provide institutional, monitoring, reporting, and documentation measures for environmental safeguards compliance; and
- To aid decision-makers in taking informed decisions.

1.3 Scope of EIA

The EIA identifies the potentially significant impacts of the proposed project and suggests the applicable mitigation measures to avoid, minimize or reduce the magnitude of the impacts. It will also indicate the institutional and training requirements to implement mitigation measures during the construction and operation of the proposed project.

The current EIA presents a preliminary roadmap for the environment and social management for the construction and operation of the water supply scheme, sewerage network, sewage treatment plant (STP), septic tank/ soakage pit and stand posts all selected 08 Mouzas of Tehsil Rojhan i.e., Kotla Hassan Shah, Umer Kot, Tariqabad, Saleemabad, Safdarabad, Mutfaraq Mazari, Chak Dilber & Dera Dildar.

1.4 Contractual Requirements/ Obligations of EIA

The impacts and their mitigation measures, summarized in ESMMP, will be part of the Bidding Documents to ensure that contractors implement EIA recommendations at all project stages. The ESMMP requirements will be part of the Contract and the details prescribed in the ESMMP will be mandatory. The ESMMP will be equally applicable to Subcontractors, including nominated Subcontractors (if any).

At the stage of the bidding process, the Contractor will be instructed to carefully consider the requirements for environmental and social management contained in this ESMMP when preparing the bid and pricing the items of Work. The Contractor will need to accept that the prescriptions and clauses detailed in the ESMmP are an integral part of the Contract for relevant items of Work; unless separate items are included in the Bill of Quantities (BoQs). The Contractor will need to accept that separate payment will not be made in respect to compliance with the ESMMP. The Contractor should, therefore, be aware that in case the Contractor or Subcontractors fail to implement the ESMMP recommendations, the Engineer shall take necessary action(s) to ensure that the ESMMP is properly implemented and/or to rectify the damages caused by such negligence.

1.5 Proponent and the Consultant



1.6 Approach & Methodology to Work

1.6.1 Approach

The study has been conducted in accordance Punjab Environmental Protection Agency (PEPA) guidelines were also considered in preparation of this document. The study is based on both primary and secondary data and information. The primary data includes data collected from field i.e., information about existing conditions; environmental sampling and analyses for air, water and noise; environmental sensitive receptors, ecological survey; social survey including demographic characteristics, income dependency & quality of life, occupation, and social amenities etc. The secondary data includes a review of relevant information from literature and previous reports. Discussions were held with stakeholders including government officials, community representatives and a wide range of local communities. The main purpose of this approach was to obtain an impartial impression of the people's perceptions of the project and its environmental and social impacts.

The assessment remains subject to change with respect to the finalization of technical specifications and alignment of the proposed sewer, water supply lines & location of overhead tanks, pumping station, stand post and STP.

1.6.2 Methodology

The following methodology was adopted to develop the EIA of the proposed Project:

A. Orientation

Meetings and discussions were held among the members of the EIA Consulting Team. This activity is aimed at achieving a common ground of understanding various issues of the Study.

B. Data Collection Planning

Subsequent to the concept clarification and understanding obtained in the preceding step, a detailed data acquisition plan was developed for the internal use of the EIA Consulting Team. The plan included; identification of specific data requirements and their sources; determination of time schedules and responsibilities for their collection and the indication of the logistics and other supporting needs for the execution of the data acquisition plan. Field surveys were then conducted based on the data collection plan.

C. Detailed Field Survey

Detailed site visits for the collection of data were conducted from April 03 to April 08, 2023. The data collected from the field include:

- Identification of environmentally sensitive receptors including air-sensitive receivers, noise-sensitive receivers, and water bodies expected to receive pollutant load;
- Sampling and analysis for air, noise wastewater, and groundwater;
- Ecological survey;
- Socioeconomic survey including public consultation;
- Stakeholders' consultations.

D. Sampling & Analysis of Physical Environmental Parameters

M/s Pak Green Services Laboratory (EPA Certified Laboratory) was hired for environmental monitoring. The Laboratory was mobilized on 10 & 11 April, 2023 for collection of water and wastewater samples as well as air and noise monitoring.

E. Review of Secondary Data

Previous environmental and social soundness assessment for tehsil Rojhan and other published and unpublished information was collected in order to gain a complete understanding of existing environmental conditions of the area including:

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

F. Review of Environmental and Social Laws and Institutional Requirements

The project needs to comply with all the applicable national and provincial environmental and social policies, laws, guidelines, acts, and legislations. All these requirements and policies were reviewed.

G. Area of influence (AoI)

The area of influence is the area likely to be affected by the project, including all its ancillary aspects. The AoI includes the areas where positive and adverse impacts may be foreseen due to the execution of the proposed project.

A team of environmental and social/ gender experts, including environmental engineers, sociologists, ecologists, gender specialists & enumerators etc., carried out the environmental and social survey of the AoI to familiarize themselves with the local conditions and the environmental settings. During the survey, information regarding the topography, soil, rock, surface water, groundwater, flora and fauna, forested areas, and social settings along the AoI was collected.

H. Environmental and Social Baseline Survey of the Project

An environmental and social survey was carried out within the AoI to establish the baseline of the project area from April 03 to April 08, 2023. Prior to the start of field activities, comprehensive checklists, proformas, and maps were developed to gather the following information:

(i) Physical Environment

The following information was acquired for the establishment of the physical environment baseline:

- Topography;
- Water resources (including available surface and groundwater resources and natural streams, hydrology, water supply, water contamination etc.);
- Climate data (including temperature, precipitation, humidity, wind speed, direction etc.);
- Water, surface water, ambient air quality and noise level monitoring data;
- Existing water supply and sewerage systems;
- Seismology;
- Land resources (including land use pattern, soil & geology); and
- Environmental Sensitive Receptors.

(ii) Ecological Environment

- Flora (trees, herbs, shrubs, grasses, and overall vegetation including valuable or rare trees and their loss due to implementation of the Project, etc.);
- Fauna/ Wildlife (Mammals, reptiles, amphibians, and avifauna.);
- Agriculture and livestock;
- Reserved forests, Community forests/ Private forests, and wildlife sensitive or notified areas in AoI;
- Migratory birds' corridors; and
- Endangered species (both flora and fauna).

(iii) Socio-Economic Environment

A sample survey was carried out within the AoI in order to develop the socio-economic baseline information of the general settled population. Several socio-economic parameters were covered in the socio-economic baseline survey of the sample population settled along the AoI in the light of primary and secondary data. These aspects include but are not limited to the following:

- Demographic characteristics;
- Literacy status/ education;
- Nature of business/occupation;
- Livelihood/income;
- Living standard of the population;
- Social Infrastructure available;
- Gender issues;
- Housing construction patterns;
- Mode of transport;
- Basic amenities of the project area;
- Health facilities/ Educational facilities.; and
- Other aspects.

I. Stakeholder Consultations

For the current study, stakeholder consultations were carried out through following techniques:

- Formal/ informal meetings;
- Individual interviews;
- Group Discussions; and
- Scoping Sessions

The study team met with the government functionaries, affected persons and local communities in and around the project area. The objective of the consultation was to disseminate information on the project and its expected impact, long-term as well as short-term, among primary and secondary stakeholders and to gather information on relevant issues so that the feedback received could be used to address these issues at an early stage.

J. Impact Assessment and Mitigation Measures

A logical and systematic approach was adopted for impact identification and assessment. The process began during the screening and continued through scoping which identified the key issues and classified them into different categories. The tools were used for impact assessment, through Checklists (Environmental and social screening) for both the construction and operational phase.

Identification of potential environmental and social impacts in terms of their nature, magnitude, extent, location, timing, and duration was carried out. The impacts were correlated to the Project location, design stage, construction as well as operation stage. Based on the impacts

prediction methods and as a result of public/stakeholder consultations, EIA team screened the adverse environmental and social impacts for inclusion in the mitigation measures and environmental and social management plan. Stakeholder consultations (which provided feedback on the impacts from the stakeholder's viewpoint) were used to screen out the insignificant impacts.

EIA team proposed practicable, economically feasible and socially acceptable mitigation measures for the significant adverse environmental and social impacts. These measures were based on exploring the ways to achieve the project objectives by causing the least disturbance to the existing environment by alternative ways, proposing changes in the Project design, through improved monitoring and management practices (storage of construction materials, labor camps, waste disposal, disposal of construction debris, etc. or through monitory compensation).

K. Environmental and Social Management Plan

The data collected from the field was analyzed and the impacts of the proposed project on the physical, biological and socio-economic environment prevalent in the project area were identified and characterized with respect to significance and probability of occurrence at the design, construction, operation, and decommissioning phases. Possible mitigation measures and implementation mechanisms are proposed so that the impacts can be mitigated/controlled and the project implementation remains sustainable.

1.7 Structure of Report

The structure of this report is listed below:

Section 1: Introduction briefly presents the project background, objectives, methodology and need of the study.

Section 2: Legal and Administrative Framework Lists national as well as provincial laws, regulations.

Section 3: Project Description provides an overall description of the project including proposed networks, design considerations and concepts, manpower requirement, waste generation, machinery and material requirements.

Section 4: Baseline Profile gives a description of baseline physical, biological and socio-economic conditions of the project area.

Section 5: Public Consultation and Information Disclosure identify the main stakeholders and their concerns raised during scoping sessions and deal with the measures to mitigate the social impacts.

Section 6: Potential Environmental and Social Impacts and their Mitigations Measures identify, predict, and evaluate the impacts of the project activities during the construction

and operation stages and deal with the measures proposed to mitigate potential environmental impacts of the proposed project.

Section 7: Environmental and Social Management & Monitoring Plan This section outlines the organizational framework, mitigation, and monitoring plans, and training requirements, defines roles and responsibilities and estimates budget requirements for satisfactory implementation.

2 LEGAL AND ADMINISTRATION FRAMEWORK

2.1 General

This section deals with the current environmental policy as well as legal and administrative framework required to develop Environmental Impact Assessment (EIA) for the proposed interventions in selected villages of Tehsil Rojhan. All relevant provisions of environmental policies laid down by the Government of Pakistan and Government of Punjab have been duly discussed and the project proponent will be required to adhere to these regulations throughout the course of the project. The institutional arrangement for compliance to these laws has been described in ESMMP (Section 7).

2.2 Summary of Key National Strategies, Policies, Acts and Legislation

The summary of key national strategies, policies, acts and legislation from environmental perspective are briefly described in **Table 2.1** below:

Table 2. 1: Key National strategies / policies, legislation / Acts, Laws and Regulations and Their Relevance to the Project

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to project
1	Fatal Accidents Act 1855	An act to provide compensation to family's loss occasioned by the death of a person caused by actionable wrong. It is enacted as follows: • Suit for compensation to the family of a person for loss occasioned to it by his death by actionable wrong • Not more than one suit to be brought • Plaintiff shall deliver particulars etc. • Interpretation clause	The provisions of this act would be applicable if any fatal accident occurs during the execution of construction works for the proposed Project.
2	Pakistan Penal Code 1860	It authorizes fines, imprisonment or both for voluntary corruption or fouling of public springs or reservoirs so as to make them less fit for ordinary use.	The provisions of the Penal Code, 1860 are applicable to the project in terms of penalties for effecting human lives and public property. It also addresses the control of noise, air emissions, and effluent disposal.
3	Land Acquisition Act, 1894 (Including Later Amendments)	The primary law for acquisition of land for public purposes in Pakistan is the "Land Acquisition Act, 1894". The Land Acquisition Act, 1894, is a "law for the acquisition of land needed for public purposes and for companies and for determining the amount of compensation to be paid on account of such acquisition". The exercise of the power of acquisition has been limited to public purposes. The principles laid down for the determination of compensation, as clarified by judicial pronouncements made from time to time, reflect the anxiety of the law-giver to compensate those who have been deprived of property, adequately.	State's land will be preferred for the construction of overhead tanks, pumping stations, STP, stand post and soakage pit/ septic tank. However, in some villages state land is not present in near vicinity, so private land will be acquired on voluntary land donation (VLD) bases.
4	Protection of Trees and Brushwood Act, 1949	This Act prohibits cutting or lopping of trees and brushwood without permission of the Forest Department.	This act will be applicable to the proposed project in term of Tree Cutting.

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to project
5	Pakistan Antiquities Act 1975	The protection of cultural resources in Pakistan is ensured by the Antiquities Act of 1975. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc. The act is designed to protect antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area, which may contain articles of archaeological significance. NOC would be requested from DG Archeological Department for construction within 200 feet of cultural heritage sites.	The provisions of this act would also be applicable, if any accidental archaeological discoveries may occur during the excavation works for the construction of proposed Project.
6	National Conservation Strategy 1992	Pakistan National Conservation Strategy (NCS), which was approved by the federal cabinet in March 1992, is the principal policy document on environmental issues in the Country. The NCS outlines the Country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment.	The core areas that are relevant in the context of the proposed project are pollution prevention during construction, conserving, biodiversity and supporting forestry and plantation.
7	Guidelines for Public Consultation, 1997	The Pakistan Environmental Protection Act 1997 requires public participation during the review of an EIA (Section 12(3)). The "Policy and procedures for the filing, review, and approval of environmental assessments" requires proponents to consult with the affected community and relevant NGOs during the preparation of an environmental report. Public involvement is a feature of environmental assessment and can lead to better and more acceptable decision-making. The objectives of public involvement include: • informing the stakeholders about what is proposed;	These guidelines are applicable for the preparation of the EIA.

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to project
		• providing an opportunity for those otherwise unrepresented to present their views and values, therefore allowing more sensitive consideration of mitigation measures and tradeoffs	
8	National Sanitation Policy, 2006	The National Sanitation Policy of Pakistan, 2006, stresses on the safe disposal of excreta away from the dwellings, creation of an open defecation-free environment and, promotion of health and hygienic practices in the country.	This policy is applicable to the project for the efficient management of solid waste or wastewater during construction or operation phase of the project. This project primarily focused on provision of improve sanitation services in Rojhan.
9	Pakistan Labor laws	The labor laws are a comprehensive set of laws in Pakistan dealing with the following aspects: • Contract of Employment; • Termination of Contract; • Working Time and Rest Time; • Working hours; • Paid Leave; • Maternity Leave and Maternity Protection; • Other Leave Entitlements; • Minimum Age and Protection of Young Workers; • Equality; • Pay Issues; • Workers' Representation in the Enterprise; • Trade Union and Employers Association Regulation; and Other Laws.	The labor laws will be relevant as it will deal with employment of labor for the construction of proposed Project. Following are the major labor laws which are applicable to the project: • Bonded Labor System (Abolition) Act, 1992 • Employment of Child Act, 1991 • Minimum Wages Ordinance, 1961 • Industrial Relations Act, 2010
10	Pakistan Approaches to Total Sanitation, 2010	The PATS contains number of branded total sanitation models, having a key role of communities, which include: • Community Led Total Sanitation • School Led Total Sanitation • Component Sharing • Sanitation Marketing • Disaster Response	The applicable models of PATS will be adopted where it is necessary.

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to project
		The above models may be adopted by the provincial and local governments in accordance to what suits best in their local context and in accordance with the reinforcement values of PATS.	
11	Protection Against Harassment of Women at the Workplace Act, 2010	The Protection Against Harassment of Women at the Workplace Act refers to sexual harassment at the workplace.	This Act will be applicable to the project if women are employed for the construction of the proposed Project or women living in near vicinity of the project area.
12	Canal and Drainage Act 1873 and Amendment Act, 2016	This Act prohibits corruption or fouling of water in canals (defined to include channels, tube wells, reservoirs and watercourses), or obstruction of drainage.	This act is applicable to the project for the efficient management of wastewater disposal during the construction or operation phase of the project.
13	Panchayats and Neighborhood's Councils Act, 2019	The Panchayats and Neighborhoods Councils Act, 2019 (PVPNCA 2019) was repealed in February 2021 through an amendment to the PLGA 2019. The result was the Punjab Local Government (Amendment) Ordinance 2021 that established a new tier of local government at the village level called Village Councils, which incorporated the main functions of village panchayats prescribed in the PVPNCA 2019 with regard to water, sanitation, and waste management.	This act is applicable to the proposed project, village councils is informed about the project and will remain in contact during the construction or operation phase of the project.
14	National Climate Change Act, 2021	The National Climate Change Policy provides a framework for addressing the issues that Pakistan faces or will face in future due to the changing climate. In view of Pakistan's high vulnerability to the adverse impacts of climate change, in particular extreme events, adaptation effort is the focus of this policy document. The vulnerabilities of various sectors to climate change have been highlighted and appropriate adaptation measures spelled out. The policy covers measure to address issues in various sectors such as water, agriculture, forestry, coastal areas, biodiversity, and other vulnerable ecosystems. Notwithstanding the fact that Pakistan's contribution to global Greenhouse Gas (GHG) emissions is very small, its role as a responsible member of the global community in combating climate	This policy document is a 'live' document and will be reviewed and updated regularly to address emerging concepts and issues in the ever-evolving science of climate change.

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to project
		change has been highlighted by giving due importance to mitigation efforts in sectors such as energy, forestry, agriculture, and livestock.	

2.3 Key Provincial Strategies / Policies, Legislation / Acts, Laws and Regulations

The provincial policies, strategies, acts and laws relevant for the environmental safeguard of the project activities are given below in **Table 2.2.**

After the 18th amendment to the constitution of Pakistan, many subjects, including environmental protection and pollution prevention, have been devolved to the provincial jurisdiction. Therefore, the apex environmental statute governing the proposed project will be the Punjab Environmental Protection Act 1997 (Amended 2012, 2017 & 2022). However, detailed rules, regulations and guidelines required for the implementation of the policies and enforcement of legislation are still in various stages of formulation and discussion. The following description presents a brief overview of the relevance of various existing provincial policies, legislation and guidelines.

Table 2.2: Key Provincial strategies / policies, legislation / Acts, Laws and Regulations and Their Relevance to the Project

Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
1	Punjab Land Revenue Act, 1967	The Land (Punjab) Revenue Act, 1967 was enacted on 7 December, 1967 and then was amended for the province of Punjab to consolidate and amend the laws related to the land revenue in Punjab. It expedites the consolidation and maintenance of the record of rights, assessment and collection of land revenue, appointment of land officers and all the matters relating and arising in connection with the administration of land revenue.	The provisions of this act would be applicable during the implementation of the proposed project.
2	Punjab Plantation and Maintenance of Trees Act, 1974	The Punjab Plantation and Maintenance of Trees Act, (1974) regulates tree plantations and enforces measures for their protection. The requirements of this act are applicable in terms of planting new trees and their maintenance by the occupier of the proposed Project land who would have the physical possession.	This act would be implemented if any tree cutting activity involved during construction.
3	The Punjab Wildlife (Protection, reservation, Conservation & Management) Act, 1974	This act provides for the protection, preservation, conservation and management of wildlife in the Province of Punjab. This act defines the wildlife sanctuary, game reserves, protected areas, and national parks. It also defines the rules and responsibilities of the relevant authorities and the relevant personnel to protect ecological resources. It also describes the penalties and punishments on offenses against the sections given in the act.	This policy is to avoid any disturbance to ecological system near project area due to construction activities.
4	Punjab Land Acquisition Rules, 1983	This Law provides for the acquisition of land needed for public purposes and for Companies, and determines the amount of compensation to be made on account of such acquisition. The Collector of the District may make a preliminary investigation on any land in any locality that may be needed for any public purpose or for a Company. The Commissioner, for land acquired for a public purpose, or the Provincial Government for land acquired for a Company, when satisfied of the result of the investigation, shall publish a notification in the Official Gazette. Following this, a declaration of intended acquisition shall be published, and shall state the district or other territorial division in which the land is situate, the purpose for which it is needed, its approximate area, and, where a plan shall have been made of the land, the place where such plan may be inspected (Part II). The amount of compensation shall then be settled, and if any dispute arises the Collector may	The provisions of this act would be applicable during the execution of the proposed project.

Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
		refer such dispute to the decision of the Court (Part IV and V). Part VI deals with procedures for the temporary occupation and use of any waste or arable land needed for any public purpose or for a Company. The acquisition of land for companies is provided for in Part VII. Part VIII contains provisions of miscellaneous nature.	
5	The Motor Vehicles Rules, 2000	Subject to the provisions of this Act, and the rules and regulations, no person shall operate a motor vehicle from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the National Environmental Quality Standards, or where applicable the standards customary under clause (g) of sub-section (I) of section 6.	During Construction all these rules will be followed to avoid emission of air pollutant.
6	Punjab Forest Act (Amended), 2010	The act empowers the provincial forest departments to declare any forest area as reserved or protected. It empowers the provincial forest departments to prohibit the clearing of forest for cultivation, grazing, hunting, removing forest produce, quarrying and felling, lopping and topping of trees, branches in reserved and protected forests. The proposed project is semi- urban in nature and no protected forest is situated in and around the Project area.	During construction there will be no clearing of any forest for cultivation in this site. Incase If any site observed permission will be seek prior construction activities.
7	Punjab Drinking Water Policy 2011	The overall objective of Punjab's Water Policy is to provide clear policy directions to the Government of Punjab on the sustainable management and development of water from all sources of water (surface water, groundwater and rainwater), for all sub-sectors of water use (domestic, stock water, agriculture, industry).	This policy is applicable and drinking water supply will be designed according to PDWP policy guidelines.
8	Punjab Environmental Tribunal Rules, 2012	According to Section-31 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Tribunal shall make every effort to dispose of a complaint or an appeal or other proceedings regarding environmental problems associated with the construction and development of any project within sixty days from the date of filing of the complaint, appeal or other proceedings but any decision of the Tribunal shall not be rendered invalid by reason of any delay in the disposal of complaint, appeal or other proceedings.	This is applicable to dispose of a complaint or an appeal or other proceedings regarding environmental problems associated with the construction and development of any project within sixty days from the date of filing of the complaint, appeal or other proceedings.
9	Punjab Antiquities Amendment Act, 2012	The Punjab Antiquities Amendment Act, 2012 is adopted from the Pakistan Antiquities Act of 1975 with a few minor changes. The law will be applicable to	The provisions of this act would be applicable, if any accidental

Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
		the proposed project mainly due to its provision that „any construction activity within 61 meter or 200 ft. of protected antiquities, are prohibited". The provisions of this act would also be applicable, if any accidental archaeological discoveries may occur during the excavation works for the construction of proposed Project.	archaeological discoveries may occur during the excavation works for the construction of proposed Project.
10	Punjab Environmental Quality Standards (PEQS), 2016	In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the Punjab Environmental Quality Standards (PEQS), 2016. They endow information on the permissible limits for discharges of municipal and industrial effluent parameters and industrial gaseous emissions in order to regulate environmental pollution. Results of environmental monitoring (ambient air, water and noise) conceded out at different locations in study area are compared with PEQS values and are conversed in later chapter of the report.	These standards are applicable in compliance with all the Punjab Environmental Quality standards of different Environmental Parameters during Construction and operational phase.
11	The Punjab Flood Plain Regulation Act, 2016	This act regulates construction in the flood plains in the Punjab. According to this act, no construction can be carried out in flood plains without prior approval in writing from canal officer.	Construction work will be carried out in underground for installing of water supply lines and sewerage lines.
12	Punjab Restriction on Employment of Children Act, 2016	According to the sub-section 11(a) of this act, an occupier who employs or permits a child (person under the age of 15 years) to work in an establishment shall be liable to punishment with imprisonment for a term which may extend to six months, but which shall not be less than seven days, and a mandatory fine between 10,000 and 50,000 rupees. This act will trigger if contract higher skilled and unskilled labor under age 15.	The relevance of this act to the project will be to prohibit child employment for construction of the proposed project
13	Punjab Protection of Women against Violence Act, 2016	This act counters gender-based discrimination, violence against women, and economic and social empowerment of women. This act will entail if gender-based violence observed in the project area during construction phase.	This Act will be applicable to the project if women are employed for the construction of the proposed Project or women living in near vicinity of the project area.
14	Punjab Tehsil / Town municipal Administration (Works)	According to Chapter VIII-A Occupational Safety &Hazard 50 A Workplace Safety: - 1. the Contractor shall ensure that:	All the mentioned clauses will be applicable on construction labor/workers/ and sewer

Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
	rules, 2003 (amendments, 2016)	a) any hazard at the place of work, during the execution of work, shall not cause any loss of life. b) The work shall not loss to the property of any other person; c) Before commencing the work, all the safety equipment is in place and safety measures have been taken as necessarily required at the place of work: d) All necessary safety requirements are strictly adhered to at the place of work; and e) Protective safety equipment for workers, as specified by the local government engineer, are functional and in working order. 50 B the Local Government Engineer shall ensure that: 1. All the safety measures, during the operation and maintenance of existing infrastructure, according to the nature of work, have been adopted to secure life and property; and 2. All precautionary measures and use of sewer safety 3. equipment specified in Schedule have been taken in respect of; 4. Sanitation functions; or Cleanliness of sewer, manholes and descending sanitary workers in the sewer manholes.	men/sanitary workers during execution of subprojects.
15	Punjab Environmental Protection Act 1997 (Amended 2022)	Post the adoption of the 18th Constitutional Amendment in 2011, the subject of environment was devolved and the provinces have been empowered for environmental protection and conservation. The Punjab Environmental Protection Act, 1997 (as Amended up to 2022) is comprehensive legislation and provides the legislative framework for 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".	All projects to be implemented in Punjab must comply with PEQS during all the phases i.e., construction and operation. No Objection Certificate (NOC) shall be required from Environmental Protection Department (EPD) before commencement of construction.

Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
16	Punjab Policy on Controlling Smog, 2017	The Punjab Environmental Protection Department issued this policy on controlling smog in 2017 It imposed a complete ban on open burning of rice stubble, solid waste and other hazardous materials. It focuses the reasons behind the formation of dense smog in the Punjab, especially in Lahore and its environs, on the onset of winters each year and provide a short and medium to long term plan, including measure for protection of school going children; minimizing road accidents and creating mass awareness on precautionary measures for citizens at large.	During construction and operational phases all PEQS will be followed in accordance with to compliance and to minimize pollution load to control smog.
17	Punjab Labor Policy, 2018	Through this Labor Policy, the Government resolves to demonstrate its commitment to work for the protection of labor and ensuring its dignity through coordinated efforts and policy integration. The Punjab Labor Policy, 2018 also intends to guide and support the Government and the stakeholders in developing strategies, plans and programs for the protection and promotion of the rights and benefits of working community without jeopardizing the genuine concerns of the employers.	The labor policy will be relevant as it will deal with the protection of labor.
18	Punjab Growth Strategy 2018	The document endorses Punjab's health sector vision and strategy, which emphasizes improvement of water, sanitation and hygiene services to prevent communicable diseases.	This strategy will be adopted in design of proposed project.
19	Punjab Occupational Safety and Health Act, 2019	This law was enacted to ensure occupational safety and health of the persons at workplace. It aims at protection of workers against risks arising out of the occupational hazards and to promote safe and healthy working environment catering to the physiological and psychological needs of the employees at workplace.	This act will be applicable to the proposed project in term of the health and safety during the construction and operational phases of the project.
20	Punjab Water Act 2019	An Act to comprehensively manage and regulate water resources in the Punjab in the interest of conservation and sustainability. It is expedient to provide for comprehensive management of all water resources in the Punjab and to regulate their use in the interest of conservation and sustainability and matters connected with and ancillary thereto.	This act will be applicable to the proposed project. The drinking water supply will be designed in light of PWA, 2019.
21	Punjab Local Government Act 2022	It is expedient to reconstitute the local governments and consolidate laws relating to powers and functions of local governments for establishing an effective elected local government system for meaningful devolution of	All project activities to be implemented must comply with Punjab Local

Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
		political, administrative and financial responsibility and authority to the directly elected representatives of the local governments as envisaged under Article 140A of the Constitution to promote good governance, effective delivery of services and transparent decision making through institutionalized participation of the people at local level; and to deal with ancillary matters.	Government Act during all the phases i.e., construction and operation.

2.4 Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx

This guidance note provides guidance on identifying, assessing and managing the risks of adverse social and environmental impacts that are associated with the temporary influx of labor resulting from Bank supported projects. The guidance note contains guiding principles and recommendations to be considered as part of the design and implementation of projects with civil works that require labor from outside the project's area of influence.

2.5 International Protocol/Conventions

As Pakistan is a member of a number of international organizations such as United Nations Organization (UNO), Organization of the Islamic Conference (OIC), South Asian Association for Regional Cooperation (SAARC), Economic Cooperation Organization (ECO) etc., so it has to follow the international protocols and obligations related to the environment. The major protocols, ratification dates by Pakistan and obligations related to the proposed project are provided in the **Table 2.3** below.

Table 2.3: International Agreements/Conventions Relevant to the Project

Sr. No	Agreement/ Convention	Ratification	Description/Relevance
1.	UNESCO Convention on the Protection of the World's Cultural and Natural Heritage, 1972 Web Link: http://whc.unesco.org/en/%20convention%20text/	Pakistan ratified this convention on 23 July 1976.	Convention concerning the Protection of the World Cultural and Natural Heritage - requires parties to adopt a general policy on the protection of the natural and cultural heritage, to set up services for such protection, to develop scientific and technical studies, to take appropriate legal, technical, scientific and administrative measures and to foster training and education for such protection. The proposed project design and ESS team paid due attention to archaeological sites and local norms. Both of these factors will also be considered during project implementation.
2.	Convention on Conservation of Migratory Species of Wild Animals, 1979 https://www.cms.int/	Pakistan signed this convention in 1981 and ratified it in December 1987.	Convention on the Conservation of Migratory Species deals with the conservation and protection of the migratory species. Species covered in the Convention should be given special attention during EA and monitoring and any impacts identified should be mitigated to acceptable levels.
3.	The Rio Declaration, 1992	Pakistan signed the treaty on 13Jun 1992 and ratified on 1 June 1994	The Rio Declaration comprises 27 principles which address important issues such as; sustainable development to integrate environmental

Sr. No	Agreement/ Convention	Ratification	Description/Relevance
	Web Link: http://www.unesco.org/education/pdf/RIO_E.PDF		protection into the development process; common but differentiated responsibilities to conserve, protect and restore the earth's ecosystems; public participation and information access at the national level, reduce and eliminate unsustainable patterns of production and consumption.
4.	Convention on Biological Diversity, 1994 Web Link: https://www.cbd.int/	Pakistan signed this treaty in 1992 and it was ratified by cabinet in 1994.	The Convention on the Biological Diversity (CBD) has three main goals: Conservation of biological diversity (or biodiversity); sustainable use of its components; and fair and equitable sharing of benefits arising from genetic resources.

2.6 Institution Responsible for Planning, Policies and Regulations

The institutional setting in Punjab has traditionally comprised various agencies at federal, provincial and LG levels with separate land areas, separate legal and administrative frameworks, and engaging in little institutional coordination.

2.6.1 Environmental Protection Agency, Punjab

Implementation of Punjab Environmental Protection Act 1997 (Amended 2012, 2017 & 2022) is the mandate of the Punjab-EPD. Punjab-EPD is headed by a Director General, and sections are headed by Directors, i.e., Director Technical, Director Administration and Finance, and Director Laboratory. Punjab-EPD has established District Environment Offices at district level.

As the proposed Project falls in Tehsil Rojhan of District Rajanpur Punjab, therefore, Punjab-EPD will be responsible for reviewing the report, issuing environmental approval and overall monitoring of the proposed project activities.

3 PROJECT DESCRIPTION

The proposed subproject encompasses eight (08) Mouzas/villages of Tehsil Rojhan in District Rajanpur namely Kotla Hassan Shah, Umer Kot, Tariqabad, Saleemabad, Safdarabad, Mutfaraq Mazari, Chak Dilber & Dera Dildar.

3.1 Need and Purpose of Project

The villages in the project area are facing grave issues related to water supply and sewerage. The underlying issues related to water supply and sewerage in the all Eight (08) villages are summarized below:

Water Supply Issues:

- Groundwater is brackish and not consumable;
- Brackish water is being used for domestic purposes;
- No water distribution system in the villages;
- Drinking water is being purchased through private RO plants or through donated RO plants; and
- People in most of the villages are facing health issues like hepatitis, kidney stones and joint pains.

Sewerage Issues:

- Sewerage system does not exist in Revenue Villages of Rajanpur except in some parts of Umer Kot which is not in working condition;
- Existing open drains are damaged and collect sewage only from some houses;
- No proper Disposal Point in all the villages;
- Sewage collected in soakage pits and open plots seeps into ground and contaminates groundwater; and
- Raw sewage ponds are a breeding ground for diseases.

3.2 Project Location

There are 08 selected Mouzas/ villages of Tehsil Rojhan, located approximately 12 to 40 km away from Rojhan city towards Rajanpur city. Indus Highway N-55 is the main access road from Rojhan city to these selected villages. The location map of all (08) villages is shown in **Figure 3.1**.

3.3 Objective of Project

The project development objective is to provide equitable and sustainable access to safely managed water and sanitation and reduce child stunting.

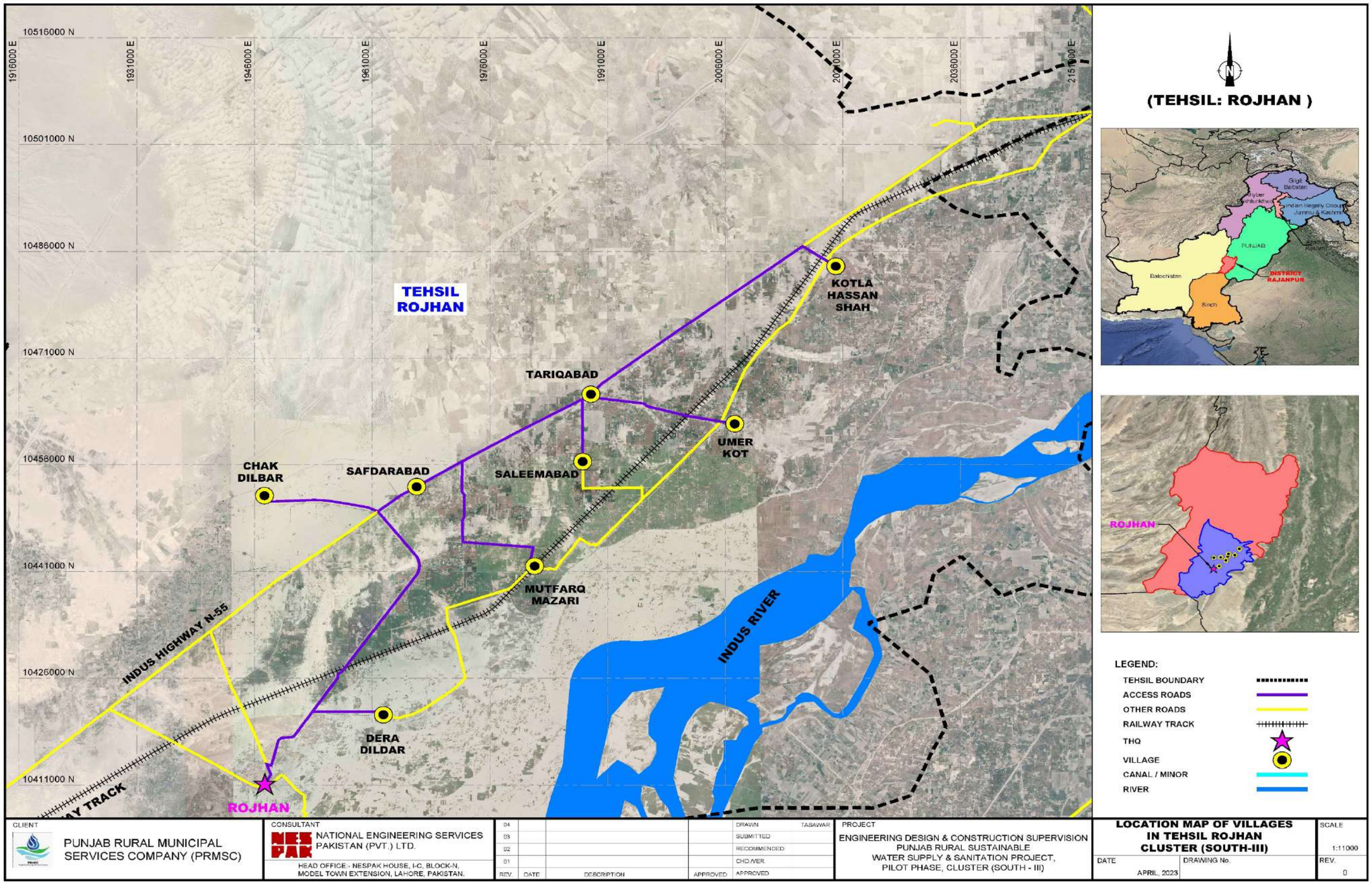


Figure 3.1 : Location map of all Eight (08) villages

3.4 Project Description

3.4.1.1 Existing System

A. Existing Water Supply System

There is no existing water supply system in all selected Eight (08) Mouzas/ villages. The ground water is brackish which is available at the depth of approximately 20ft. Shallow handpumps of 30-40 ft bore depths are installed which are used to pump groundwater for domestic purposes such as bathing and washing dishes. In Kotla Hassan Shah hand pumps are installed along Umer Kot distributary which is being used by locals for drinking water. In Umer Kot water filtration plant is also installed on south-eastern side which is also being used for drinking purposes. In Tariqabad, Chak Dilber & Safdarabad, people fetch water from water filtration Plants installed at the bank of Qadra Canal at Bangla Hidayat for drinking purpose. In Saleemabad & Mutfarq Mazari hand pumps are installed along Saleemabad distributary which is being used by locals to access drinking water.

B. Existing Sewerage System

There is no existing sewerage pipe network or disposal station in selected eight (08) Mouzas/ villages except Umer Kot. In Umer Kot, sewerage system is under construction and it is not operational yet. This sewerage system covers the main streets and does not cover the whole settlement. The diameter of sewers varies from 12 to 24 inches and it ultimately discharges into disposal station. The disposal station is under construction and located on south-eastern side of the village. Most of the household has built a soakage pit (typically 10-15 feet deep) inside their house boundary and all sewage generated is being discharged into it. The soakage pit is cleaned/drained once completely filled.

3.4.1.2 Proposed System

A. Criteria for selection of facilities

As per meeting held on 26.01.2023 at PRMSC Head Office with the representatives of World Bank along with the client and subsequent minutes of meeting issued vide letter No. PRMSC/PRWSWSSP/EDCS/South-III/493 dated 27.01.2023, it has been instructed by the Client to provide interventions in major settlements of revenue villages based on the number of households (2023). The criteria for selection of interventions mentioned in below **Table 3.1** & Minutes of meeting attached as **Annex-I.**

Table 3.1: Criteria for selection of facilities

No. of Households	Intervention for Water Supply System	Intervention for Sewerage System
HH<40	Behavior Change/Communication Campaign only	Behavior Change/Communication Campaign only
40<HH<150	Public Standposts with Chlorination (Non-Piped System)	Septic Tanks and Soakage Pits (Non-Piped System)

No. of Households	Intervention for Water Supply System	Intervention for Sewerage System
HH>150	Piped Water Supply System with Chlorination	Piped Sewage Collection System with Treatment Plant

Based on criteria referred above in **Table 3.1,** the number of households in three (02) villages are greater than 150, therefore, piped network (water supply and sewerage system) along with sewerage treatment plant (STP) has been proposed. In remaining seven (06) villages the number of households are between 40 to 150, therefore, community stand post for clean drinking water has been proposed and septic tanks & soakage pits will be provided for disposal of sewage.

B. Design Principal of Sewerage system

Pipe Network

Sewer line will be laid in the center of the street and house connection chambers will be provided in middle of two houses on both sides of the street to collect sewage into sewer line. Out of Eight (08) Mouzas/ villages pipe network will be given in Two Mouzas/ villages Umer Kot & Dera Dildar. Detail is given in below **Table 3.2,** Typical figure of proposed house connection with sewer line is shown in below **Figure 3.2.**& Schematic of Proposed Sewerage System (For Piped System) is shown below in **Figure 3.3.**

Table 3.2: Summary of Proposed Sewerage System in Revenue villages of Rojhan (With Pipe Network)

Sr. No.	Village Name	Total Served Population (2050)	Sewage Design Flow	Length of Sewerage Network	Final Disposal Point
		(Persons)	(cusecs)	(ft)	
1	Umer Kot (Main Settlement)	13,396	1.80	12” - 51,431 15” – 2000 18” – 2000	Nearby Water Course
2	Umer Kot (Settlement-1)	1,872	0.25	12” - 6,692	Nearby Water Course
3	Dera Dildar	1,597	0.26	12” - 6,397	Nearby Water Course

Septic Tanks

In case of septic tank and soakage pits, septic tank will be connected to two (02) households. Last chamber of septic tank will also have filter media in it and outlet will be connected to a soakage pit. Effluent from soakage pit will be directly discharged into the ground. Septic tank & soakage pits will be given in 06 selected Mouzas/ villages. Details are given in below **Table**

3.3 & Schematic of Proposed Septic Tank with Soakage Pit (For Un-Piped System) is given below in **Figure 3.4.**

Table 3.3: Summary of Proposed Sewerage System in Revenue villages of Rojhan (Without Pipe Network)

Sr. No.	Revenue Village	Settlement Name	Population 2023	No. of Households	No. of Septic Tanks	No. of Soakage Pits
1	Umer Kot	Settlement 2	789	120	72	72
2	Dera Dildar	Basti Haji Shahnawaz	694	105	64	64
		Basti Naseebabad	480	73	43	43
3	Kotla Hassan Shah	Basti Jamal Hussain Shah	590	89	54	54
		Basti Gareebabad	490	74	44	44
		Basti Malik Sabir	463	70	42	42
		Basti Malik Ijaz Hussain	262	40	24	24
4	Safdarabad	Basti Ghulam Muhammad	693	105	62	62
		Basti Haji Umeed Ali Lanjwani	555	84	50	50
		Basti Ghulam Nabi & Basti Malik Imam Baksh	426	64	38	38
		Basti Mehar Baksh Bakhtlani	321	49	29	29
5	Saleemabad	Basti Norang Ali Shah & Basti Qari Abdur Razzaq	620	94	56	56
		Basti Sher Kaleem Chachar	473	72	43	43
		Basti Virk	299	45	28	28
6	Tariqabad	Bangla Hidayat	776	118	71	71
		Basti Jhulan	370	56	34	34

Sr. No.	Revenue Village	Settlement Name	Population 2023	No. of Households	No. of Septic Tanks	No. of Soakage Pits
7	Mutfarq Mazari/Chak Mazari	Basti Elahi Baksh	355	54	32	32
8	Chak Dilber	Basti Ghareebabad	2,395	363	217	217

*__Note:__ *Each septic tank and soakage pit will be connected with two houses. However, an additional quantity of 20% has been taken.*

C. Design Principal of Water Supply System

According to the criteria of intervention, piped network will be provided in 2 revenue villages. For these villages water would be extracted through tubewells from the source that is recommended by Ground Water Study. These tubewells will fill the tank and water will be supplied through overhead tanks. Main loop of the water supply system will be designed by considering overhead Tanks as source i.e., Fill and Draw Method.

For minor settlements, in revenue villages where pipe network is provided, a pipeline would be extended from the main water distribution network of principal settlement. Drinking water storage tanks (1,000 or 2,000 Gallons) would be placed in these minor settlements and the distribution pipe from principal settlement would fill these tanks. Taps would be attached to these tanks; hence residents of minor settlements would be able to collect drinking water from these tanks. Two types of standpost will be provided in the settlements of revenue village:

- **Type I: Tubewells/Ejector Pumps**

  This standpost would consist of 1000- or 2000-gallons capacity storage tanks placed at appropriate locations within a settlement. This tank will be filled through either ejector pumps or tubewells.

- **Type II: Ejector Pumps with treatment (RO plant)**

  RO plants have been recommended in ground water study report in settlements where no sustainable source is present in and around the settlement. In this type, ejector pump will draw ground water and this ground water will be treated through RO to provide drinking water to the residents.

The type of system in settlements of each village is given in below **Table 3.4.**

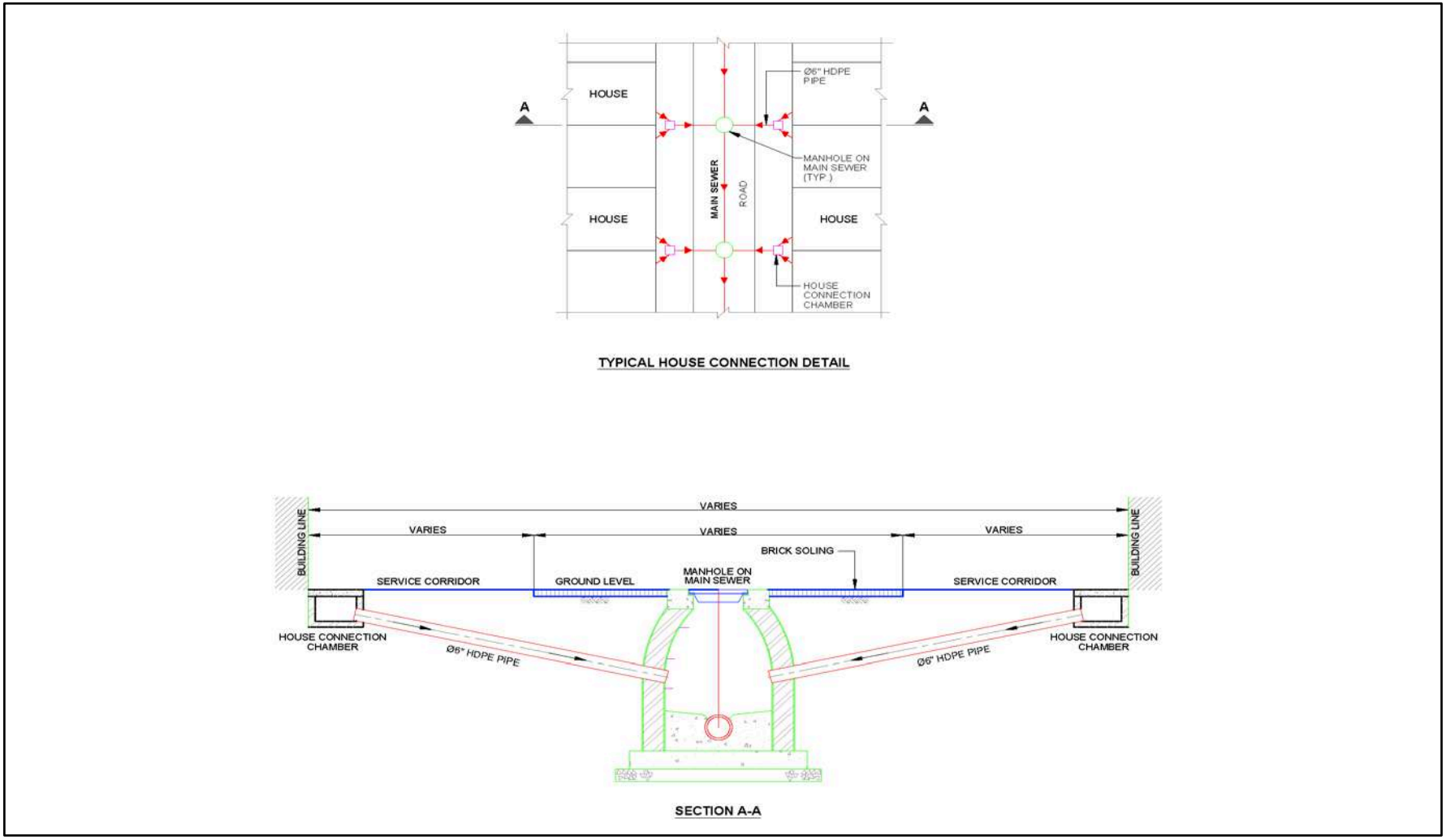


Figure 3.2: Typical Detail of Proposed House Connections with Sewer Line

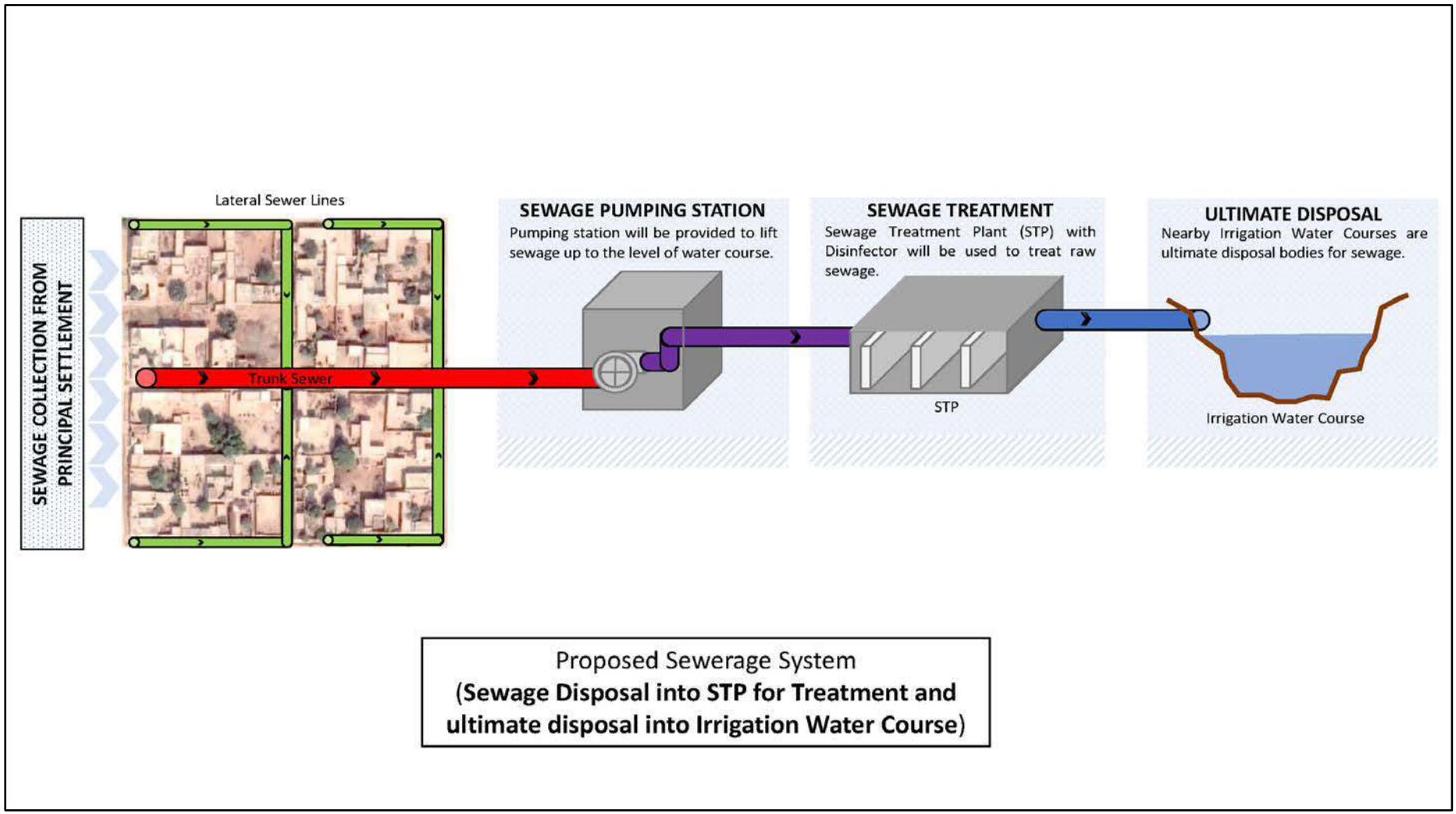


Figure 3.3: Schematic of Proposed Sewerage System (For Piped System)

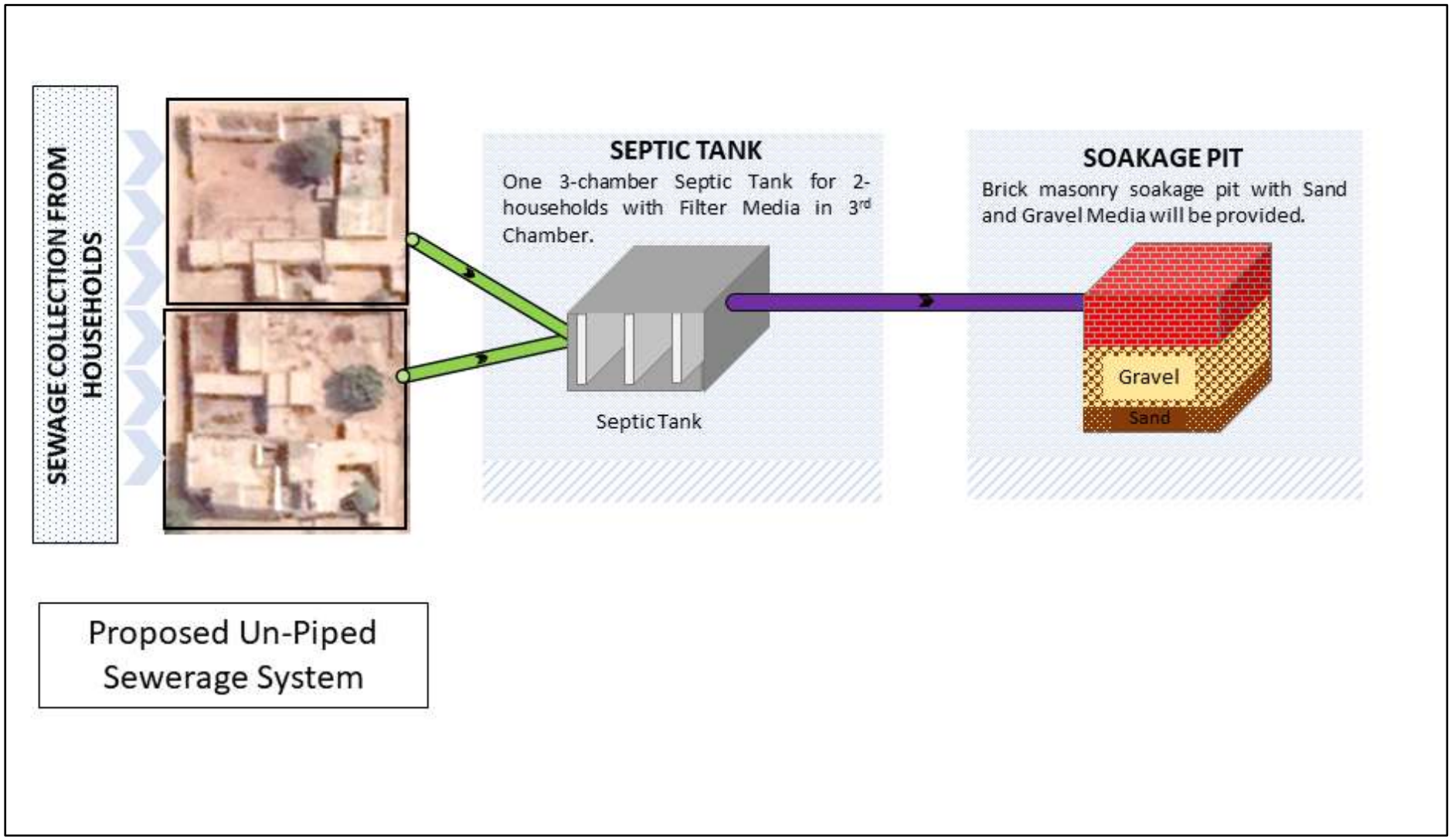


Figure 3.4: Schematic of Proposed Septic Tank with Soakage Pit (For Un-Piped System)

Table 3.4: Village Wise Summary of Proposed System

Sr. No.	Revenue Villages	Name of Selected Settlements	Type of Standpost	Capacity & Nos	
				No.	Capacity
1	Kotla Hassan Shah	Basti Jamal Hussain Shah	Type-I: Stand Post	1	2,000 Gallons
2		Basti Gareebabad	Type-I: Stand Post	1	2,000 Gallons
3		Basti Malik Ijaz Hussain	Type-I: Stand Post	1	1,000 Gallons
4		Basti Malik Sabir	Type-II: RO Plant	1	1,000 L/hr
5	Umer Kot	Settlement-2	Type-I: Stand Post	1	2,000 Gallons
6	Tariqabad	Bangla Hidayat	Type-I: Stand Post	1	2,000 Gallons
7		Basti Jhulan	Type-I: Stand Post	1	1,000 Gallons
8	Saleemabad	Basti Sher Kaleem Chachar	Type-I: Stand Post	1	2,000 Gallons
9		Basti Norang Ali Shah & Basti Qari Abdur Razzaq	Type-I: Stand Post	1	2,000 Gallons
10		Basti Virk	Type-I: Stand Post	1	1,000 Gallons
11	Safdarabad	Basti Ghulam Muhammad	Type-I: Stand Post	1	2,000 Gallons
12		Basti Mehar Baksh Bakhtlani	Type-I: Stand Post	1	1,000 Gallons
13		Basti Ghulam Nabi & Basti Malik Imam Baksh	Type-I: Stand Post	1	2,000 Gallons
14		Basti Haji Umeed Ali Lanjwani	Type-I: Stand Post	1	2,000 Gallons
15	Mutfarq Mazari (Chak Mazari)	Basti Elahi Baksh	Type-II: RO Plant	1	1,000 L/hr
16	Chak Dilber	Basti Ghareebabad	Type-II: RO Plant	2	2,000 L/hr
17	Dera Dildar	Basti Naseebabad	Stand Post	1	2,000 Gallons

Sr. No.	Revenue Villages	Name of Selected Settlements	Type of Standpost	Capacity & Nos	
				No.	Capacity
18		Basti Haji Shahnawaz	Stand Post	1	2,000 Gallons

D. Proposed Solid Waste Management System

One waste enclosure is proposed for each village. The internal dimensions of the waste enclosure are kept as 16'-0''x12'-0''. The waste will be temporarily stored at the community-based waste collection point which is also referred as waste enclosure. Galvanized sheet is proposed as roof of waste enclosure to protect solid waste from rain water and subsequent leachate production. The Client will procure contractor for collection and disposal of solid waste under separate contract.

3.5 Project Cost

The estimated total cost for construction of proposed project is **1727.15** million PKR. This cost is tentative and will be finalized with the detailed technical design of the proposed project.

3.6 Land Acquisition

The water supply and sewerage network will not involve any impacts on land. However, land will be required for the construction of overhead tank and sewerage treatment plant in (Umer Kot & Dera Dildar), and for stand posts in remaining six villages. Government land will be preferred for this purpose. If government land is not available than land will be acquired through voluntarily land donation (VLD). Locals are willing to donate their land voluntarily.

3.7 Project Administrative Jurisdiction

The proposed project falls under the jurisdiction of Deputy Commissioners of Rajanpur, Punjab province.

3.8 Project Implementation Schedule

The project is scheduled to be completed in 10 months.

3.9 Construction Activities and Required Machinery

Construction activities involve following:

- Earth work
- Structure/ Concrete works
- Pipe laying

Table 3.5 presents the list of expected machinery required for construction. The number of these machines will be finalized with the detailed design of the proposed road:

Table 3.5: List of expected Machinery/Equipment

1	Mobile Crane	15	Jack Hammer
2	Wood Shuttering	16	Plate Compactor
3	Formwork	17	Concrete Mixer Machine
4	Steel Cage Shuttering Unit	18	Motor graders
5	Dumpers	19	Pneumatic Tyred Roller (PTR)
6	Mini/ Hand Roller	20	Tandem Roller
7	Road/Power Roller	21	Generators
8	Light Weight Compactor	22	Welding Plant
9	Ramming Machine	23	Transit Mixer
10	Water Sprinkler and Water Tanker	24	Vibrators
11	Excavator	25	Scaffolding
12	Tractor with Front Blade and Trolley	26	Tower Crane
13	Loader	27	Light Transport
14	Road Cutter	28	Barricades

3.10 Construction Camps

Camp sites will be selected based on following considerations:

- Number of workforces deployed
- Type and quantity of machinery mobilized
- Availability of adequate area for establishing camp sites including parking areas for machinery, stores and workshops,
- Access to communication and local markets
- Appropriate distance from sensitive areas including settlements and religious and/or cultural facilities

Final locations will be selected by the contractor with the assistance of Supervision Consultant. Care will be taken to safeguard the existing environment of the area and location shall be selected away from settlements. The contractors may acquire land on lease from private landowners.

3.11 Construction Materials

The materials used in construction of water supply, sewerage, overhead tanks, stand post & socage pits/ septic tanks would include coarse aggregates (crush), bricks, fine aggregates (sand), soil, water, pipes (RCC), cement, reinforcement etc.

3.12 Workforce Requirement

Manpower demand estimation is an essential component to facilitate deployment of manpower.

Workforce during Construction Phase

Total man power required on site for proposed Project will be approximately 110 workers per day, depending on the type of construction. They will be inside of the area of possession, under the supervision of a Contractor who will be awarded the contract.

Workforce during Operation Phase

Total man power required during operation phase for proposed Project will be approximately 49 workers comprising skilled and unskilled staff.

3.13 Solid Waste Generation

Due to construction activities waste will be generated at construction and contractors camp site. The construction waste will include wastewater, oil spillage from machinery, domestic waste and waste construction materials. Solid waste generated during construction and camp sites will be safely disposed of in demarcated waste disposal sites.

Construction Phase

The solid waste generation is estimated to be 30.8[3]kg/day for 110 construction workers during construction phase of the proposed Project.

Operation Phase

The solid waste generation is estimated to be 13.72[4]kg/day for 49 staff members during operation phase of the proposed project at full development.

3.14 Water requirement

Construction Phase

The water consumption is estimated to be 550 gallons/day for 110 construction workers during construction phase of the proposed Project.

Operation Phase

The water consumption is estimated to be 245 gallons/day for 49 workers during operation phase of the proposed project.

3.15 Power Requirement During Construction Phase

[3] 0.28kg/capita/day)
[4] 0.28kg/capita/day)

The main source of electricity/electric power during construction phase will be diesel generators for construction camps and construction machinery.

3.16 Wastewater Generation during Construction Phase

The wastewater generation is estimated to be 440[5] gallons/day for 110 construction workers during construction phase of the proposed project. Temporary toilets with cesspit will be adequately installed and treated periodically, and after the completion of work, the ground will be resto

[5] Design Criteria of Public Health Engineering for Water Supply, Sewerage and Storm Water Drain (Domestic sewage generation = 80% of water consumed/day)

4 Baseline Profile

4.1 General

This chapter presents the current environment around the proposed development which has been considered with respect to physical, ecological and socio-economic resources. An environmental baseline study is intended to establish a database against which potential project impacts can be predicted and managed later. The EIA of the proposed project covers a comprehensive description of the project area, including the resources which are expected to be affected by the project, as well as, those which are not expected to be directly affected by the construction and operation of the project. The prevailing environmental conditions around the proposed project have been considered with respect to physical, biological and socio-economic aspects.

EIA team conducted the detailed surveys of the project area for baseline data collection from April 3 to April 7, 2023. The prime objective of the field visits was to collect the baseline data on physical, eco-biological and environmental & social aspects along with identification, assessment and categorization of the significant environmental and social impacts of the proposed Project. The secondary data was collected from published sources/reports and relevant departments, which were also verified through visual observations during reconnaissance and detailed surveys.

4.2 Purpose of the Baseline Study

An environmental baseline study is intended to identify and establish all the physical, biological and social environmental conditions, prevailing earlier the execution of the project, in order to use this information as a reference datum to associate future changes and judge them if the conditions have changed for better or worse. As such, it must include all resources, which can reasonably be affected by the project. The baseline description is intended to accomplish the following objectives:

- To deliver proponent of the project with adequate knowledge about socio-economic set-up, physical environment aspects, social aspects, ecological features, built-up structures and infrastructure of the project area; and
- To allow the planners to assess the potential efficacy of the actions to alleviate the adverse impacts and improve benefits.

4.3 Delineation of Study Area/ Area of Influence (AoI)

As per the environmental screening study conducted earlier, the project falls in “Category E2” which means that the impacts of the project activities are limited and within the boundary of project area. Therefore, the whole village has been considered Area of Influence (AoI). **Figure 4.1**, **Figure 4.2, Figure 4.3, Figure 4.4, Figure 4.5, and Figure 4.6,** represents the AoI of the Kotla Hassan Shah, Umer Kot, Tariqabad, (Saleemabad, Safdarabad, Mutfarq Mazari), Chak Dilber and Dera Dildar respectively.

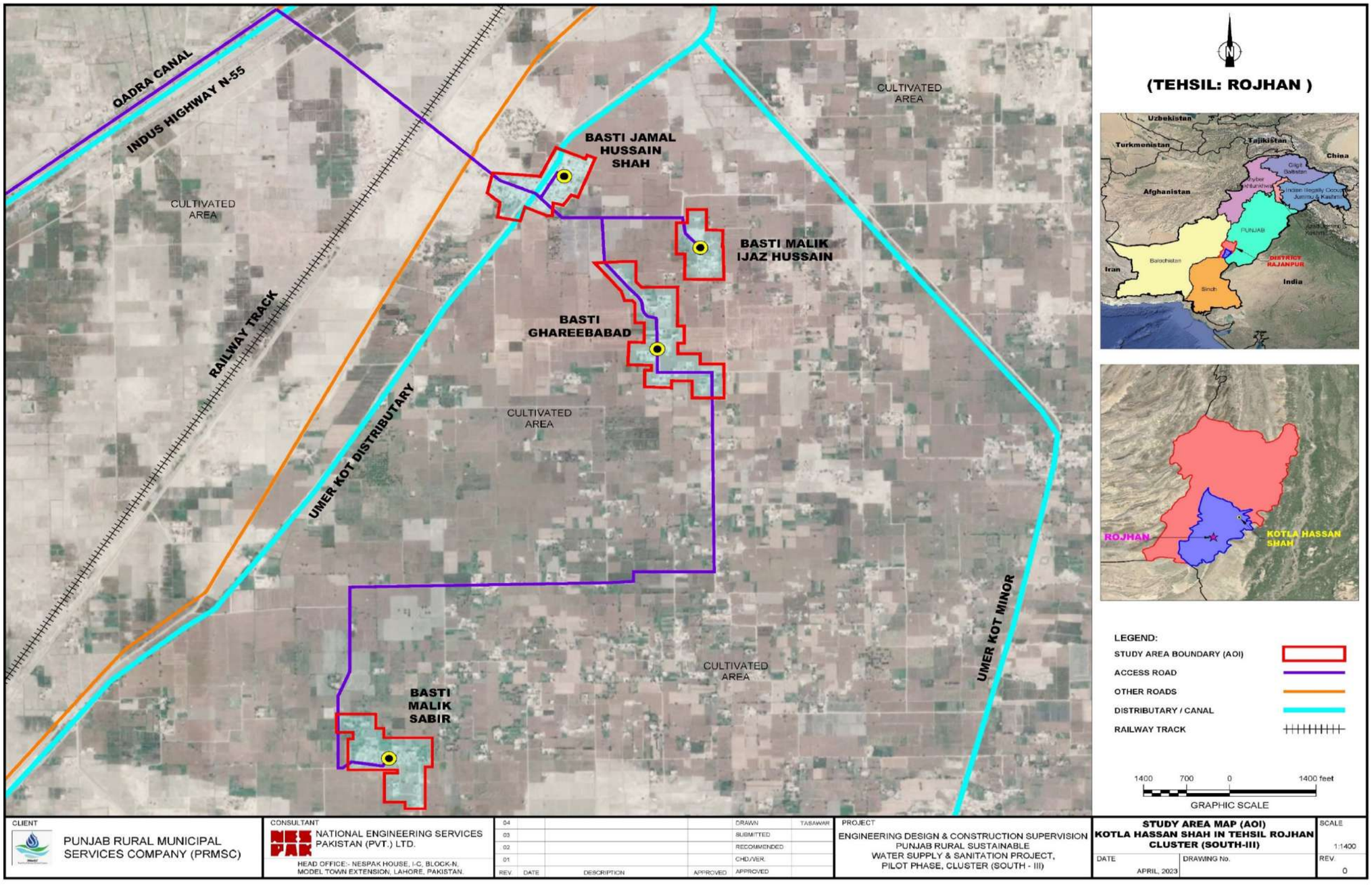


Figure 4.1: Study Area Map / AoI of Kotla Hassan Shah

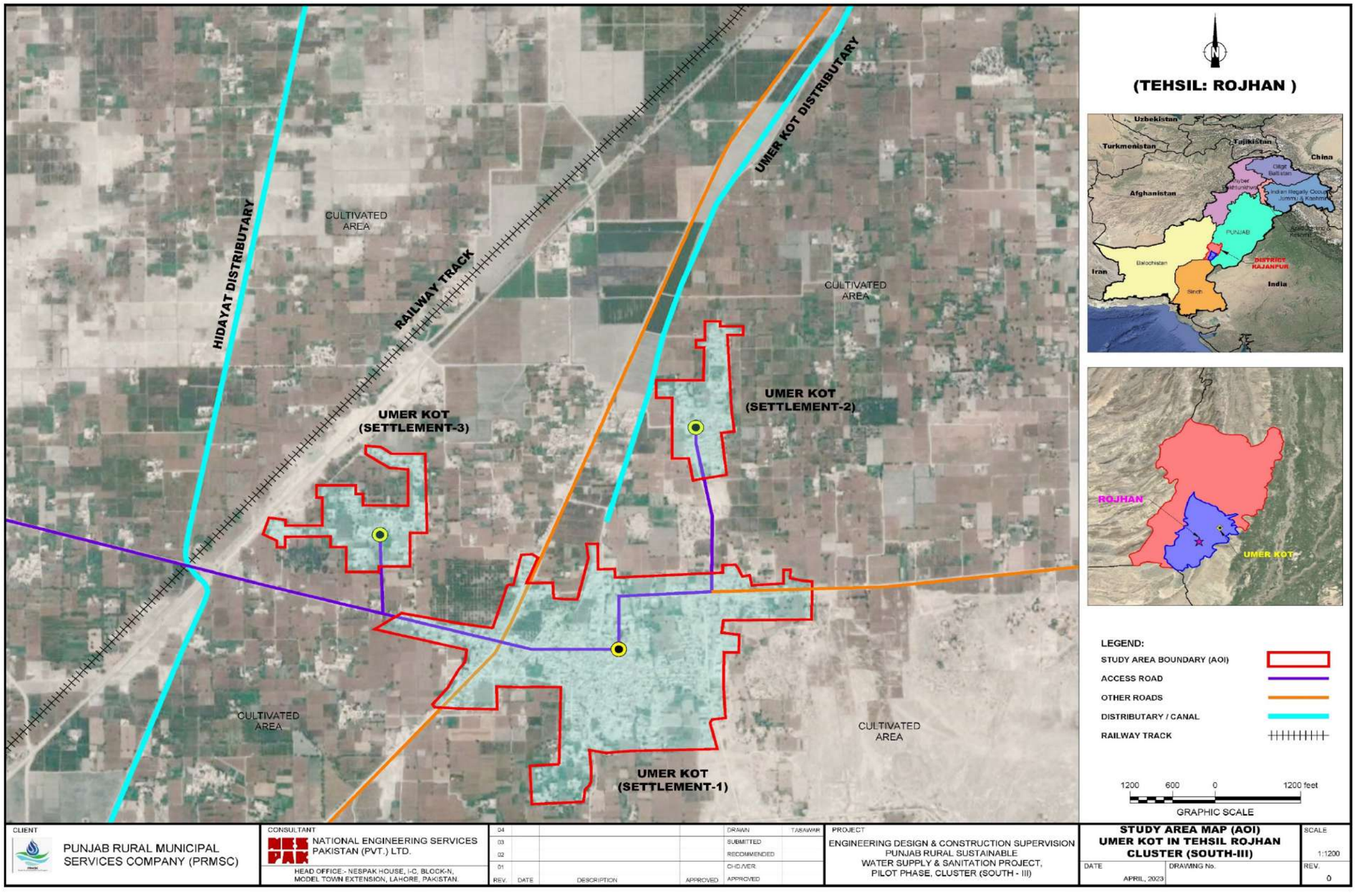


Figure 4.2: Study Area Map / AoI of Umer Kot

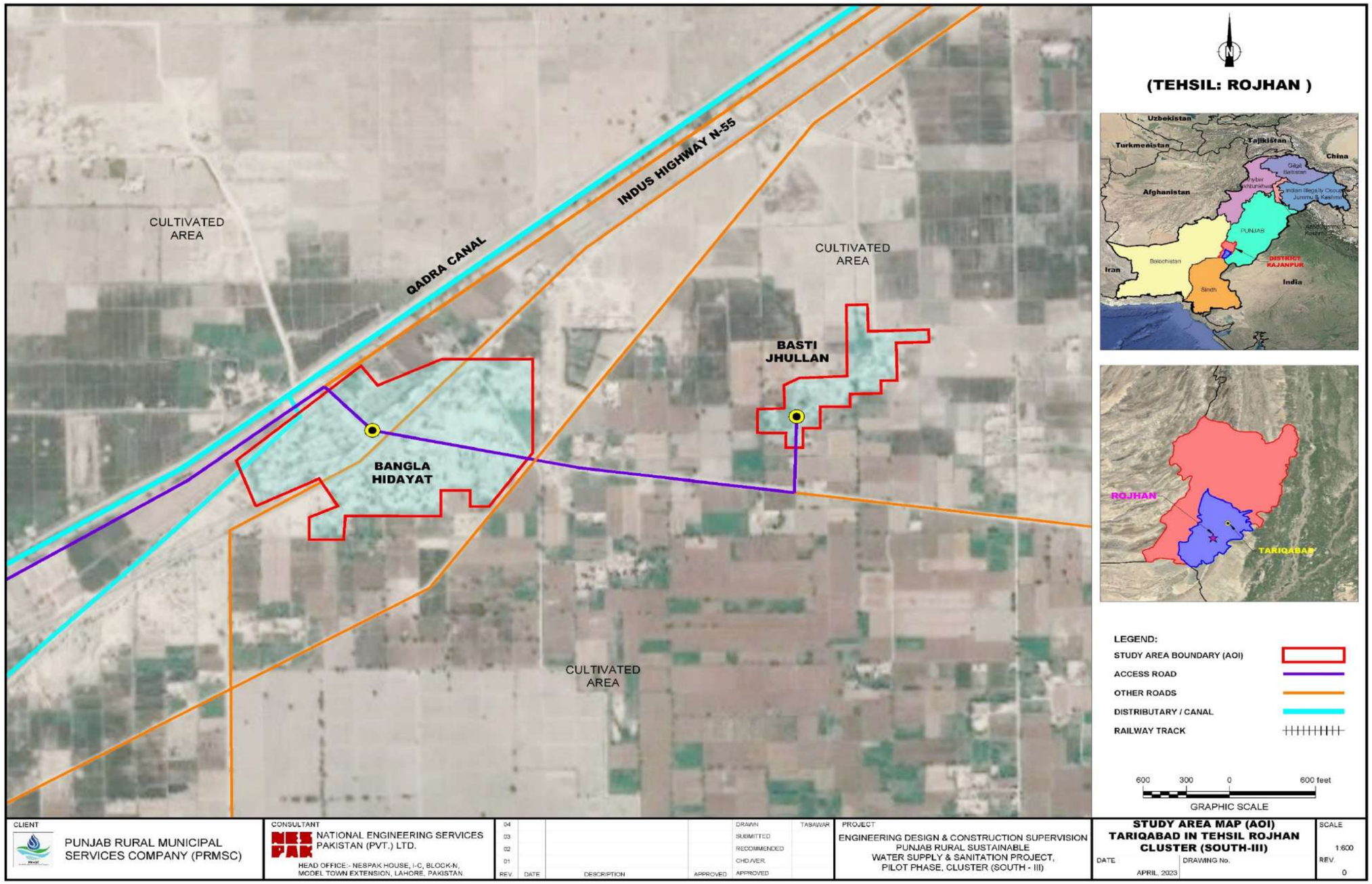


Figure 4.3: Study Area Map / AoI of Tariqabad

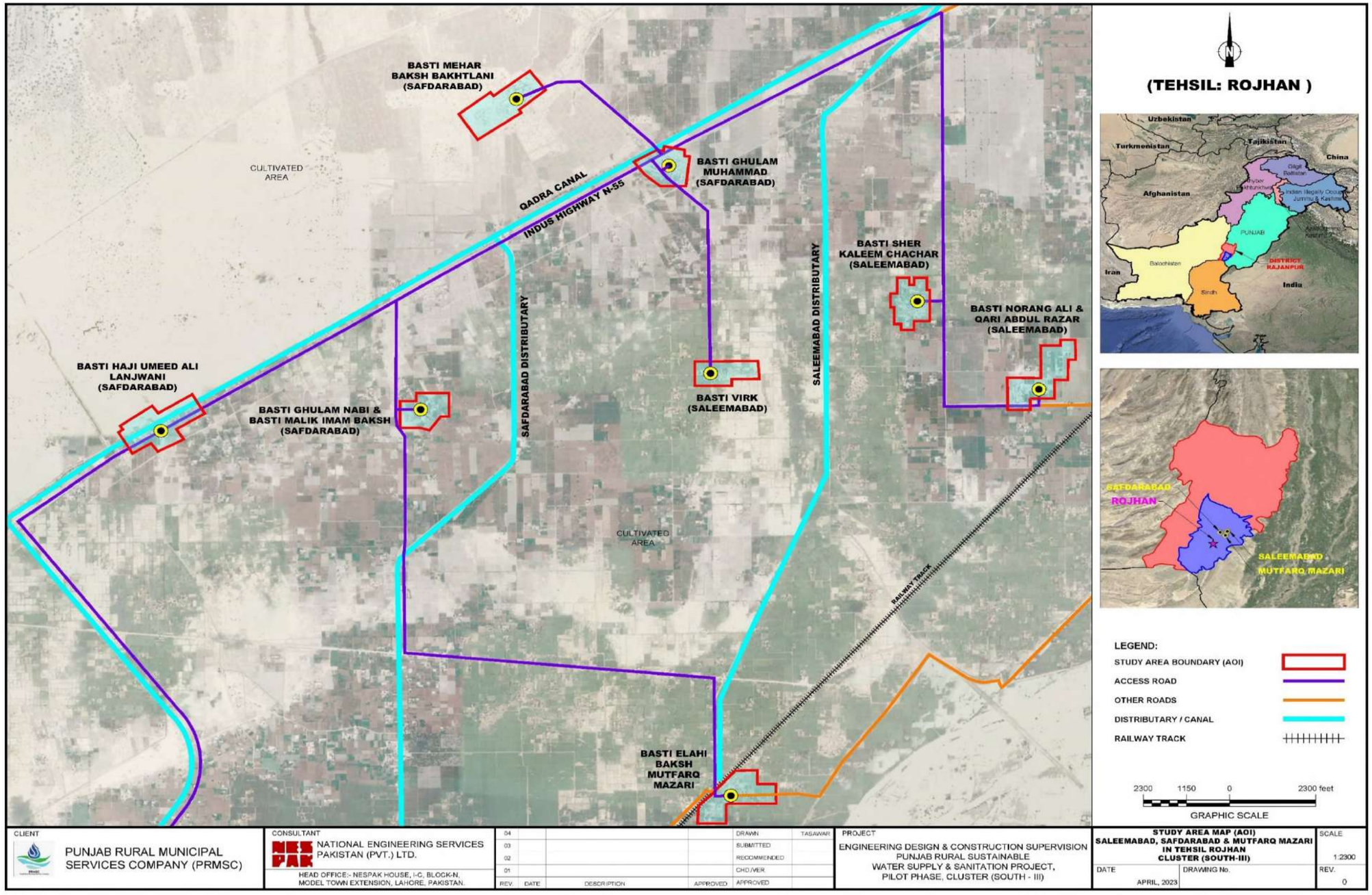


Figure 4.4: Study Area Map / AoI of Saleemabad, Mutfarq Mazari, & Safdarabad

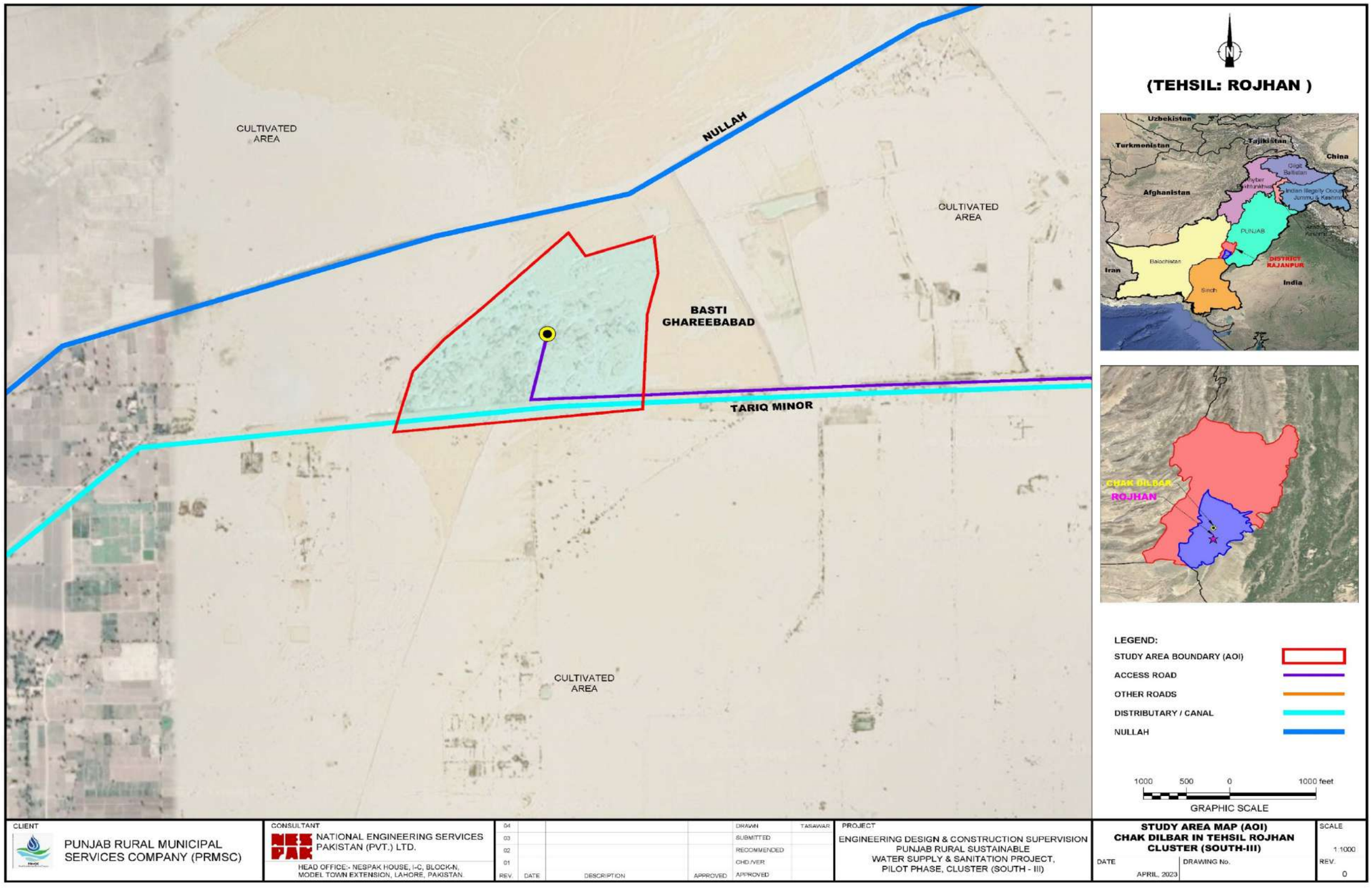


Figure 4.5: Study Area Map / AoI of Chak Dilber

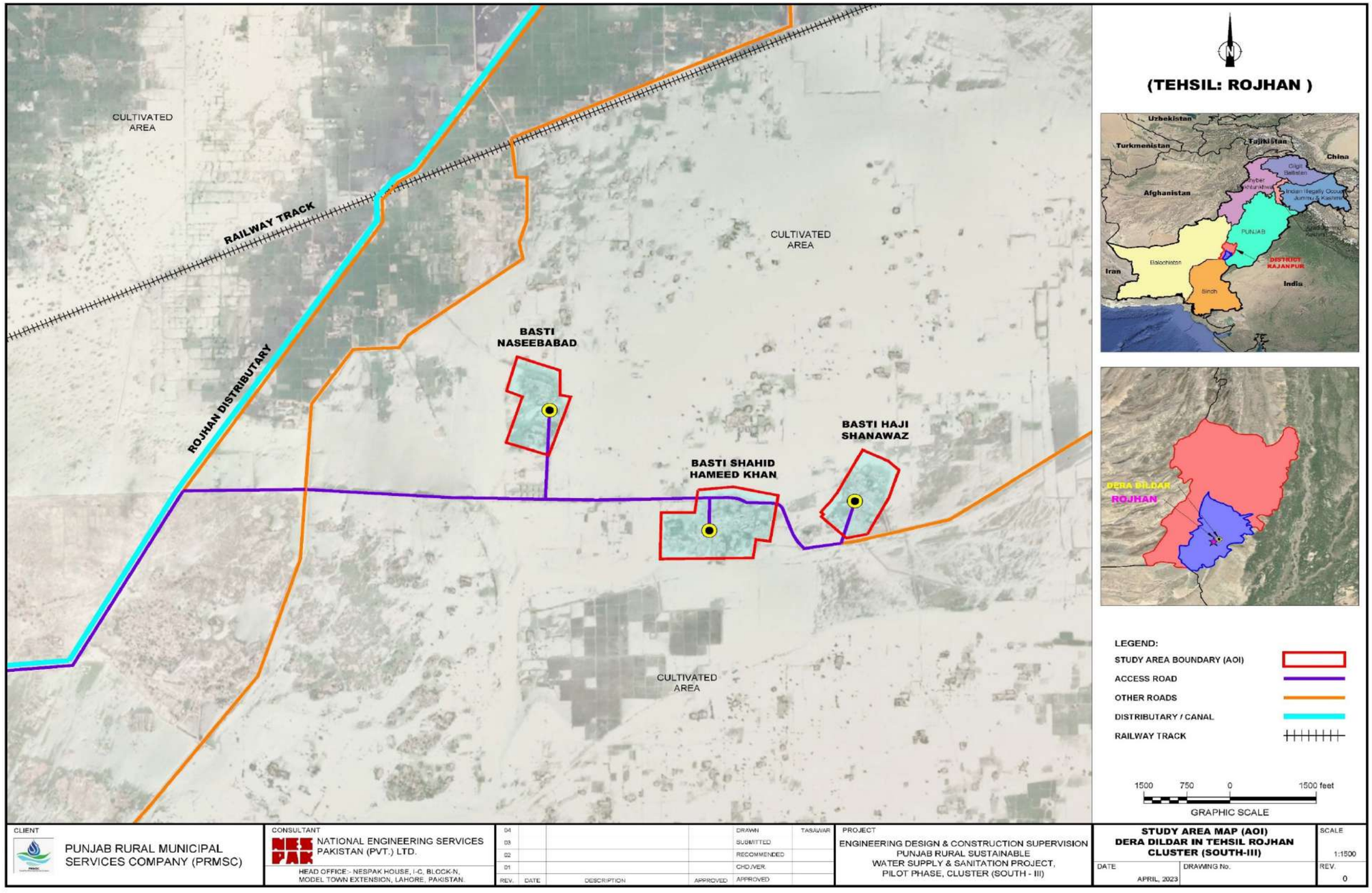


Figure 4.6: Study Area Map / AoI of Dera Dildar

As per the national and provincial regulations impacts and risks have been analyzed within the project AoI. Environmental and social impacts and risks will also be analyzed for all relevant stages of the project cycle, including pre-construction, construction and operation phases of the project.

4.4 Physical Environment

The physical environment includes topography, geology, soil, climate, hydrology, drainage, seismology, surface water, groundwater and ambient air.

4.4.1 Topography

The elevation of study area generally ranges between 250 and 300 ft above mean sea level. It slopes towards the Indus River which runs along the eastern boundary. There are small sedimentary hills in the western and southwestern side that rises to an elevation of about 100 meters. The western side is gravel plain with very little natural vegetation cover. The eastern half is the part of the Indus River flood plain. The Topographic survey is carried out in Umer Kot, (Major Settlement), Umer Kot (Settlement 1) and Dera Dildar. From the topographic survey its is found that in Umer Kot (Major Settlement) maximum and minimum elevations are 300 ft and 277 ft. In Umer Kot (Settlement 1) maximum and minimum elevations are 293 ft and 284 ft. And in Dera Dildar maximum and minimum elevations are 286 ft and 276 ft.

4.4.2 Geology

Geologically, this lands in the flood plains are lightly mantled with alluvial deposits transported from the Suleman Range. These areas contained energy, industrial and metallic mineral resources. Amongst, the main resources are Coal, Iron Ore, Gypsum, Dolomite, Fuller earth, Bentonite, Silica Sand and limestone etc. The project site is located on nearly horizontal flood plains covered by fine grained loamy soils.

4.4.3 Climate and Meteorology

i. Average Temperatures

Figure 4.7 represents modelled data where mean monthly maximum and minimum temperatures for different months of the last 30 years. The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Tehsil Rajanpur Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years.[6]

[6] https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/chiniot_pakistan_1181096

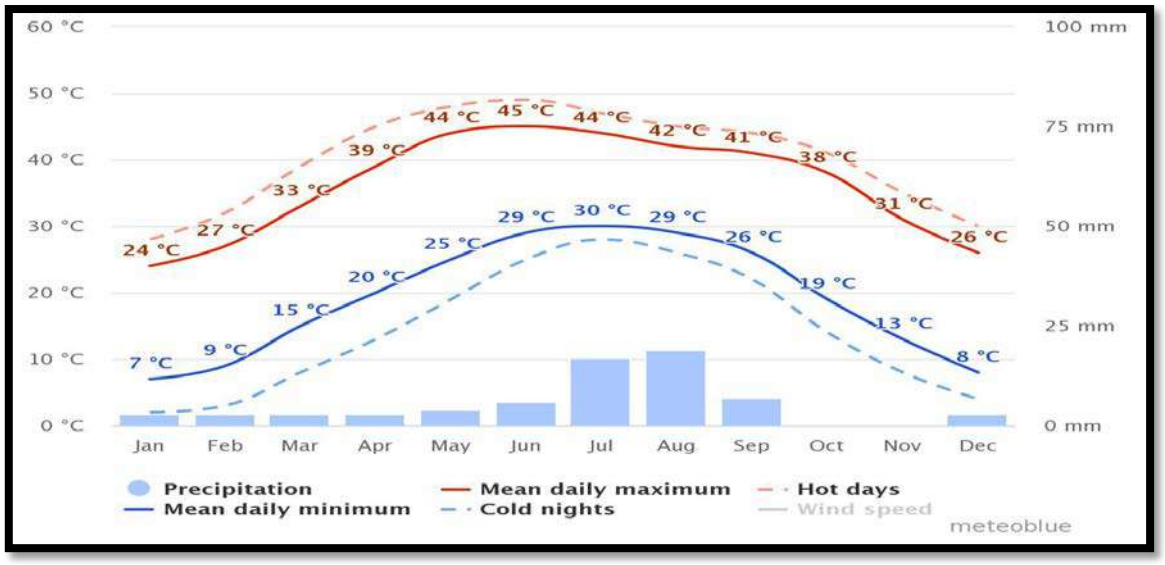


Figure 4.7: Average Temperatures

As it can be seen from **Figure 4.7**. The project area has extreme climate. It has hot summer and cold winters. The summer starts from May and lasts till September. June is the hottest month. The mean maximum and minimum temperature are 45 ºC and 29 ºC respectively for month of June. The winter seasons lasts from November to February. January is the coldest month. The mean maximum and mean minimum temperature are 24 ºC and 7 ºC in January. The maximum temperatures are presented in **Figure 4.8**.

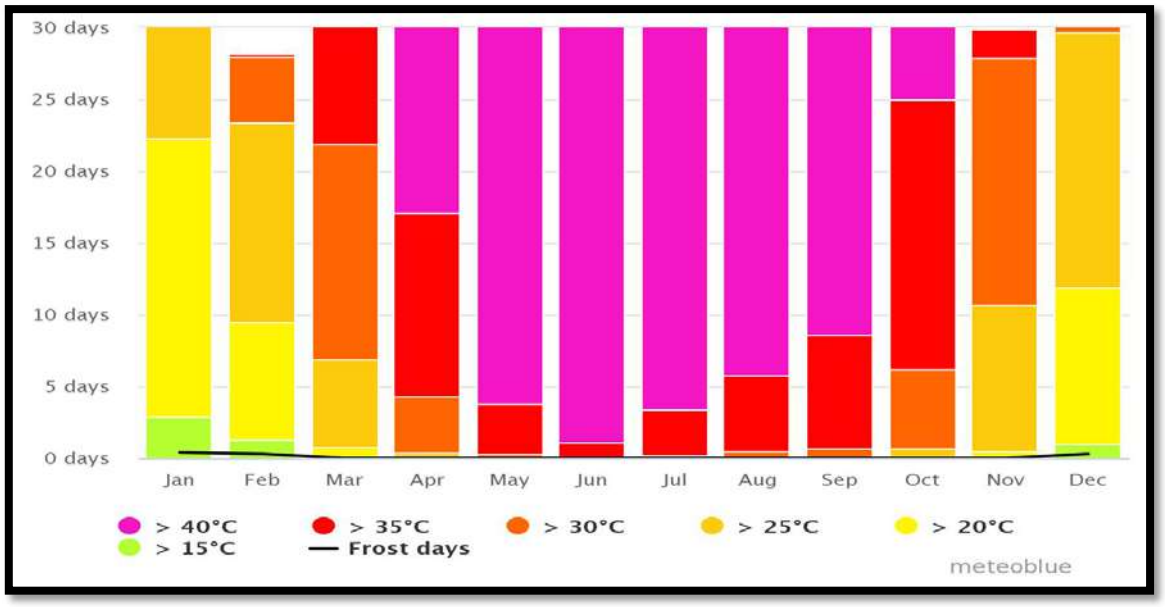


Figure 4.8: Maximum Temperatures

Figure 4.9 shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast.

It is clear from the chart that most of the times of year sunny days dominate. A few days per month are partly cloudy and with seldom overcast days. The maximum participation days are observed during July to August.[7]

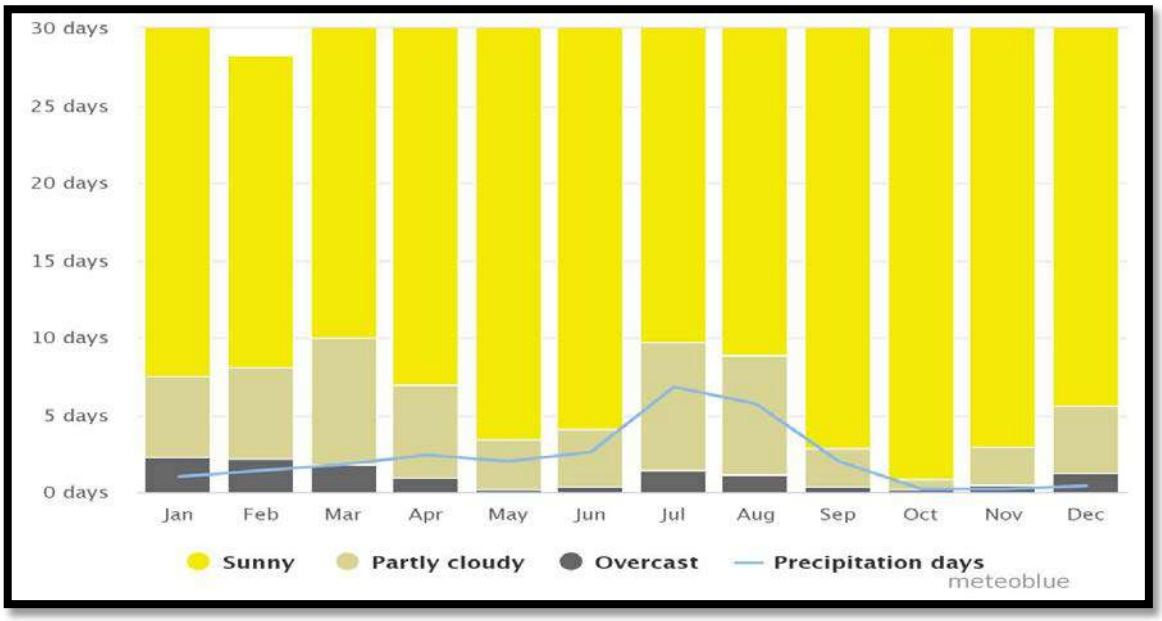


Figure 4.9: Cloudy, Sunny and Precipitation Days

Figure 4.10 shows on how many days per month, certain precipitation amounts are reached. It can be seen from the chart that the precipitation in June, July and August is maximum and ranges between 5-10 mm. Highest intensity of precipitation is also observed in the months of June, July and August ranges between 5-10 mm as Shown in **Figure 4.9**.

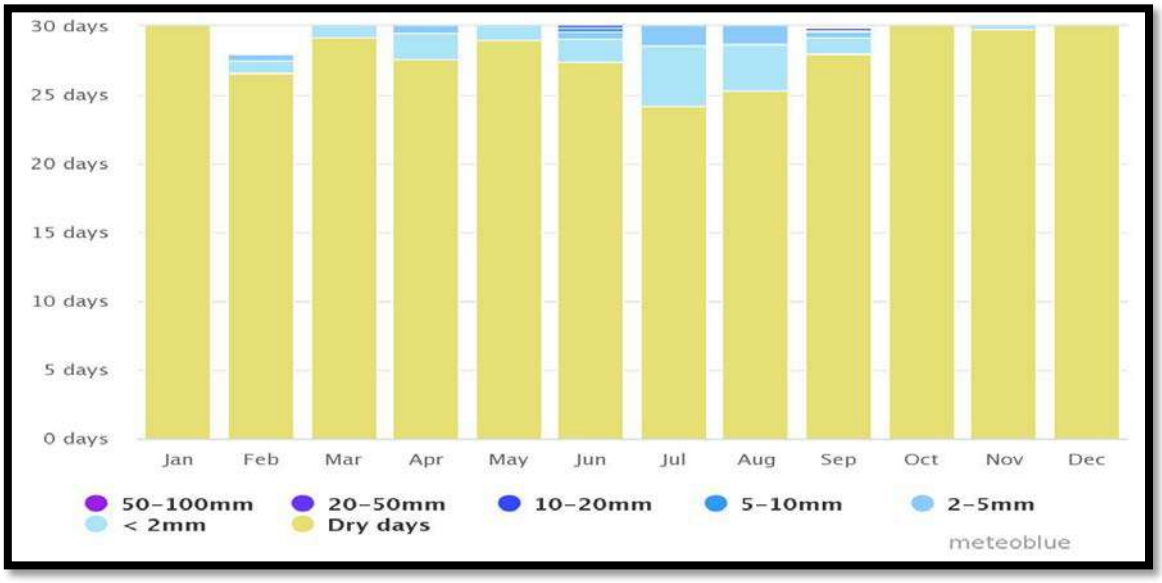


Figure 4.10: Precipitation Amounts

[7] https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/chiniot_pakistan_1181096

ii. Wind

Figure 4.11 shows the days per month, during which the wind reaches a certain speed. Maximum wind speeds can be observed in the months of January to September which be >28 km/h. Wind speed >12 km/h dominates throughout the year.

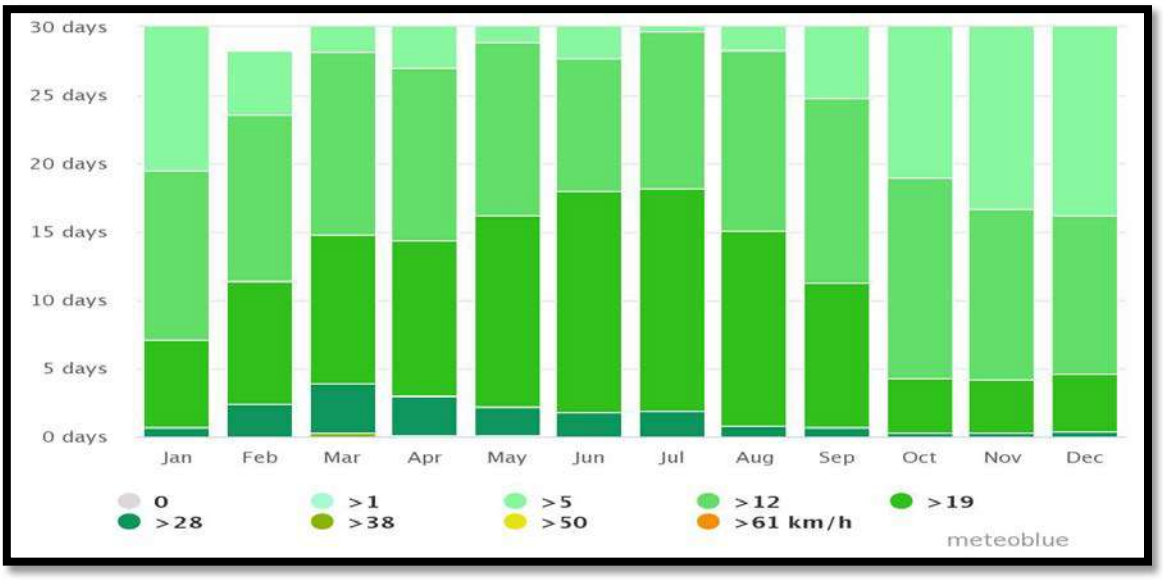


Figure 4.11: Wind Speed

The wind rose for Rajanpur shows how many hours per year the wind blows from the indicated direction. Wind rose is shown in **Figure 4.12**. It can be seen from the wind rose that dominant wind direction is towards North (N), NNE,NE, NNW, South (S), SSW, and SW.

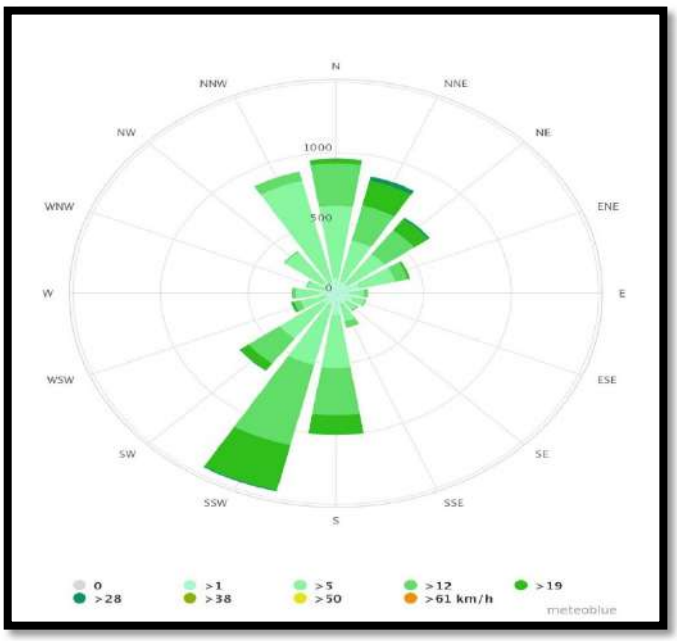


Figure 4.12: Wind Rose

4.4.4 Water Resources

Description of surface water and groundwater of Rojhan villages is as under. Hydrology map of Rojhan is shown in **Figure 4.18.**

A. Surface water

a) River Indus

The elevation of study area generally ranges between 15 and 45 m above mean sea level. It slopes towards the Indus River which runs along the eastern boundary. The land is sandwiched by river Indus on one side, while the Suleiman Mountains range on the other. Due to the Geo-hydrogeological sitting of the project area, Indus River drains water of the area including floods water of Suleman Mountain and has no significant recharge to the project area.

It is reported that after 2010 floods, two wells were installed for water supply scheme of Dera Dilber in Chak Karia situated near the Right bank of Indus River. This source can be utilized for water supply to Dera Dilber, Umer Kot, Mutfarq Mazari, and Saleem Abad after proper investigations.

b) Qadra Canal

Qadra canal is seasonal canal and flow for only four (4) months and remains dry for remaining eight (8) moths in a year. The nearby settlements include Kotla Hassan shah, Tariq Abad, Safdar Abad and Mutfarq Mazari and Saleem Abad.

c) Saleemabad Minor

Saleemabad minor is a lined minor, it flows for only four (4) months and remains dry for remaining eight (8) months in a year. It flows from the settlements of Saleemabad, Mutfarq Mazari. This source can be utilized with treatment option to provided drinking water to the nearby settlements.

d) Umer Kot Distributary

Umer Kot distributary (lined), flow for only four (4) months and remains dry for remaining eight (8) months in a year. It flows from the settlements of Kotla Hassan Shah, and Umer Kot This source can be utilized with treatment option to provided drinking water to the nearby settlements.

e) Tariq Minor

Tariq Minor flows for only four (4) months and remains dry for remaining eight (8) months in a year. It flows from the settlements of Chak Dilber. This source can be utilized with treatment option to provided drinking water to the nearby settlements.

B. Groundwater

Groundwater investigation study reveals that overall groundwater is brackish. Existing tube wells are pumping brackish water with TDS values 1480 to 4684 mg/lit for agriculture purpose. There is no groundwater-based water supply scheme in project area except outlived scheme of Dera Dilber and Safdarabad. The depth of water wells ranges from 80 to 130 ft BGL. Investigations reveal very limited freshwater column ranging from 7 to 32 meter along the banks of Saleem minor and Qadira Canal respectively. People fetch water from the hand pumps installed along the canals/minors to meet their drinking needs or purchase water from private vendors at an average rate of Rs. 50 per 30-liter bottle of fresh water. The anticipated freshwater discharge is 56 USGPM from Qadira Canal.

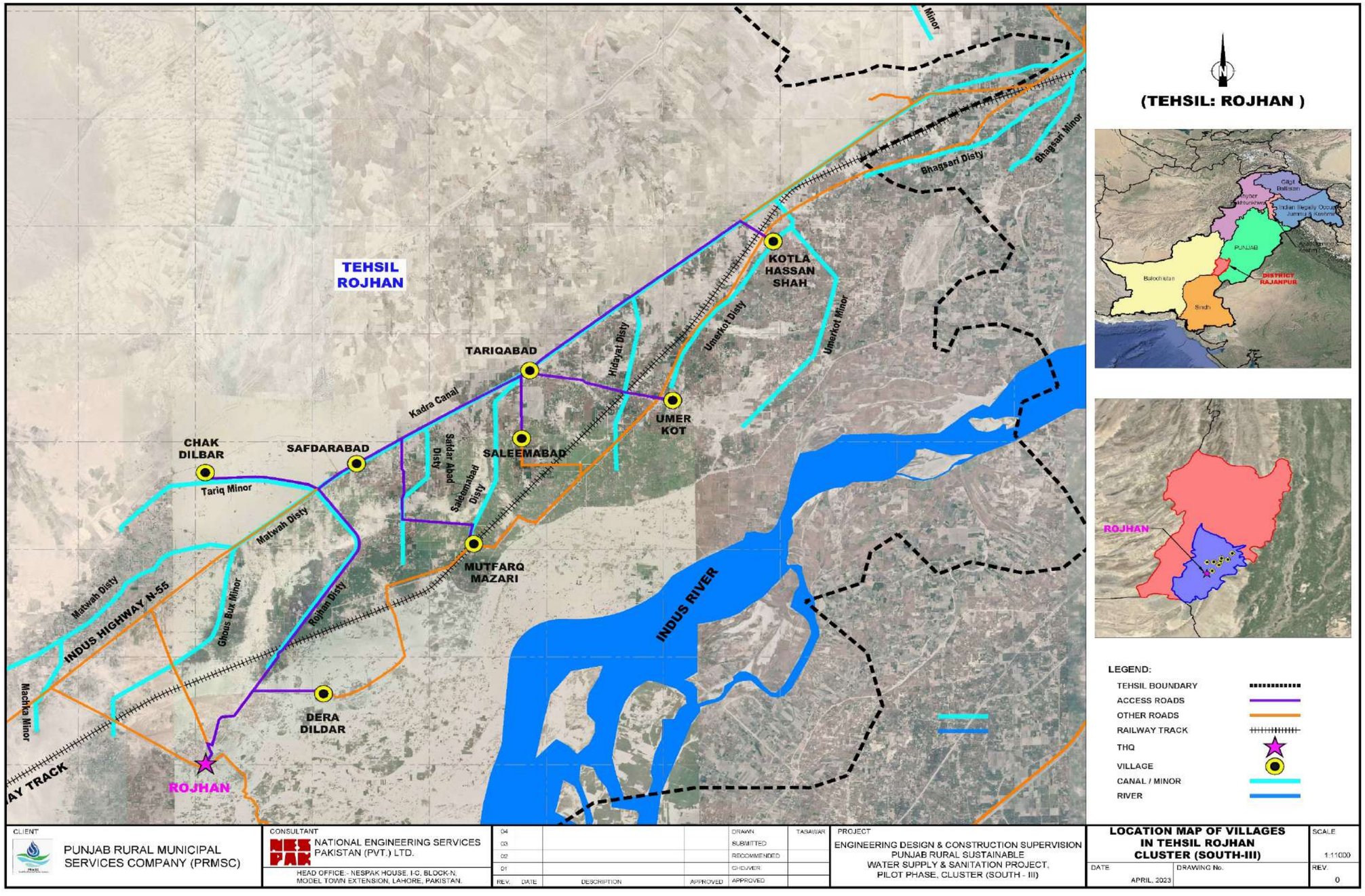


Figure 4.13: Hydrology Map of Rojhan

4.4.5 Environmental Monitoring, Sampling and Testing for Proposed Project

In order to determine the ambient air, noise levels, groundwater/ drinking water and wastewater quality of the study area 12 samples of groundwater, 01 samples of wastewater, 01 sample each of ambient air & noise was taken.

The sampling locations for the environmental monitoring of ambient air, noise and groundwater/ drinking water and wastewater for all eight villages is shown in **Figure 4.14.**

The task of environmental monitoring and testing was awarded to EPD approved environmental laboratory i.e., M/S Pak-green Laboratories.

A. Ambient Air Quality

The ambient air quality for priority pollutants such as NO, NO_2, SO_2, CO, O_3, PM_{10}, $PM_{2.5}$ and Suspended Particles Matter (SPM) was carried out at Umer Kot from April 10, 2023 to April 11, 202 by Pak Green Laboratory. The monitoring period was 24 hours. The results of ambient air quality monitoring are given in **Table 4.1** and Lab reports are attached as **Annex-II.**

Table 4.1: Ambient Air Quality Results

Sr. No.	Parameters	Avg. sampling time	Unit	Location	PEQS
				Umer Kot	
1	Carbon monoxide		mg/m³ (8 Hour)	0.7	5
2	Sulphur dioxide		µg/m³	22.22	120
3	Ozone		µg/m³ (1 Hour)	23.4	130
4	Nitric oxide		µg/m³	0.45	40
5	Nitrogen Dioxide		µg/m³	5.58	80
6	PM (2.5)		µg/m³	65.9	35
7	PM (10)		µg/m³	146.2	150
8	Suspended particulate Matter (SPM)		µg/m³	381.7	500

B. Noise Level

Noise level monitoring was carried out at the same locations where ambient air quality was monitored. Noise levels were monitored with the help of a potable digital sound meter at the

project site for 24 (twenty-four) hours. The results of noise monitoring are given in **Table 4.2** and Lab reports are attached as **Annex-II.**

Table 4.2: Noise Monitoring Results

Sr. No.	Location	Equivalent Noise Level (Leq) dB(A)		PEQS Limit dB(A)	
		Day Time	Night Time	Day Time	Night Time
1	Umer Kot	75	69	60.2	53.2

C. Groundwater/ Drinking Water Quality

Groundwater/ Drinking water samples were collected from all eight (08) villages of Rojhan on April.11, 2023 by Pak Green Laboratory and was analyzed for chemical and microbiological parameters. The analysis results of groundwater samples are compared with PEQS. The detailed monitored results for ground water quality are given in **Table 4.3 and** in **Table 4.4** attached as **Annex-II** respectively.

Table 4.3: Results of Groundwater Phase 1

Sr. No.	Measuring Parameter	Units	PEQS Limits	Umer Kot Rajanpur	Basti Haji Bashir Ahmad	Dera Dildar Basti Naseeb Abad	Safdarabad	Saleemabad Govt School	Tariqabad Left Bank Basti Bajwa	House of Pir Baksh Mazari Razi	Basti Gareebabad House of Jameel
1	PH @ 25˚C		6.5-8.5	8.023	7.708 at 23.6ºC	7.834 at 24ºC	7.398 at 24.1ºC	7.590 at 23.4ºC	7.803 at 23.4ºC	7.267 at 23.9ºC	6.995 at 23.0ºC
2	Colour	TCU	<15TCU	0	0	0	29.8*	0	0	26.4*	105.9*
3	Taste	…..	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Objectionable*	Non-Objectionable	Non-Objectionable	Non-Objectionable	Objectionable*
5	Odour	…..	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Objectionable*	Non-Objectionable	Non-Objectionable	Non-Objectionable	Objectionable*
4	Turbidity	NTU	5	0.05	0.90	0.25	35*	1.20	0.15	7.04*	21*
6	Total Dissolved Solids	TDS (mg/L)	<1000	343	930	527	1740*	955	563	5740*	7810*
7	Total Hardness as CaCO3	(mg/L)	<500	180	390	210	930*	510*	280	2010*	3950*
8	Aluminum	Al^{+3} (mg/L)	≤0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	Antimony	Sb (mg/L)	≤0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	Arsenic	As (mg/L)	≤50	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Barium	Ba (mg/L)	0.7	0.0010	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Boron	B(mg/L)	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Cadmium	Cd^{+2} (mg/L)	0.003	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Chloride	Cl^{1-} (mg/L)	<250	85	90	50	275*	70	30	1475*	2609*

Sr. No.	Measuring Parameter	Units	PEQS Limits	Umer Kot Rajanpur	Basti Haji Bashir Ahmad	Dera Dildar Basti Naseeb Abad	Safdarabad	Saleemabad Govt School	Tariqabad Left Bank Basti Bajwa	House of Pir Baksh Mazari Razi	Basti Gareebabad House of Jameel
15	Chromium	Cr (mg/L)	≤0.05	BDL	BDL	BDL	BDL	0.7559*	0.3938	BDL	0.0372
16	Copper	Cu^{2+} (mg/L)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.0299
17	Fluoride	F^{-} (mg/L)	≤1.5	0.7	0.7	0.5	1.9*	0.9	0.9	4.9*	6.4
18	Lead	$Pb.^{2}$ (mg/L)	≤0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Manganese	Mn^{2+} (mg/L)	≤0.5	0.0143	0.0046	BDL	BDL	0.7559*	0.0010	0.1388	0.2153
20	Mercury	$Hg.^{2}$ (mg/L)	≤0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Nickel	$Ni.^{2}$ (mg/L)	≤0.02	BDL	BDL	BDL	BDL	1.091	BDL	BDL	BDL
22	Nitrate	NO_3^{-} (mg/L)	≤50	1.240	BDL	BDL	1.994	BDL	BDL	4.998	7.004
23	Nitrite	NO_2^{-} (mg/L)	≤3	BDL	BDL	BDL	1.246	BDL	BDL	6.512*	11.946*
24	Selenium	$Se.^{2}$ (mg/L)	0.01	BDL	BDL	0.01	BDL	BDL	BDL	BDL	BDL
25	Residual Chlorine	Cl_2 (mg/L)	0.2-0.5	0.06	0.0310	BDL	BDL	BDL	0.24	BDL	BDL
26	Zinc	$Zn.^{2}$ (mg/L)	5	0.0989	BDL	0.0470	0.4284	0.1389	0.1304	0.0714	1.4286
27	Phenolic compound	Phol (mg/L)	-	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Sodium	(mg/L)	-	81.6586	90.4511	71.3856	99.4849	77.9688	159.84	156.7982	158.0386
29	Potassium	(mg/L)	-	23.8625	10.9700	8.5836	10.6545	9.1167	11.13	25.6644	20.7500
30	Total Iron	(mg/L)	-	0.0194	BDL	BDL	1.9324	BDL	0.168	0.7078	3.1356

Sr. No.	Measuring Parameter	Units	PEQS Limits	Umer Kot Rajanpur	Basti Haji Bashir Ahmad	Dera Dildar Basti Naseeb Abad	Safdarabad	Saleemabad Govt School	Tariqabad Left Bank Basti Bajwa	House of Pir Baksh Mazari Razi	Basti Gareebabad House of Jameel
31	Total Coliform	TC (count/100 ml)	0/100ml	484.6	286.2	95	1282.6*	286.2*	Nil	486.4*	486.4*
32	Escherichia Coli	E.Coli (count/100 ml)	0/100ml	182.5	95	NiL	485.8*	95*	Nil	105.6*	104.7*
33	Fecal Coliform	F.Coli (count/100 ml)	0/100ml	220.6	104.7	35.9	532.0*	113.4*	Nil	286.2*	116.5

Table 4.4: Results of Groundwater Phase 2

Sr. No.	Measuring Parameter	Units	PEQS Limits	Umer Kot Rahim Karyana Store	Dera Dilber	Tariqabad Basti Bajwa House M. Iqbal	Safdarabad Sheikh Zaid Colony
1	PH @ 25˚C		6.5-8.5	7.673 at 23.7ºC	7.824 at 23ºC	7.372 at 23^0C	7.099 at 23.6^0C
2	Colour	TCU	<15TCU	98.7	0.000	25.3*	284.2*
3	Taste	…..	Non-Objectionable	Non-Objectionable	Non-Objectionable	Objectionable*	Objectionable*
5	Odour	…..	Non-Objectionable	Non-Objectionable	Non-Objectionable	Objectionable*	Objectionable*
4	Turbidity	NTU	5	6.20	0.30	37*	80*
6	Total Dissolved Solids	TDS (mg/L)	<1000	2490	506	4660*	7360*

Sr. No.	Measuring Parameter	Units	PEQS Limits	Umer Kot Rahim Karyana Store	Dera Dilber	Tariqabad Basti Bajwa House M. Iqbal	Safdarabad Sheikh Zaid Colony
7	Total Hardness as CaCO3	(mg/L)	<500	820	240	1430*	3320*
8	Aluminum	Al^{+3} (mg/L)	≤0.2	BDL	BDL	BDL	BDL
9	Antimony	Sb (mg/L)	≤0.005	BDL	BDL	BDL	BDL
10	Arsenic	As (mg/L)	≤50	BDL	0.104	BDL	0.0294
11	Barium	Ba (mg/L)	0.7	BDL	BDL	BDL	BDL
12	Boron	B(mg/L)	0.3	BDL	BDL	BDL	BDL
13	Cadmium	Cd^{+2} (mg/L)	0.003	BDL	BDL	BDL	BDL
14	Chloride	Cl^{1-} (mg/L)	<250	530	55	1145*	2339*
15	Chromium	Cr (mg/L)	≤0.05	BDL	BDL	0.2080	0.0407
16	Copper	Cu^{2+} (mg/L)	2.0	BDL	BDL	0.0436*	0.0411
17	Fluoride	F^{-} (mg/L)	≤1.5	3.6	0.6	4.6*	5.6*
18	Lead	Pb^{+2} (mg/L)	≤0.005	BDL	BDL	BDL	BDL
19	Manganese	Mn^{2+} (mg/L)	≤0.5	0.0138	BDL	0.0138	0.4568
20	Mercury	Hg^{+2} (mg/L)	≤0.001	BDL	BDL	BDL	BDL
21	Nickel	Ni^{+2} (mg/L)	≤0.02	BDL	BDL	BDL	BDL
22	Nitrate	NO_3^- (mg/L)	≤50	1.249	BDL	5.196	6.884
23	Nitrite	NO_2^- (mg/L)	≤3	BDL	BDL	7.788	10.024*
24	Residual Chlorine	Cl_2 (mg/L)	0.2-0.5	BDL	BDL	BDL	BDL

Sr. No.	Measuring Parameter	Units	PEQS Limits	Umer Kot Rahim Karyana Store	Dera Dilber	Tariqabad Basti Bajwa House M. Iqbal	Safdarabad Sheikh Zaid Colony
25	Zinc	$Zn.^{2}$ (mg/L)	5	0.1015	0.0063	0.1986	1.1933
26	Phenolic compound	Phol (mg/L)	-	BDL	BDL	BDL	BDL
27	Sodium	(mg/L)	-	134.0147	61.6304	154.0307	157.3466
28	Potassium	(mg/L)	-	12.8642	8.5134	15.9516	20.4483
29	Total Iron	(mg/L)	-	1.83232	BDL	0.0401	8.7406

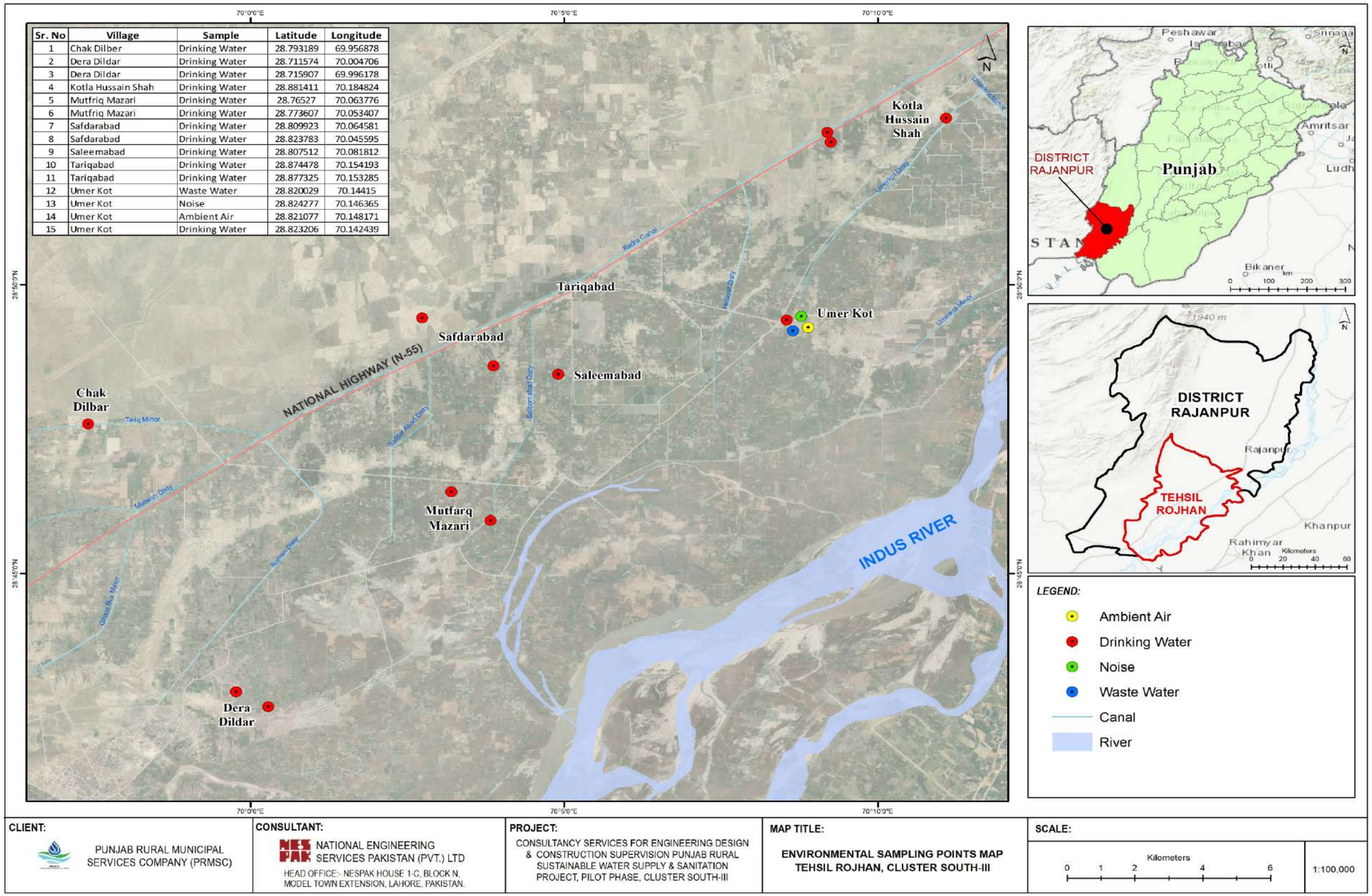
D. Wastewater Quality

Wastewater sample was collected from l selected village on April 11 2023 by Pak Green Laboratory and was analyzed for its parameters. The analysis results of wastewater sample is compared with PEQS. The detailed monitored results for wastewater quality are given in **Table 4.5 and** attached as **Annex-II** respectively.

Table 4.5: Results of Wastewater

Sr. No.	Measuring Parameter	Units	PEQS Limits	Umer Kot Rahim Karyana Store
1	Temperature	◦C	---	24.2
2	PH @ 25 ˚C	pH	6.5 to 8.5	7.617 at 24.2ºC
3	Biological Oxygen Demand	BOD5 (mg/L)	80	98*
4	Chemical Oxygen Demand	COD (mg/L)	150	160*
5	Total Dissolved Solids	TDS (mg/L)	1000	8320*
6	Total Suspended Solids	TSS (mg/L)	200	200
7	Oil & Grease	O.Gr(mg/L)	10	BDL
8	Phenolic Compound	Phol (mg/L)	--	BDL
9	Chloride	Cl1- (mg/L)	<250	2269*
10	Fluoride	F^{-} (mg/L)	≤1.5	3.6*
11	Anionic Detergent	Det (mg/L)	20	1.946
12	Sulphate	SO_4-2(mg/L)	600	645*
13	Sulphide	S^{-2} mg/L)	1.0	BDL
14	Ammonia	NH3(mg/L)	40	16.4
15	Cadmium	Cd^{+2} (mg/L)	0.01	BDL
16	Chromium	Cr (mg/L)	≤0.05	0.1905
17	Copper	Cu2+ (mg/L)	2.0	BDL
18	Lead	Pb^{+2} (mg/L)	≤0.005	BDL
19	Mercury	(Hg) (mg/L)	≤0.001	BDL
20	Selenium	Se^{+2} (mg/L)	0.01	BDL
21	Nickel	Ni^{+2} (mg/L)	≤0.02	BDL
22	Silver	Ag (mg/L)	1.0	BDL
23	Zinc	Zn^{+2} (mg/L)	5.0	0.03559
24	Arsenic	As (mg/L)	≤50	BDL
25	Barium	Ba (mg/L)	0.7	BDL
26	Total Iron	Fe2+ (mg/L)	8.0	0.3559
27	Manganese	Mn^{+2}(mg/L)	≤0.5	BDL

Sr. No.	Measuring Parameter	Units	PEQS Limits	Umer Kot Rahim Karyana Store
28	Boron	B(mg/L)	6.0	BDL
29	Chlorine	mg/L	1.0	BDL
30	Total Toxic Metals (Cd, Cr, Cu, Pb, Hg, Se, Ni, Ag, As, Ba, B)	(mg/L)	2.0	0.1905
31	Sodium	(mg/L)	-	163.1364
32	Cyanide	CN^{-} (mg/L)	1.0	BDL



Sr. No	Village	Sample	Latitude	Longitude
1	Chak Dilber	Drinking Water	28.793189	69.956878
2	Dera Dildar	Drinking Water	28.711574	70.004706
3	Dera Dildar	Drinking Water	28.715907	69.996178
4	Kotla Hussain Shah	Drinking Water	28.881411	70.184824
5	Mutfriq Mazari	Drinking Water	28.76527	70.063776
6	Mutfriq Mazari	Drinking Water	28.773607	70.053407
7	Safdarabad	Drinking Water	28.809923	70.064581
8	Safdarabad	Drinking Water	28.823783	70.045595
9	Saleemabad	Drinking Water	28.807512	70.081812
10	Tariqabad	Drinking Water	28.874478	70.154193
11	Tariqabad	Drinking Water	28.877325	70.153285
12	Umer Kot	Waste Water	28.820029	70.14415
13	Umer Kot	Noise	28.824277	70.146365
14	Umer Kot	Ambient Air	28.821077	70.148171
15	Umer Kot	Drinking Water	28.823206	70.142439

CLIENT:	CONSULTANT:	PROJECT:	MAP TITLE:	SCALE:
PUNJAB RURAL MUNICIPAL SERVICES COMPANY (PRMSC)	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE:- NESPAK HOUSE 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CONSULTANCY SERVICES FOR ENGINEERING DESIGN & CONSTRUCTION SUPERVISION PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT, PILOT PHASE, CLUSTER SOUTH-III	ENVIRONMENTAL SAMPLING POINTS MAP TEHSIL ROJHAN, CLUSTER SOUTH-III	Kilometers 0 1 2 4 6 — 1:100,000

Figure 4.14: Environmental Sampling Points Location at Kotla Hassan Shah, Umer Kot, Tariqabad, Saleemabad, Safdarabad, Mutafrq Mazari, Chak Dilber, & Dera Dildar

4.4.6 Seismology

Tehsil Rojhan of District Rajanpur is located in a low Hazard earthquake zone. **Figure 4.21** shows the seismic zoning map of Rojhan with the project area falling under Seismic Zone-2A. The Zone 2A has Peak Ground Acceleration (PGA) in the range of 0.08 g to 0.16 g.

The seismic zoning on the basis of Peak Ground Acceleration (PGA) is summarized in **Table 4.6**.

Table 4.6: Seismic Zones

Seismic Zone	**Peak Horizontal Ground Acceleration** "g" is the acceleration due to gravity
1	0.05 to 0.08g
2A	0.08 to 0.16g
2B	0.16 to 0.24g
3	0.24 to 0.32g
4	> 0.32g

Source: Building Code of Pakistan, Seismic Provisions –

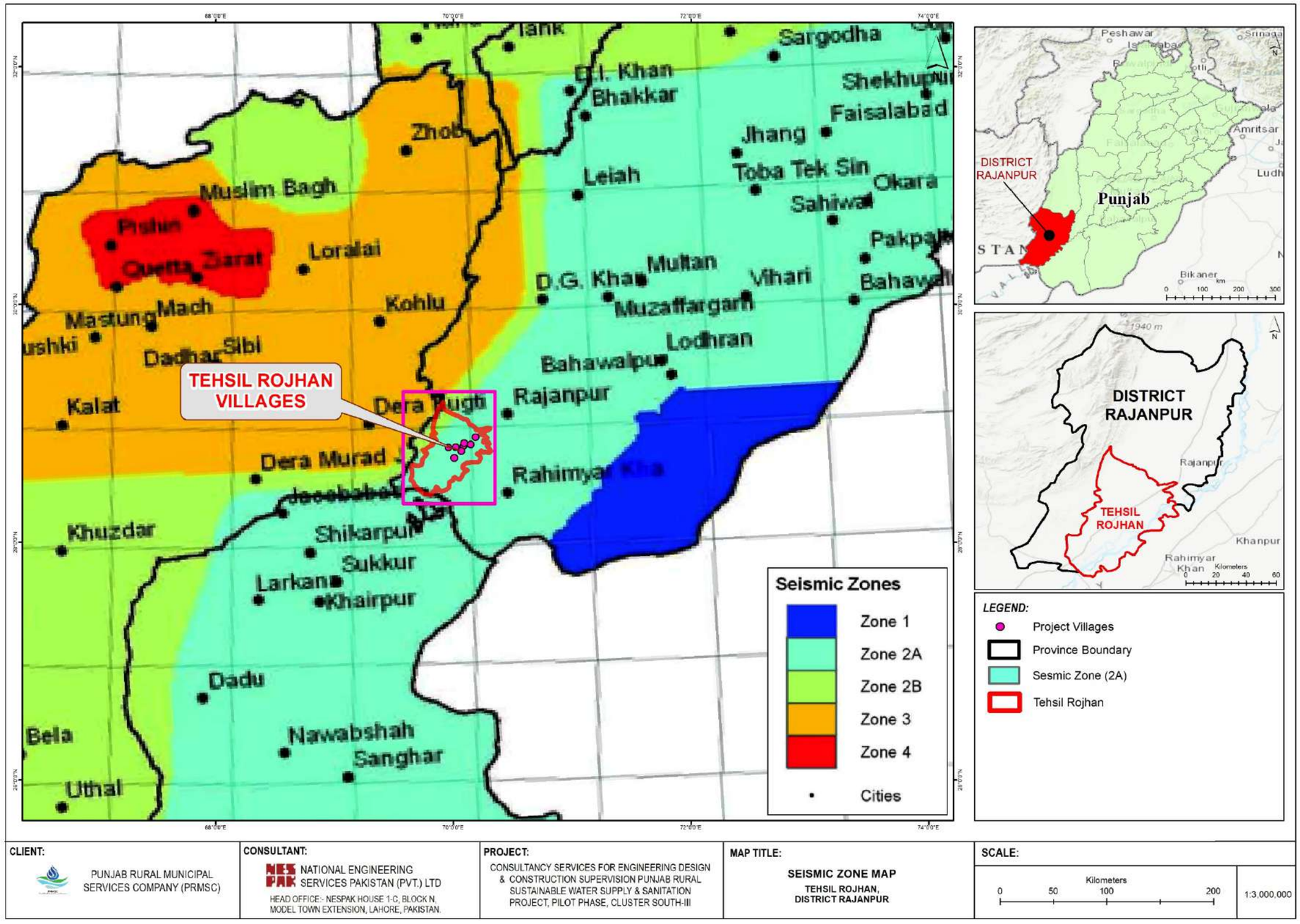


Figure 4.15: Seismic Zone Map of Project Area

4.4.7 Land use of Project Area

The project area comprises agricultural land, open land along with built up area. There are schools, mosques, and graveyards etc. Mostly roads are unpaved. There is not any existing infrastructure in project area except the Umer Kot. There are small sedimentary hills in the western and southwestern side that rises to an elevation of about 100 meters. The western side is with very little natural vegetation cover. The eastern half is the part of the Indus River flood plain. A pictorial view of selected villages of Rojhan are shown in **Plate 4.3.**



Chak Dilber (Gareebabad)



Chak Dilber (Gareebabad)



Chak Dilber (Bala-Chani)



Chak Dilber (Bala-Chani)



Chak Dildar



Chak Dildar



Kotla Hasan Shah



Kotla Hasan Shah



Mutafraq Mazari



Mutafraq Mazari



Mutafraq Mazari



Safdarabad



Safdarabad



Safdarabad



Saleemabad



Saleemabad



Tariqabad



Tariqabad



Umer Kot



Umer Kot

Plate 4.1: Land use in project Area of Rojhan

4.4.8 Environmental Sensitive Receptors

The structure coming within the project boundary considered as sensitive receptors. Sensitive receptors and their respective sensitivity for the eight villages are listed in **Table 4.7** to **4.14.** A comprehensive map showing sensitive receptors of Kotla Hassan Shah, Umer Kot, Tariqabad, Saleemabad, Safdarabad, Mutfarq Mazari, Chak Dilber, and Dera Dildar such as schools, Mosques, Graveyard, Hospital, etc. is given in **Annex-III.**

Table 4.7: Environmental Sensitive Receptors and their Sensitivity in Kotla Hassan Shah

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Kotla Hassan Shah	Govt. Girls Elementary School	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
	Govt. Insaf Afternoon School	
B	**Holy Places/ Shrines**	
Kotla Hassan Shah	Jamia Masjid Kazmi	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.
	Imam Bargh	
	Masjid 1 & 2	
	Masjid Izaz Husain	
	Masjid Gareebabad	
	Masjid Basti Malik Sabir	
C	**Health Institutions / Health Care**	
Kotla Hassan Shah	Basic Health Unit	Sensitivity due to access, dust, noise and vibrations especially during excavation. Noise and vibration may effect on mental health of patients.

Table 4.8: Environmental Sensitive Receptors and their Sensitivity in Umer Kot

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Umer Kot	Govt. Primary School Umar Kot	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
	Govt. Boys Primary School (Basti Gandi)	
	Govt. Non- Formal Primary School	
	Govt Elementary School Punjab Basti	
	Degree College	
	Govt. Higher Secondary School	
B	**Holy Places/ Shrines**	

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
Umer Kot	Mosque 1	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.
	Mosque	
	Masjid (Basti Hussain Baksh)	
	Mosque (Dera Lutf Khan)	
C	**Health Institutions / Health Care**	
Umer Kot	Basic Health Unit	Sensitivity due to access, dust, noise and vibrations especially during excavation. Noise and vibration may effect on mental health of patients.
	Abdullah Medical Center & Maternity Hospital	
D	**Graveyard**	
Umer Kot	Graveyard	Sensitivity due to access at the time of funeral, dust, further noise and vibrations especially during excavation.

Table 4.9: Environmental Sensitive Receptors and their Sensitivity in Tariqabad

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Tariqabad	Daman School System	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
	Govt. Primary School	
B	**Graveyard**	
Tariqabad	Graveyard	Sensitivity due to access at the time of funeral, dust, further noise and vibrations especially during excavation.

Table 4.10: Environmental Sensitive Receptors and their Sensitivity in Saleemabad

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Saleemabad	Govt. Boys Elementary School (Basti Jaam Elahi Baksh)	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
	Madrassa Jamia Awasia	
	Govt. Girls Primary School	
B	**Holy Places/ Shrines**	

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
Saleemabad	Jamia Masjid	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.
	Mosque	
	Noor Shah Mosque (Abdul Razzaq Basti)	
	Mosque (Virk)	

Table 4.11: Environmental Sensitive Receptors and their Sensitivity in Safdarabad

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Safdarabad	Girls Primary School	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
	Govt. School	
B	**Holy Places/ Shrines**	
Safdarabad	Mosque	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.
	Mosque	
	Mosque (Basti Khtlani)	
	Mosque (Basti Umeed)	
	Mosque (Imam Baksh)	

Table 4.12: Environmental Sensitive Receptors and their Sensitivity in Mutafrq Mazari

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Mutfarq Mazari	Govt. Boys Elementary School	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
B	**Holy Places/ Shrines**	
Mutfarq Mazari	Mosque	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.
C	**Graveyard**	
Mutfarq Mazari	Graveyard	Sensitivity due to access at the time of funeral, dust, further noise and vibrations especially during excavation.

Table 4.13: Environmental Sensitive Receptors and their Sensitivity in Chak Dilber

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Chak Dilber	Govt. Primary School	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
B	**Holy Places/ Shrines**	
Chak Dilber	Masjid	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.
	Jamia Masjid Gulzar-e- Madina	
C	**Graveyard**	
Dera Dildar	Graveyard	Sensitivity due to access at the time of funeral, dust, further noise and vibrations especially during excavation.

Table 4.14: Environmental Sensitive Receptors and their Sensitivity in Dera Dildar

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Dera Dildar	Govt. Boys High School	Sensitivity due to access, dust, noise and vibrations especially during teaching hours
	Govt. Girls Primary School	
	Govt. Boys Elementary School	
	Govt. Boys Primary School	
B	**Holy Places / Shrines**	
Dera Dildar	Mosque (Muhammadi Mosque)	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.
	Mosque	
C	**Graveyard**	
Dera Dildar	Graveyard	Sensitivity due to access at the time of funeral, dust, further noise and vibrations especially during excavation.

4.5 Biological Environment

Tehsil Rojhan of District Rajanpur is rich in biodiversity because of its diverse landscape and geographical location. The variety of ecosystem is evident as Rojhan is home to various species. The following section describes the biological environment of the project area.

4.5.1 Flora

The major floral species found in the project area include the following:

A. Trees

Commonly found trees in Rojhan are enlist below;

Table 4.15: Common Tree species in Rojhan

Sr. No.	Name	Sr. No.	Name	Sr. No.	Name
1	Neem	10	Acacia (Kikar)	19	Dab
2	Shesham	11	Eucalyptus	20	Frash
3	Beri	12	Jaman	21	Siris
4	Date Palm	13	Pesh (Dwarf Plant)	22	Jand (Prosopis spicigera),
5	Lemon	14	Jal	23	Karir (*Capparis aphylla*),
6	Vann (*Salvadora oleoides*)	15	Lana (Suda ruiteesa)	24	Khardar (*Alhaji camelorum*)
7	Peelu (*Salvadora persica*)	16	Lani (*Salsola fostida*), and ber (*Zizyphus jujube*)	25	Khabbal (*Cynodon dactylona*)
8	Kikar (Acacia nilotica)	17	Harmal (*Paganum harmala*)	26	Datura (*Datura alba*)
9	Phog (*Calligonum polygnoides*)	18	Pohli (*Argemone maxicana*)	27	Malla (*Zizyphus numularia*)

B. Major Crops

Major crops ripen and cultivated in the district are Wheat, Fodder, Moong, Mash, Masoor and tobacco.

C. Natural Bushes and Herbs

Natural bushes found in the project site include Lana, Cum, and Gorkha. Besides this, natural vegetation Panir, is commonly found in Chucha and Murunj areas which are found in medicines.

4.5.2 Fauna

The faunal species found in the project area and its vicinity include the following:

A. Mammals

Common animals found in the project area include hog deer, wild boar, fishing cat, jungle cat, small Indian civet, smooth-coated otter, and Indus blind dolphin, house rats and bats. Domestic livestock observed during field visits include buffaloes, cattle, goats, sheep, camels and donkeys that are used by the local residents for their livelihood.

B. Livestock

Livestock are the lifeline of community in the project area. According to the census conducted in 2018, the population of the livestock in Tehsil Rojhan is given hereunder:

Table 4.16: Census 2018, livestock population

Animals	Counts (Numbers)
Buffalos	39,482
Cows	109,066
Sheep	104,541
Goats	131,624
Rural Poultry	69,626
Fancy Birds	6,446
Camel	4,858
Equines	889
Total	466,532

C. Birds

House sparrow (*Passer domesticus*), House crow (*Corvus splendens*) and Mynah (*Acredotheres tristis*) are the most common sight in the area. The wild avifauna of the area includes around 40 species of ducks and geese, black partridge, countless number and species of waders, purple moorhen, common and white-breasted moorhen, yellow-eyed babbler, and several passerine species. In addition, following birds are also seen in the project area**.**

Table 4.17: Common Bird species in Rojhan

Common Name	Scientific Name
Parrot	*Psittacula krameri*
Pigeon	*Columba livia*
Hoopoe	*Upupa epops*
Koel	*Eudynamys scolopacea*
Black kite	*Mivus migrains*

D. Reptiles

Common tree lizard (*Calotes versicolor*), Monitor lizard (*Varnus bengalensis*), fat tailed lizard (*Uromastix hardwickii*) and fringed toed lizard (*Acanthodactylus cantoris*) are observed in and around the proposed site. Several speciesare also reported by the local residents.

4.5.3 Endangered Species

There are no endangered species of flora and fauna observed in the Study Area.

4.5.4 Wetlands

There are no wetlands in the study area.

4.5.5 Wildlife Sanctuaries and Game Reserves

No wildlife sanctuary or game reserve is located in the vicinity of the study area.

4.5.6 Critical Habitats

No wild life sanctuary or game reserve (Critical Habitats) exists near the project area or the study area.

4.1 Socioeconomic Environment

4.1.1 Socio-Economic Baseline Structure

This sub-section provides a socioeconomic assessment pertaining to the demographic and socio-economic conditions of the respondents of the proposed project area. Detailed site visits were conducted by Social Experts to appraise the prevailing socioeconomic conditions and to assess the socioeconomic impacts of the proposed project. During the field surveys, interviews and consultation meetings were held with the local representatives i.e., Numberdars, residents' shopkeepers, land owners, agriculturists, and their laborers of all the eight (8) villages of Rojhan. The survey tool used for the socio-economic survey tool is attached as **Annex- IV.**

4.1.2 Objectives of Socioeconomic Survey

To assess the socioeconomic conditions of the respondents, a social survey was carried out with the following objectives:

- Observe and document the existing socio-economic conditions of the respondents;
- Gain information about the demographic characteristics of the project area;
- Identify the economic resource dependency of the respondents;

Explore the situation of civic amenities, drinking water conditions, sewerage, solid waste management, education, health facilities, etc.

- Get feedback from the community about existing and potentially social issues; and
- Evaluate the possibilities of addressing their concern through relevant authorities

4.1.3 Methodology Adopted for Data Collection

Data collection for the socioeconomic study of the proposed project involved primary data for the socio-economic baseline study and secondary data to know the latest statistics of the project area.

A. Primary Data

Primary data was collected through a socioeconomic survey with the help of a structured questionnaire. Total 132 respondents were asked about their concerns in the projected area.

B. Secondary Data

Secondary data was collected from the Pakistan Bureau of Statistics (Census 2017), established literature, and research. The latest census (2017) released the number of households, population statistics for all sexes of census 2017 as shown in **Table 4.18**

Table 4.18: Secondary Data Result of Project Area

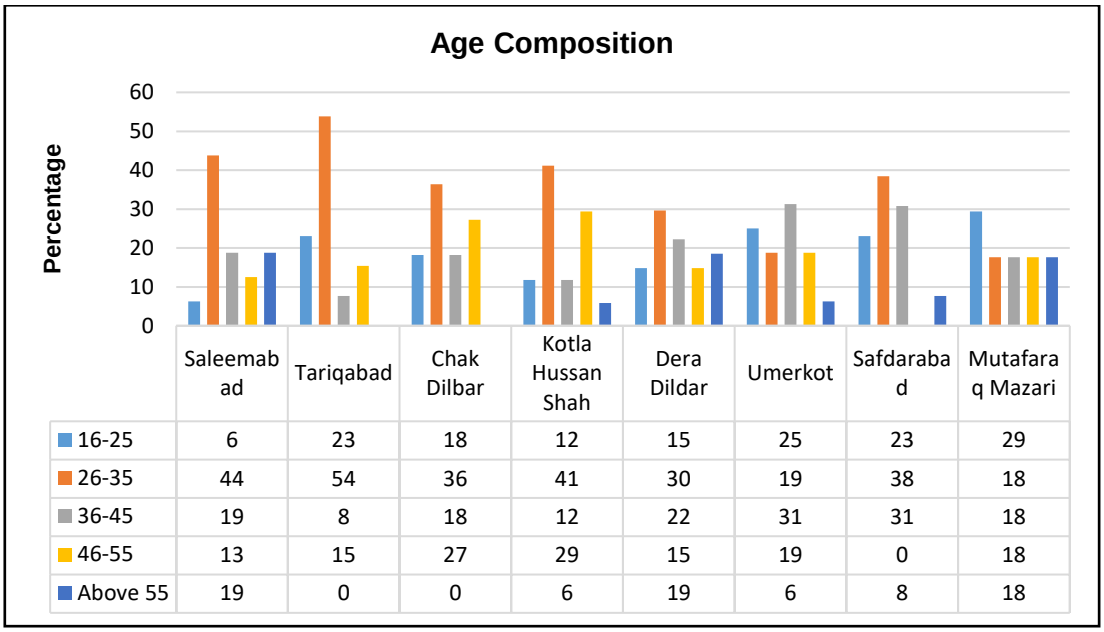
Village Name	Area (Acre)	Population				Literacy rate
		Male	Female	Trans-gender	All Sexes	
Safdar Abad	10619	4,581	4,086	1	8,668	12.09%
Umer Kot	198,347	47,051	43,241	5	90,297	22.08%
Saleemabad	5635	4,903	4,519	1	9,423	20.56%
Tariqabad	5,920	2,799	2,678	-	5,477	16.78%
Kotla Hussan Shah	1,380	1,014	920	-	1,934	29.52%
Dera Dildar	8,428	5,233	4,877	-	10,110	19.19%
Chak Dilber	39,038	7,413	6,713	2	14,128	8.24%

4.1.4 Findings of Socioeconomic Survey

A. Demographic Characteristics of the Population

The census and socio-economic survey results reveal that the majority of the respondents were aged between 26-35 years. Maximum age limit of any respondents was 55 or above 55 years, people which indicates that the respondents were mature enough to respond to the interviewers and were able to understand the proposed project interventions and give their

feedback and suggestions regarding the proposed project. **Figure 4.16** presents the age compositions of the respondents.

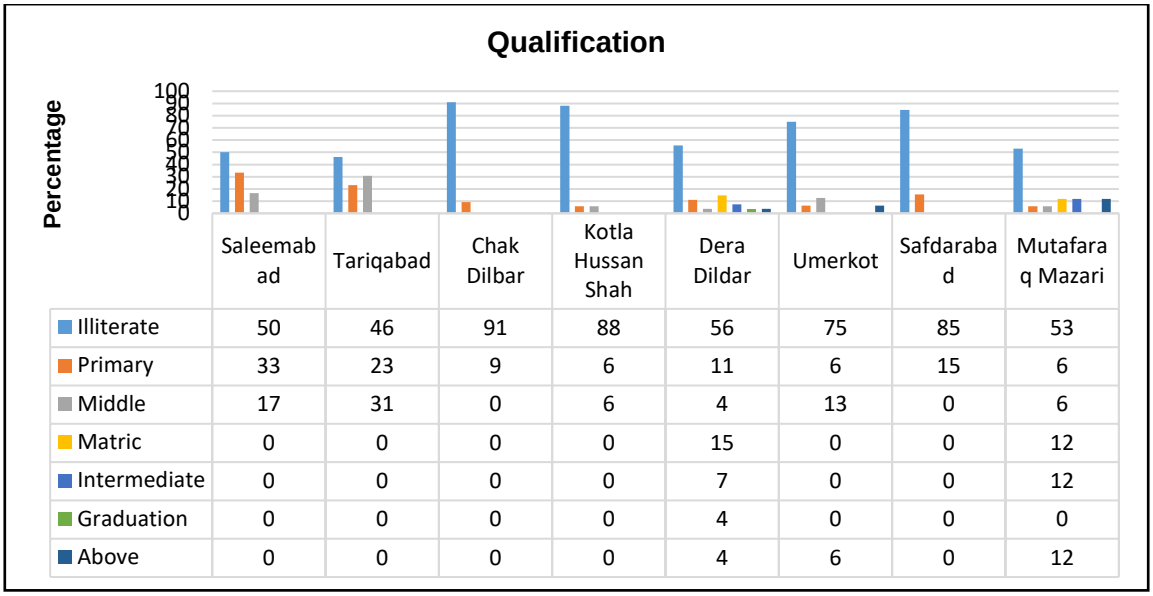


	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
16-25	6	23	18	12	15	25	23	29
26-35	44	54	36	41	30	19	38	18
36-45	19	8	18	12	22	31	31	18
46-55	13	15	27	29	15	19	0	18
Above 55	19	0	0	6	19	6	8	18

Figure 4.16: Age Composition of the Respondents

B. Qualification of Respondents

Majority of the respondents in most of the villages were illiterate. While the most common level of education attain from all the settlements is primary. Whereas as few numbers of people get higher education in Dera Dildar, Umer Kot and Mutfaraq Mazari. This shows that the trend of school-going children in the proposed project area varies from village to village which might be due to financial constraints as well as a lack of educational facilities. The qualification status of the respondents is given in below **Figure 4.17**

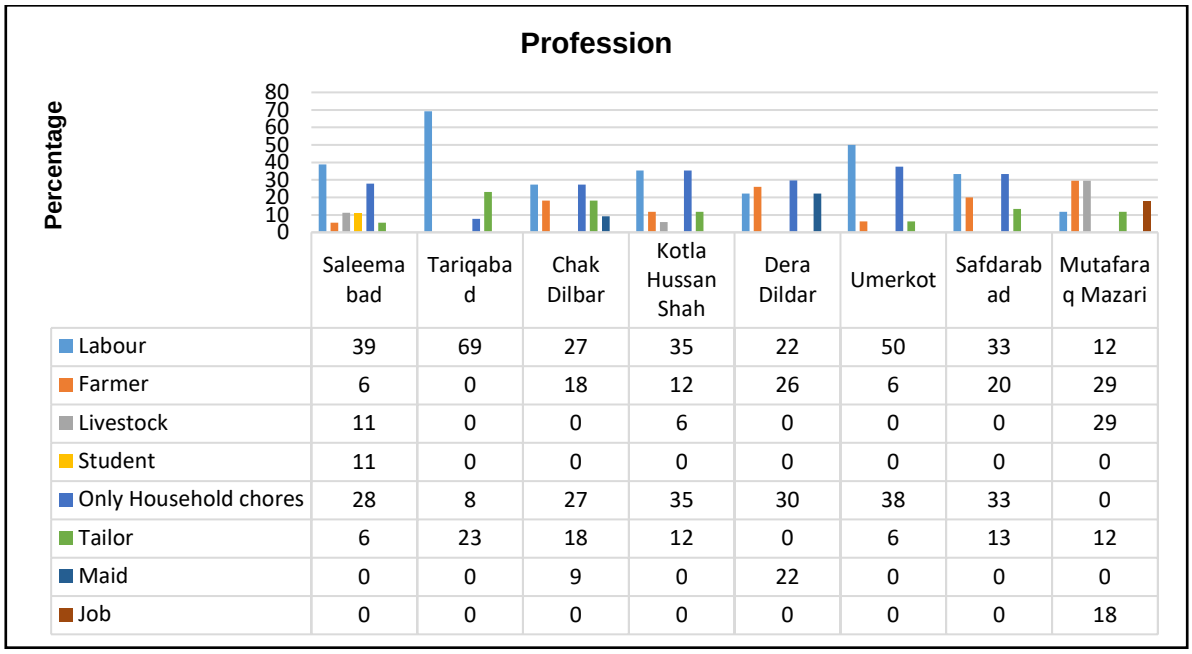


	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Illiterate	50	46	91	88	56	75	85	53
Primary	33	23	9	6	11	6	15	6
Middle	17	31	0	6	4	13	0	6
Matric	0	0	0	0	15	0	0	12
Intermediate	0	0	0	0	7	0	0	12
Graduation	0	0	0	0	4	0	0	0
Above	0	0	0	0	4	6	0	12

Figure 4.17: Qualification of the Respondents

C. Profession of the Respondents

The majority of the respondents in the villages are linked to Agriculture. Most of them were Farmers and the rest of the respondents used to work as laborers and livestock owner as profession. The trend of job was also observed to be very low but in Mutfaraq Mazari few numbers of respondent work as government employees and compounder in nearby clinic in village. Majority of female respondents do not work in the field as they are house wives and busy in household chores. **Figure 4.18,** presents percentages of the various professions of the respondents



	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Labour	39	69	27	35	22	50	33	12
Farmer	6	0	18	12	26	6	20	29
Livestock	11	0	0	6	0	0	0	29
Student	11	0	0	0	0	0	0	0
Only Household chores	28	8	27	35	30	38	33	0
Tailor	6	23	18	12	0	6	13	12
Maid	0	0	9	0	22	0	0	0
Job	0	0	0	0	0	0	0	18

Figure 4.18: Profession of the Respondents

D. Marital Status and Family System

Survey findings reveal that most of the respondents of the villages were married, few number of females respondents were widow and the majority of them live in joint family systems. **Figure 4.19 & Figure 4.20** present the marital status of the respondents

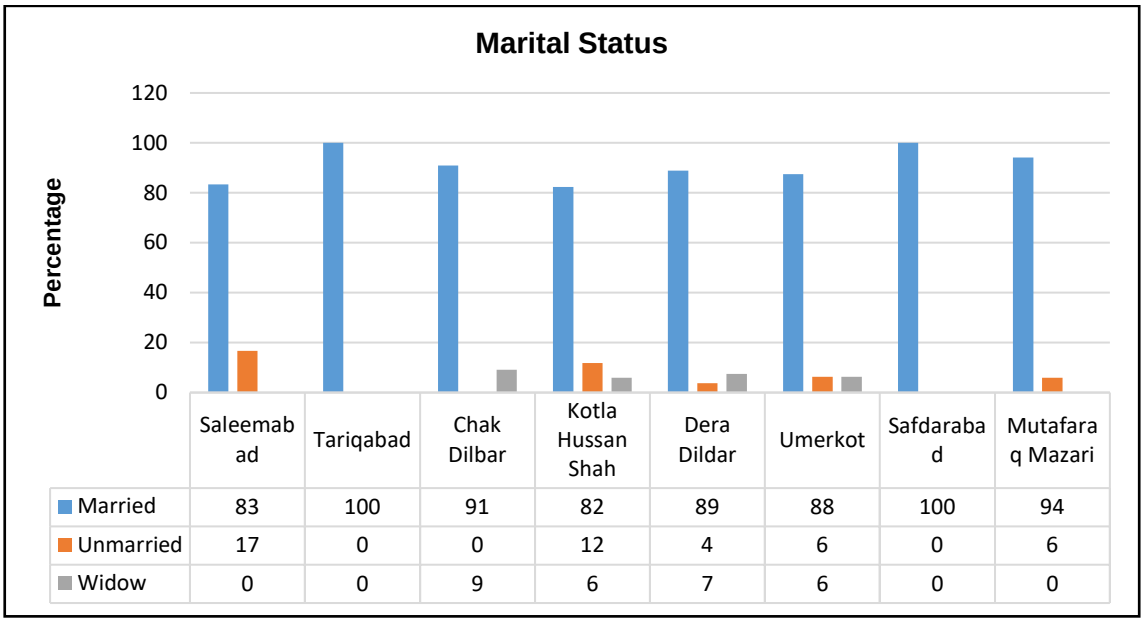


Figure 4.19: Marital Status of the Respondents

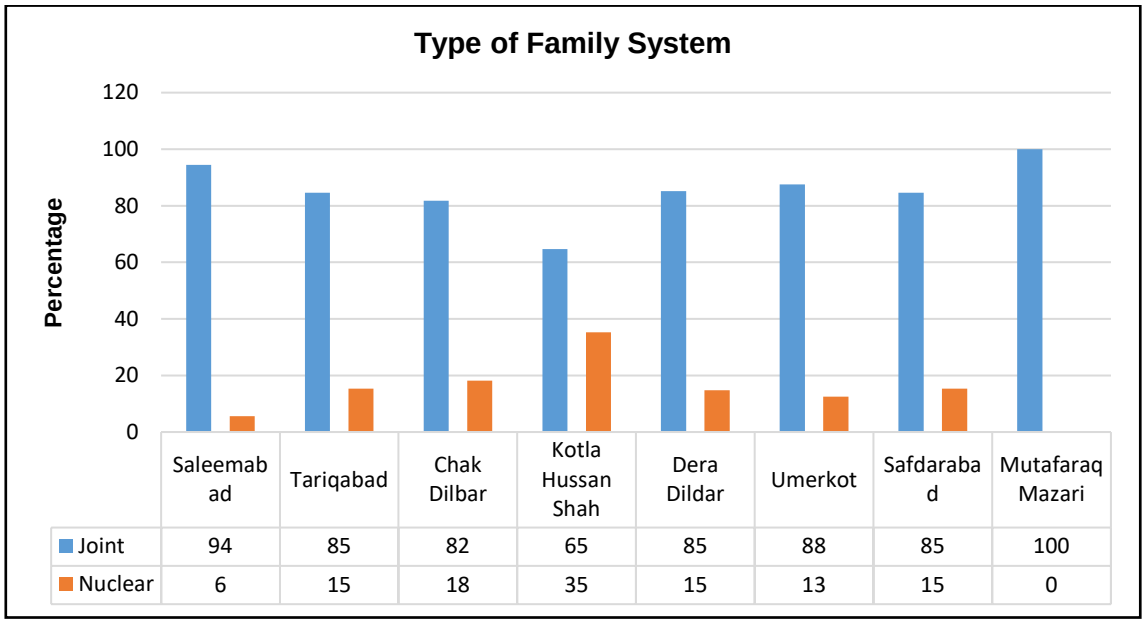


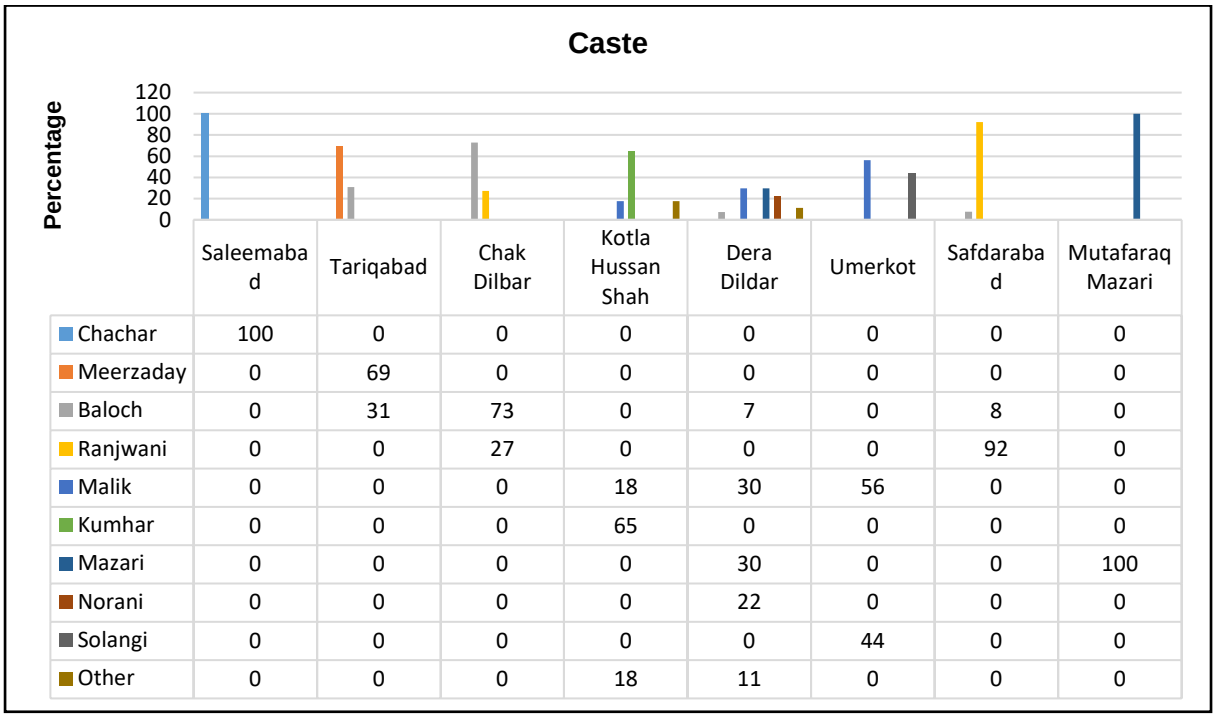
Figure 4.20: Family System of Respondents

E. Religion

The survey area is predominantly having Muslim-community, during consultation meeting the respondent were inquire about the existence of any other minority. But no other religion was reported by the respondents of any village.

F. Caste System

Extreme diversity in the caste system of the respondents was observed in all settlements of projected area. Majority villages have their caste according to the tradition and history of evolution of the respected village. The major castes include Chachar, Meerzaday, Baloch, Kumhar and Mazari. Some other castes include Syed, Somrha and Mirasi were also reported. The percentages of various castes in the proposed project sites are given in **Figure 4.21**

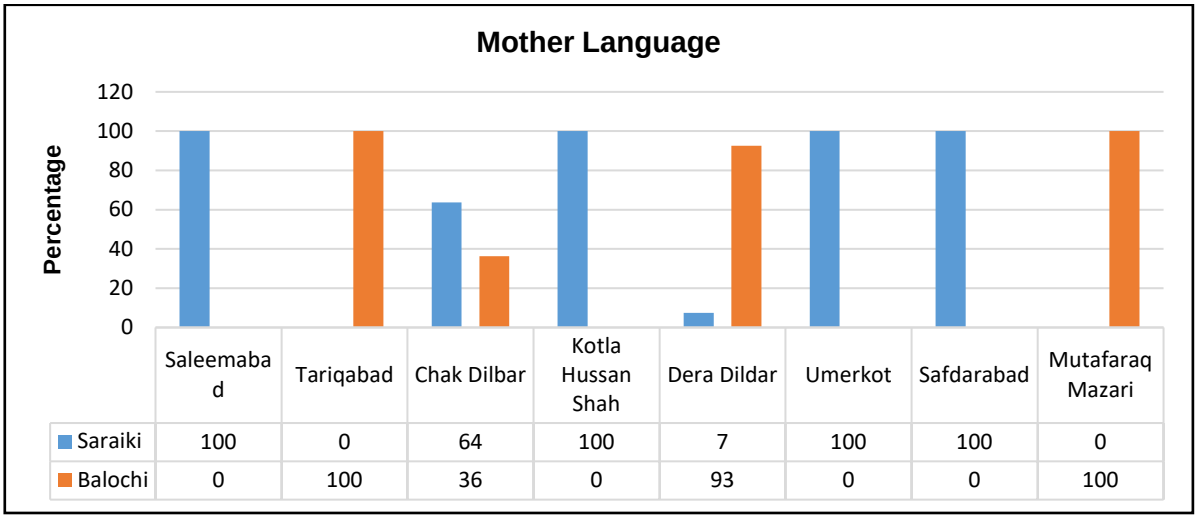


	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Chachar	100	0	0	0	0	0	0	0
Meerzaday	0	69	0	0	0	0	0	0
Baloch	0	31	73	0	7	0	8	0
Ranjwani	0	0	27	0	0	0	92	0
Malik	0	0	0	18	30	56	0	0
Kumhar	0	0	0	65	0	0	0	0
Mazari	0	0	0	0	30	0	0	100
Norani	0	0	0	0	22	0	0	0
Solangi	0	0	0	0	0	44	0	0
Other	0	0	0	18	11	0	0	0

Figure 4.21: Caste System of the Respondents

G. Languages Spoken

The dominant languages in the projected Villages are Saraiki and Balochi. **Figure 4.22** represent the percentage of language spoken by the respondents.



	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Saraiki	100	0	64	100	7	100	100	0
Balochi	0	100	36	0	93	0	0	100

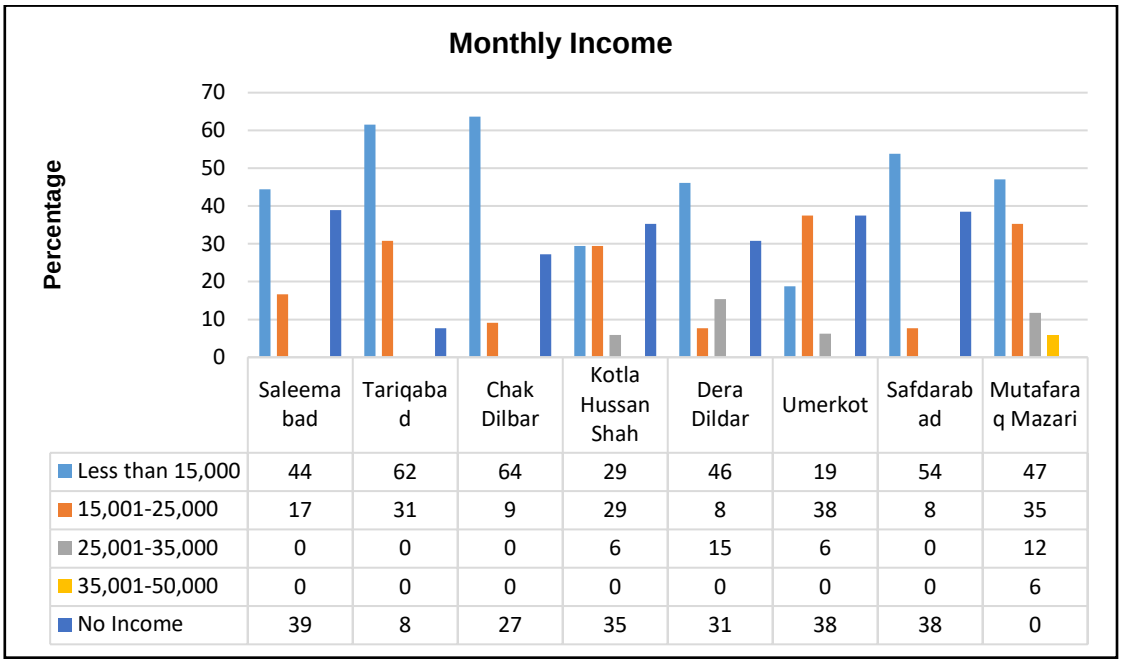
Figure 4.22: Mother Language of the Respondents

4.1.5 Socio-Economic Characteristics

A. Monthly Income of the Respondents

The monthly income earned from various sources varied widely among individuals with the lowest earning reported being less than PKR 15,000 and the highest earning above PKR 50,000. Mostly, people are apprised that their monthly income is hand to mouth to meet their household demands.

The laborers are financially weak with very limited income i.e., Less than 15,000 to 25,000 and resources to meet the needs of their families. Small number of populations earn 25001-35000. While a minor percentage of people who earn up to 50,000 are observe in Mutfaraq Mazari who work as government employee. Ratio lie under the name of No income are from the female respondents and few students. Percentage of the average monthly income of the respondents is shown **Figure 4.23**



	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Less than 15,000	44	62	64	29	46	19	54	47
15,001-25,000	17	31	9	29	8	38	8	35
25,001-35,000	0	0	0	6	15	6	0	12
35,001-50,000	0	0	0	0	0	0	0	6
No Income	39	8	27	35	31	38	38	0

Figure 4.23: Monthly Income of the Respondents

B. Ownership Status of the Houses

Majority of the respondents owned their homes and no renters were reported. Whereas, in Chak Dilber, Kotla Hussan Shah and Dera Didar, people used to live in other dwellings (living on other person's land e.g., Namberdar or any effective person of the area) were also observed. Percentage of the ownership of the houses of the respondents is shown in **Figure 4.24**.

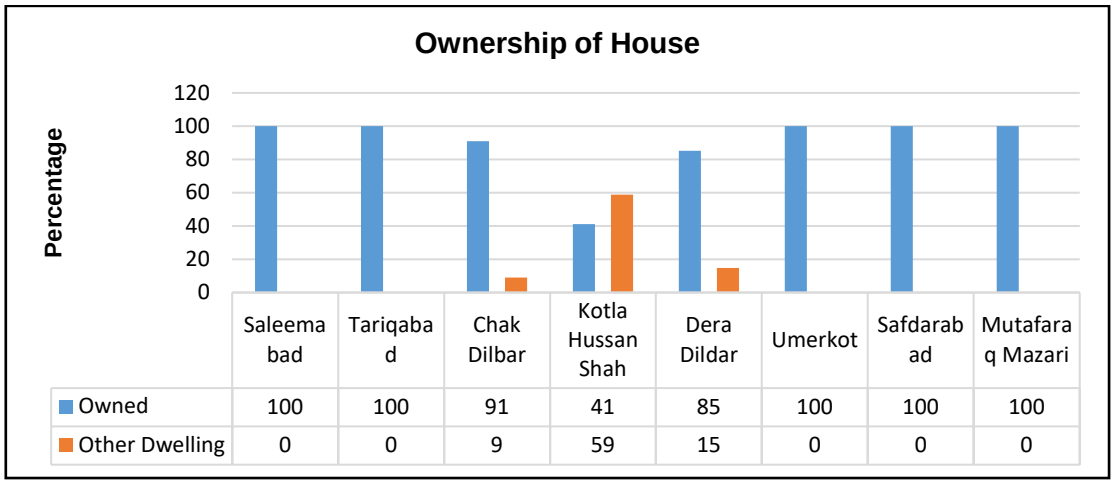


Figure 4.24: Ownership of the Houses of the Respondents

C. Housing Construction Pattern

Majority of the respondents have pacca houses though the proposed project areas lack basic amenities, however, with the passage of time, the people have built pacca homes i.e., RCC roof, stone walls with cement mortar, cement plastering & flooring. A few mud/ katcha and semi katcha houses was reported. However, a few semi-pacca houses were reported in Nature of construction of houses is shown in **Figure 4.25**

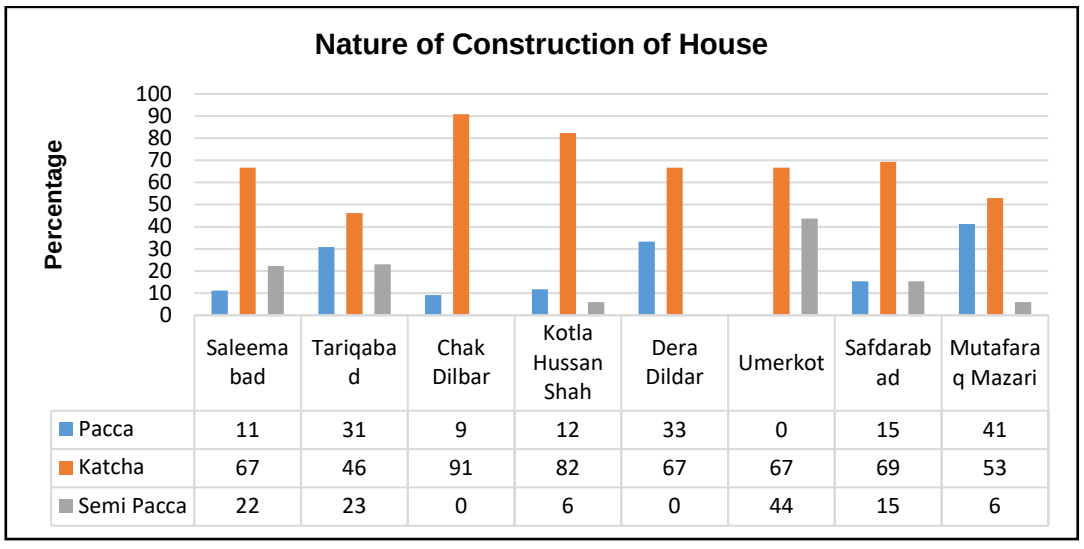


Figure 4.25:Nature of Construction of houses

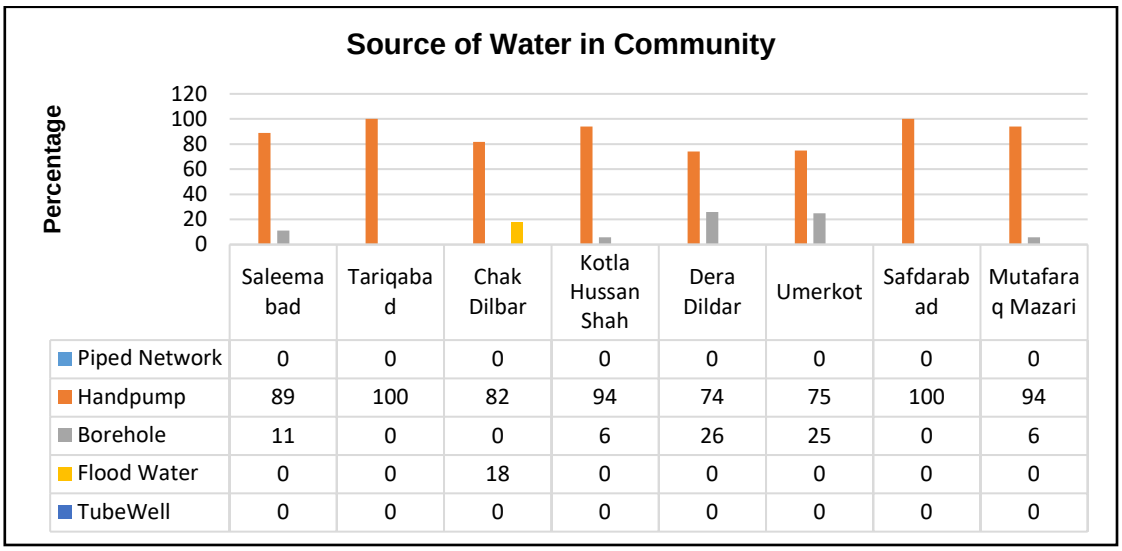
D. Health Facilities

Poor health conditions in the project area are one of the reasons behind the initiation of the proposed project. The health of the people in the proposed project area is continuously deteriorating due to inadequate water and sanitation facilities. Most of people suffer from water-borne diseases.

Majority of the respondents seek medical facilities from BHU Umer Kot, THQ Rojhan, DHQ Rajanpur, whereas, for better health consultation and treatment, the population travel to DG Khan, Sadiq Abad, Multan and Rahim Yar Khan.

E. Source of Water in Community

Majority of people in project area use handpump and bored water at their houses, a small number of people in Chak Dilber use Flood water for Domestic use as the mentioned area is flood effected. Source of water in community is shown in **Figure 4.26.**



	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Piped Network	0	0	0	0	0	0	0	0
Handpump	89	100	82	94	74	75	100	94
Borehole	11	0	0	6	26	25	0	6
Flood Water	0	0	18	0	0	0	0	0
TubeWell	0	0	0	0	0	0	0	0

Figure 4.26:Source of Water in Community

F. Source of Drinking Water

In all villages of project areas majority of people use hand pumps at their houses, few of them used bored water, people from Chak Dilber and Umer Kot use nearby filtration plant for drinking purposes but water from filter is brackish. Therefore, people of Chak Dilber buy water from Rojhan by local venders for drinking purposes. However according to respondents' water is undrinkable and causes multiple diseases in local community. Source of water in community is shown in **Figure 4.27**

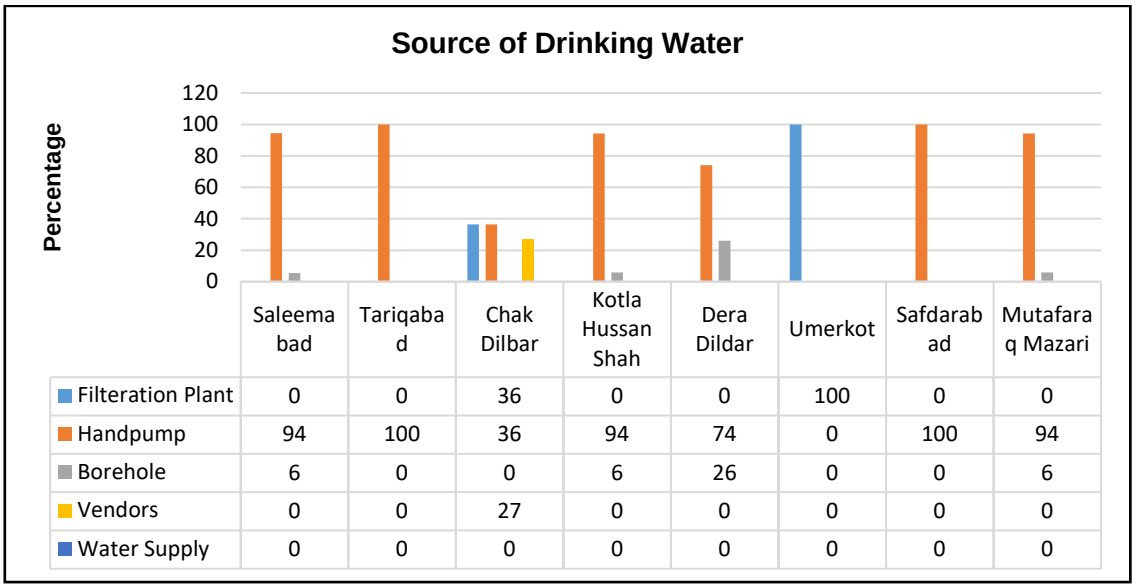


Figure 4.27:Source of Drinking Water in Community

G. Satisfaction with Water Quality

The survey is carried out to check whether the population is satisfied with the water quality or not. So, the respondent from Saleemabad show maximum level of satisfaction and respondent from Kotla Hussan Shah show full dissatisfaction from the quality of water in their community. While the rest of the participants from other villages give negative concerns. Satisfaction with water quality has been shown in **Figure 4.28**

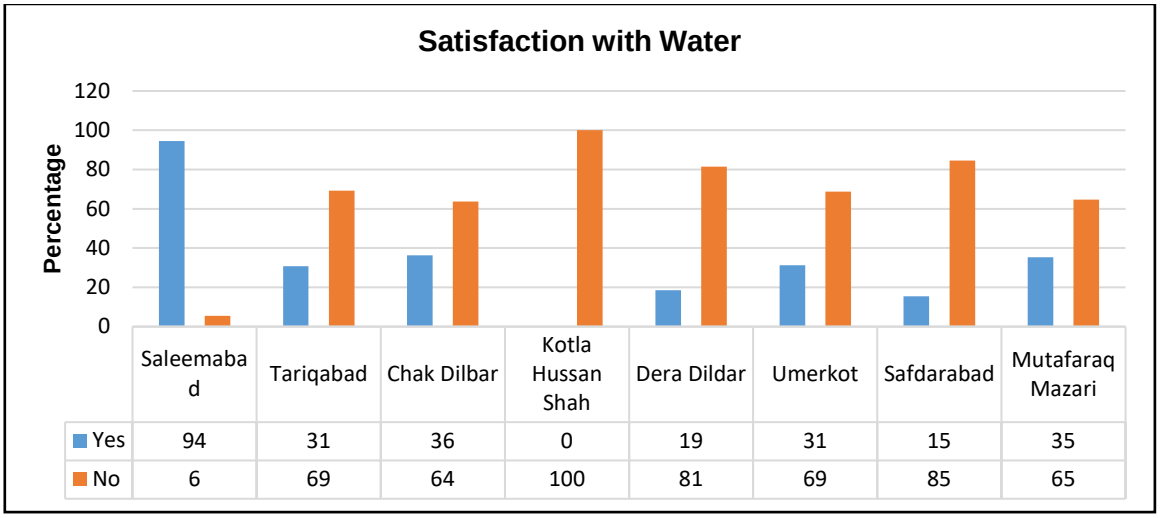


Figure 4.28:Satisfaction with the Water Quality

H. Type of Sewerage System

Two types of major sewerage system were reported in the survey i.e., soakage pits system while in rest of the population, there is no sewerage system and the sewage is being disposed of in open fields/Plots. Number of respondents from Chak Dilber and Safdarabad share to have open drain system for the disposal of waste water. Percentage of type of sewerage system in projected villages has been shown in **Figure 4.29.**

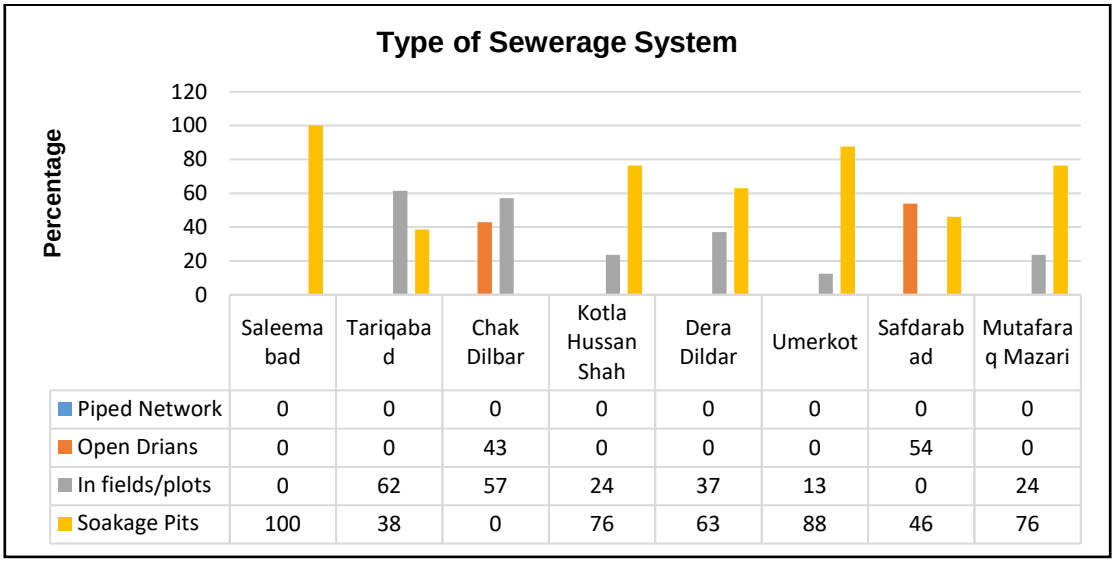


Figure 4.29: Type of Sewerage System

I. Type of Solid Waste Management

According to survey analysis, almost all respondents (100 percent) in all the villages use open dumping method for the deposal of solid wastage, expect in Chak Dilber, there the availability of Community Bin is reported.

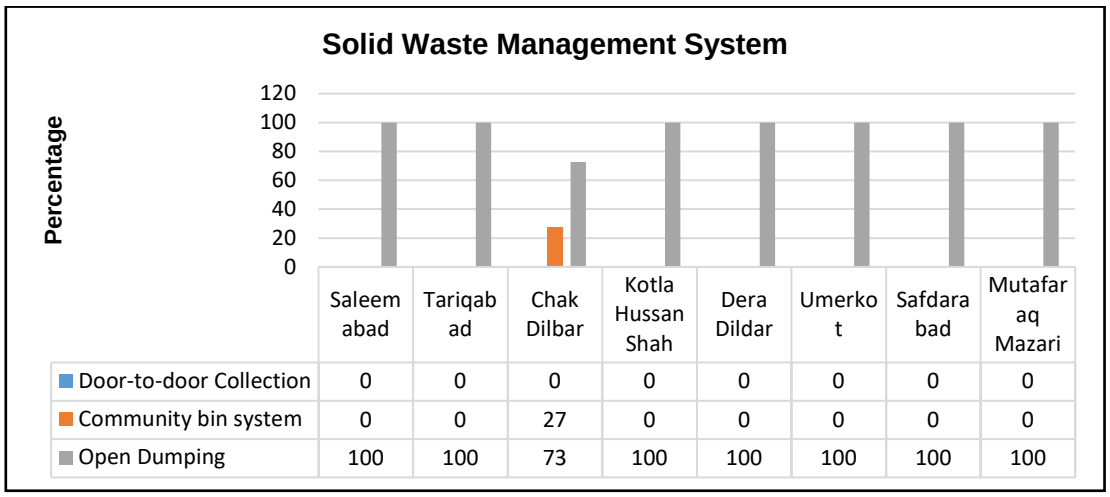


Figure 4.30: Type of Solid Waste Management System

J. Major Disease

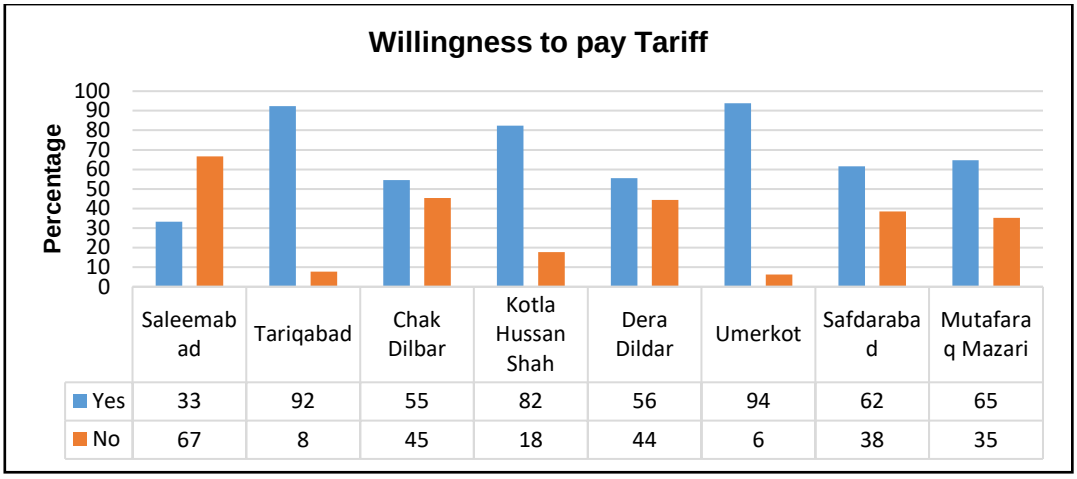
Disease like Hepatitis, stones in kidney, Malaria are seen in almost all of the villages due to bad quality of water. However, cases of gastrointestinal, typhoid and allergy are also found in majority of the respondents. As projected population share the water being used is contaminated, bitter in taste, yellow aster being exposed to air and contain smell.

K. Major Crops

Major crops of the villages of project areas are Wheat and cotton, most of the respondents who work as farmer on capitalist's land, share that the production of crops vary from season to season. As the survey is conducted in April, the crops are enriched with the production of wheat and cotton, while some of the respondents grow fodder for animals. And use Canal and Tube well for the irrigation of the fields.

L. Willingness to Pay Tariff Amount

Almost all the people approve the implementation of the project. Respondents from all the villages share the significance and need for the implementation of the project. But many participants share mix response for the willingness to pay the bill/tariff for the project. Here **Figure 4.31** show the responds of the participant for their willingness to pay tariff.



	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Yes	33	92	55	82	56	94	62	65
No	67	8	45	18	44	6	38	35

Figure 4.31: Willingness to Pay Tariff

M. Amount of Tariff

It is suggested that by considering the economic condition of local community, the respondents were asked about their budget that how much is the tariff should be, so they can pay easily. The amount divided into categories after the responses of the participants. Majority of the answers lie in 100 to 200 of category. **Figure 4.32** draw the image perfectly

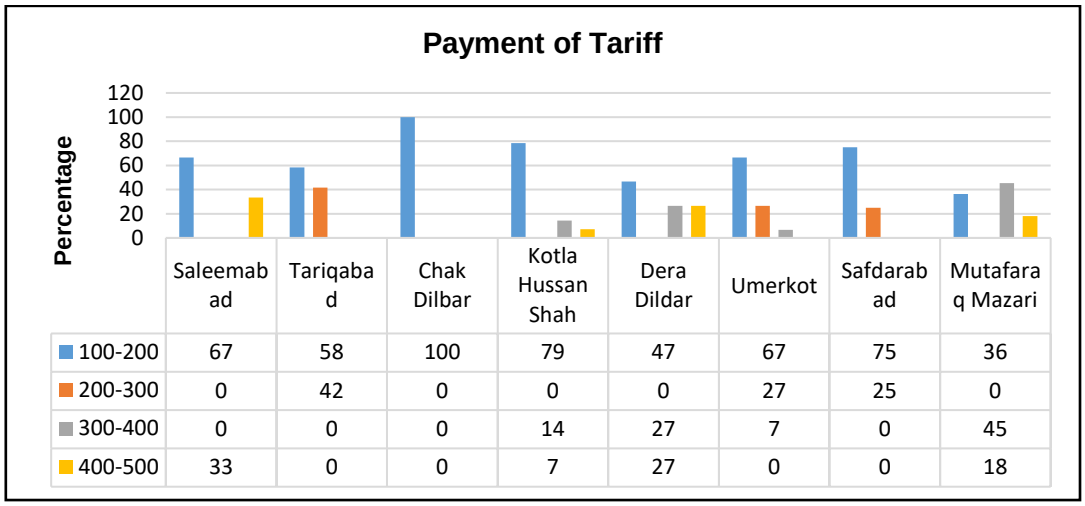


Figure 4.32: Amount of Tariff

4.1 Gender Situation Analysis

4.1.1 Introduction

This section presents findings of Gender Situation Survey. The survey was aimed at identification of women related issues, in general and water and sanitation related issue, in specific. The problems and issues identified in the gender survey shall be used as a basis of further planning and improvements in all rural settlements.

4.1.2 Purpose and Objectives

Following are some prime objectives of Gender Situation Survey:

a. To address gender related issues;
b. To specify division of labor and time allocation;
c. To address awareness and attitudes towards education and skills;
d. To facilitate and encourage involvement and participation of women;
e. To ensure tangible benefits to women;
f. To assess existing situation of water supply and sewerage facilities at household level;
g. To recognize a sense of responsibility about the usage, benefits and scarcity of water and efficient sewerage disposal;
h. To work closely with the females of all settlements to address sanitation and hygiene practices;
i. To estimate willingness to pay for improved water and sanitation facilities; and
j. To check knowledge and implementation of project execution;

4.1.3 Conducting Field Survey & Data Collection

Gender consultation meetings and interviews were conducted randomly with women in eight (08) Rural Settlements i.e., Safdarabad, Chak Dilber, Dera Dildar, Mutfaraq Mazari, Saleemabad, Kotla Hussan Shah, Umer Kot and Tariqabad during month of April 2023. During the survey, efforts were made to include such female respondents in the study, who were

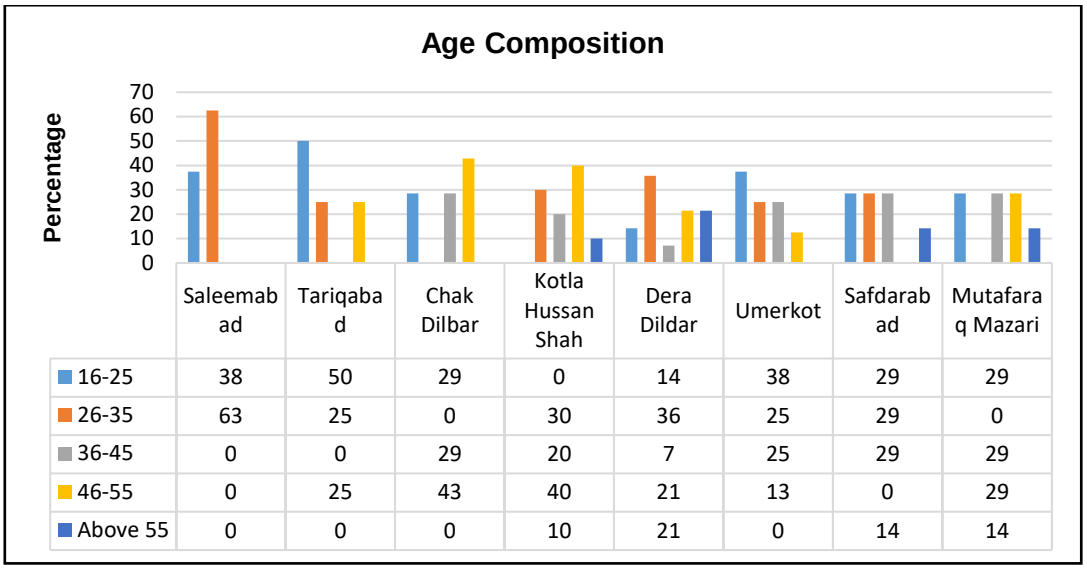
mature enough to give response, have awareness & well connected with the other community to identify the impacts caused due to proposed project. The number of women were contacted by Simple Random Sampling Technique for above mentioned sample size.

The women of project area were proactive in participation and showed their significant support for project execution. The gender survey tool is attached as **Annex-V.**

4.1.4 Results of Gender Situation Survey

A. Age Composition of Female Respondents

The gender situation survey **Figure 4.33** shows that larger percentage of women falling in age group of 16-to-25-year participants in the survey, while second most occurring age group is 26-35 and so on. Women in the age group of 26-35 years enthusiastically participated in the survey and their views have greater significance and have better vision than other age groups.

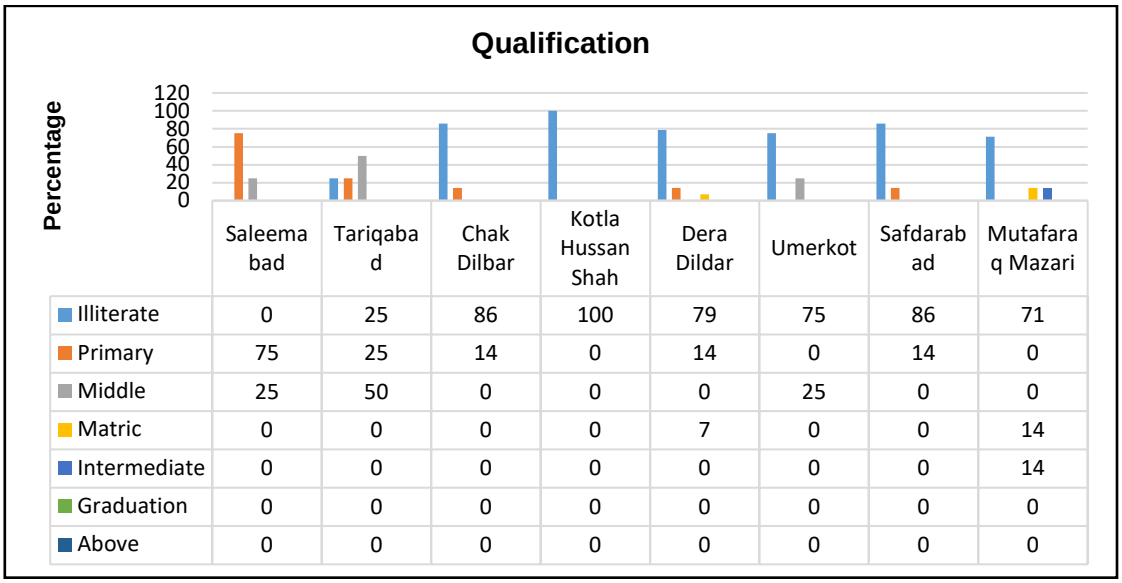


	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
16-25	38	50	29	0	14	38	29	29
26-35	63	25	0	30	36	25	29	0
36-45	0	0	29	20	7	25	29	29
46-55	0	25	43	40	21	13	0	29
Above 55	0	0	0	10	21	0	14	14

Figure 4.33: Age Composition of Female Respondents

B. Educational Status of the Female Respondents

From survey results **Figure 4.34** it was found that majority of the respondents were found illiterate. While in Saleemabad majority females are educated up to primary level and rest up to middle. Level of education up to matric is visible in every village but vary in percentage. The literacy rate actually measures the percentage of population aged 15 and above who are able to read and write. This shows that the trend of school-going children in the proposed project area varies from village to village which might be due to financial constraints as well as a lack of educational facilities. Because the survey tool is design in such way to understand the willingness of female education and all the women show great urge to pursue their education and share the suggestion of provision of educational facilities for girls.

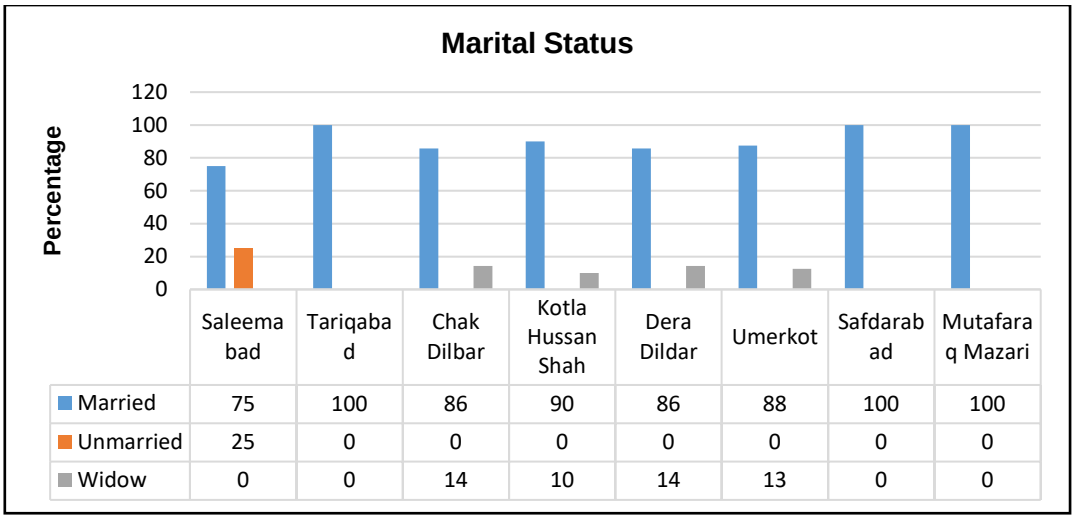


	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Illiterate	0	25	86	100	79	75	86	71
Primary	75	25	14	0	14	0	14	0
Middle	25	50	0	0	0	25	0	0
Matric	0	0	0	0	7	0	0	14
Intermediate	0	0	0	0	0	0	0	14
Graduation	0	0	0	0	0	0	0	0
Above	0	0	0	0	0	0	0	0

Figure 4.34: Qualification of Female Respondents

C. Marital Status of Female Respondents

In sampled respondents, the percentage share of married respondents was higher than that of unmarried. All the respondents were found married during the gender survey except Saleemabad where a small percentage of respondents i.e., 25% are found unmarried. Whereas cases of widow also get in report from different villages as shown in **Figure 4. 35.**



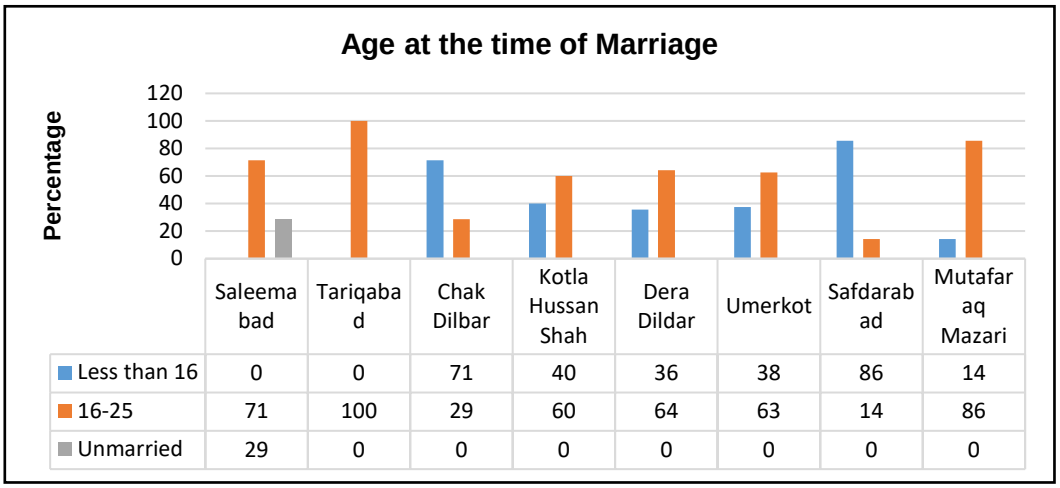
	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Married	75	100	86	90	86	88	100	100
Unmarried	25	0	0	0	0	0	0	0
Widow	0	0	14	10	14	13	0	0

Figure 4.35: Marital Status of Respondents

D. Age of Female Respondents at Time of Marriage

A huge proportion of young girls are forced to marry under the age of 16 in Chak Dilber and Safdarabad, due to socio-economic and cultural reasons, whereas small percentages of early age marriages visible in all of villages. As a greater percentage of females i.e.,100 percent got married in 16-25 years of age in Tariqabad, while other female population is also married in rest of the villages. Expect in Saleemabad where a small number of females are unmarried.

The minimum age of marriage set by the Federal Shariat Court (FSC) of Pakistan is 16 years[8] under the Child Marriage Restraint Act (CMRA) 1929. Survey findings are summarized in **Figure 4.36**

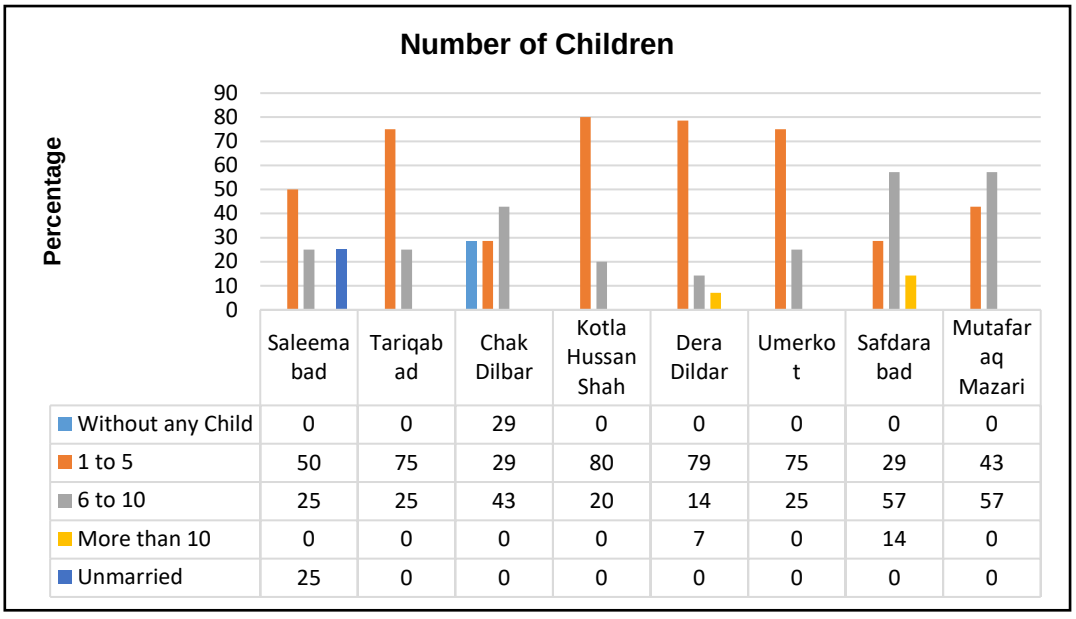


	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Less than 16	0	0	71	40	36	38	86	14
16-25	71	100	29	60	64	63	14	86
Unmarried	29	0	0	0	0	0	0	0

Figure 4.36: Age at the Time of Marriage

E. Number of Children of Female Respondents

The number of children has been divided on the bases of the responses of the respondents as shown in **Figure 4.37.** Majority of the respondents have up to 5 number of children. While in Chak Dilber female share the concern of difficulty in conceiving and many females do not have children even after many years of marriage.



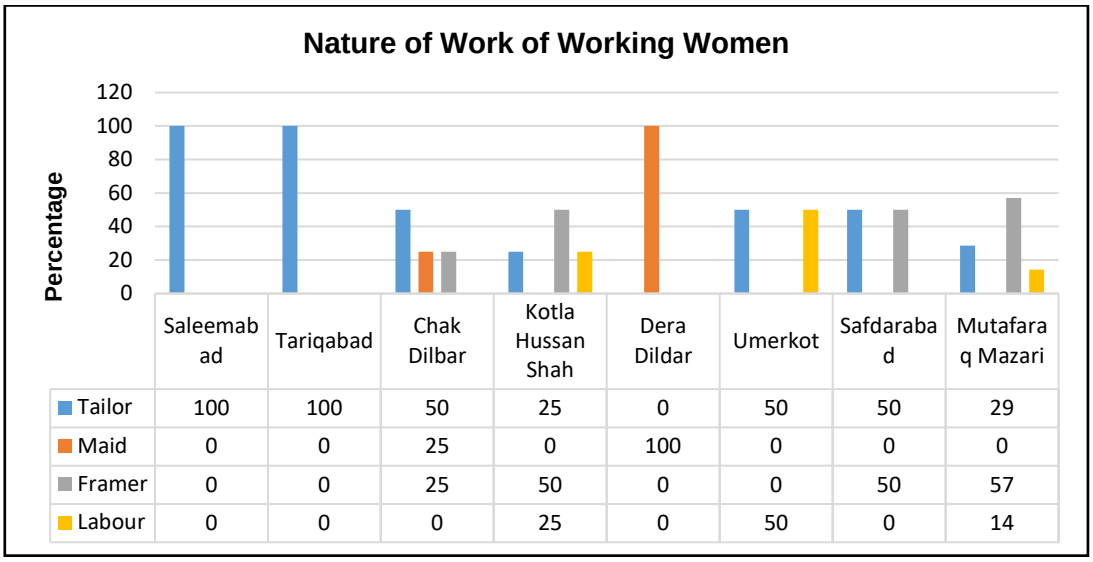
	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Without any Child	0	0	29	0	0	0	0	0
1 to 5	50	75	29	80	79	75	29	43
6 to 10	25	25	43	20	14	25	57	57
More than 10	0	0	0	0	7	0	14	0
Unmarried	25	0	0	0	0	0	0	0

Figure 4.37: Number of Children

[8] https://www.dawn.com/news/1654648

F. Occupation of Female Respondents

According to Gender Situation Survey Findings **Figure 4.38,** it has been seen that majority of the female respondents are engaged in household activities and look after their children and other family members. And the respondents from the rest of the settlements were working. The women work as tailor, house maids, farmer in agriculture and laborer to meet their expenses and to support their families, their salaries are used to fulfill the household expenses.

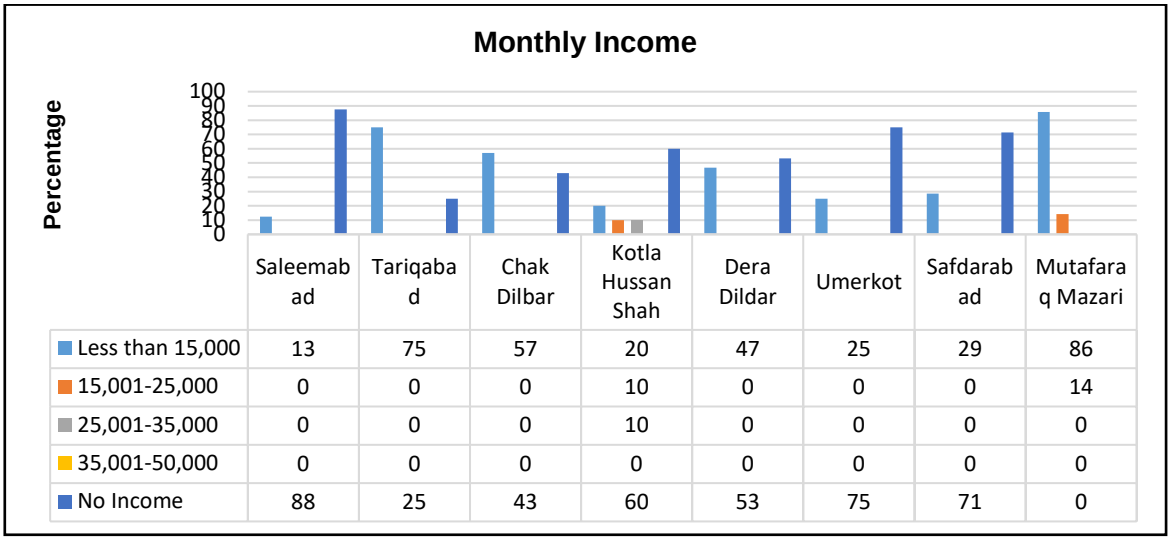


	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Tailor	100	100	50	25	0	50	50	29
Maid	0	0	25	0	100	0	0	0
Framer	0	0	25	50	0	0	50	57
Labour	0	0	0	25	0	50	0	14

Figure 4.38: Nature of Work of Working Women

G. Monthly Income of Female Respondents

As discuss earlier, majority of the females busy in household activities and taking care of their children and family members, result in no employment and generate zero income, shows in **Figure 4.39.** While on the other hand, females who works earn less than 15,000, but their income are used to fulfill the household expenses by their own will.



	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Less than 15,000	13	75	57	20	47	25	29	86
15,001-25,000	0	0	0	10	0	0	0	14
25,001-35,000	0	0	0	10	0	0	0	0
35,001-50,000	0	0	0	0	0	0	0	0
No Income	88	25	43	60	53	75	71	0

Figure 4.39: Monthly Income of Working Women

H. Power to spend the money

Figure 4.40 shows the majority of respondents have power to spend their money the way they like. While in, Chak Dilber and Safdarabad, the female shows negative concerns

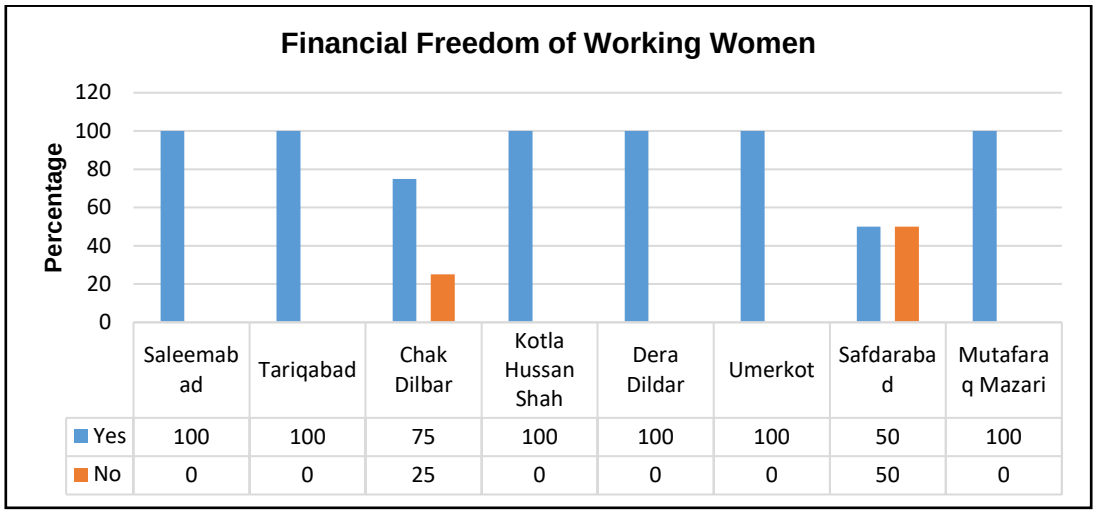


Figure 4.40: Power to spend the money

I. Reasons of not Working

The survey was designed in such way to assess the reasons behind of which women do not work outside their houses. Responses were received i.e., cultural barrier as it is considered to be bad for female to work outside of their houses, lack of resources, lack of skills to be a tailor or do any embroidery work and others as some of them are students and due to busy household chores. Flood issue is one of the issues reported from Safdarabad, as the area is under flood effects and females show their urge to work in agriculture as flood destroy their all crops and residential area. While all the female participants work and help their family members financially. Survey findings are summarized in **Figure 4.41** below:

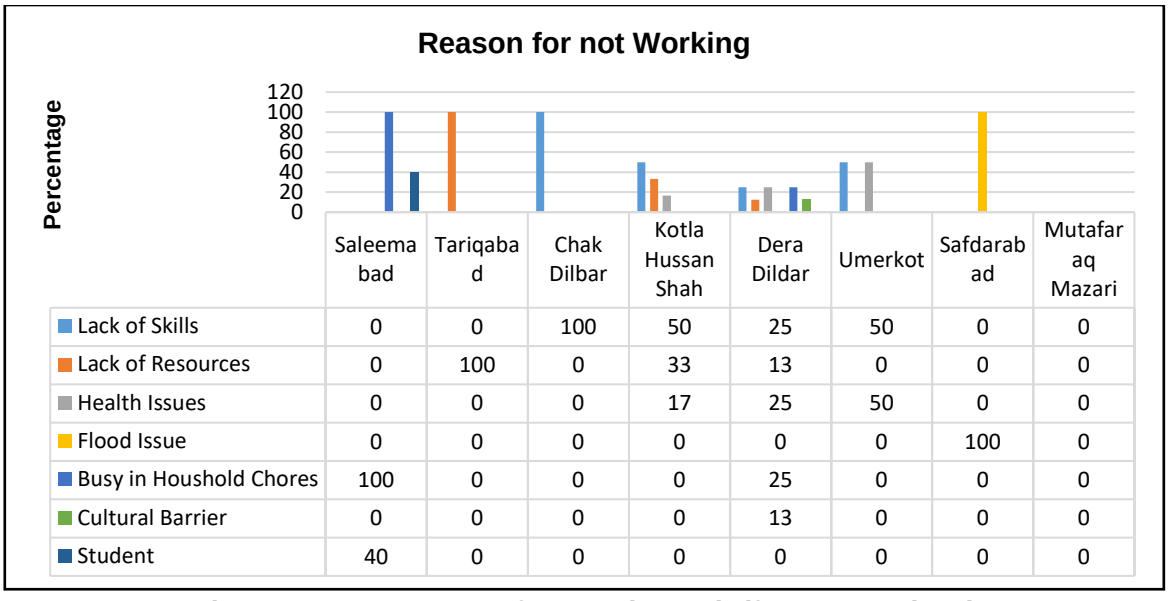


Figure 4.41: Reasons of Not Doing Job (for Housewives)

J. Monthly Savings

Figure 4.42 shows the money saving from household income every month. It is evident from the findings that majority of the respondents couldn't save money from their monthly income, as their all income goes towards the household expenses.

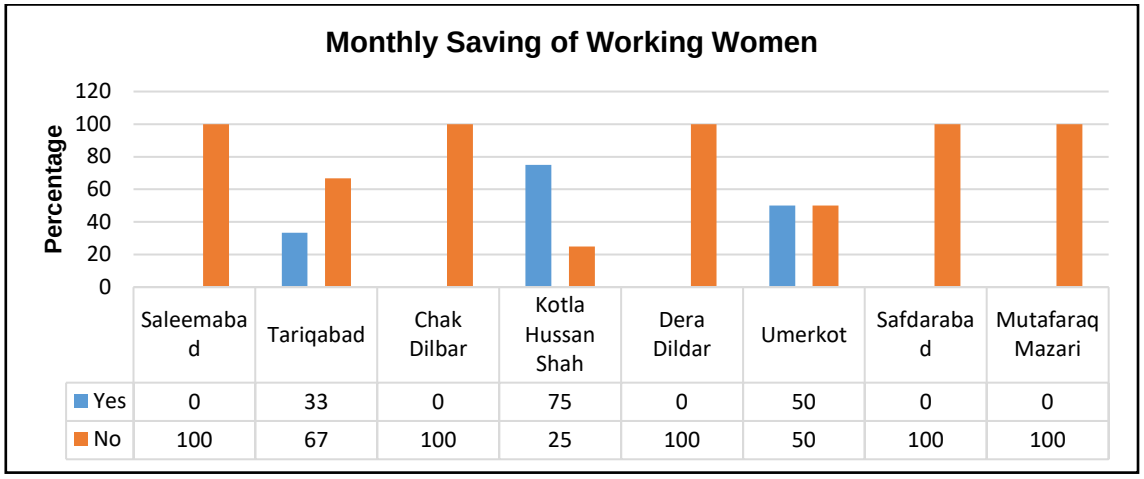


Figure 4.42: Monthly Saving of Working Women

K. Participation in Decision Making

The majority female respondents in don't take part in decision making for any kind affairs. While majority of respondents in Saleemabad and Umer Kot play major role in decision making or domestic management and Agriculture affairs. Survey findings are summarized in **Figure 4.43** below:

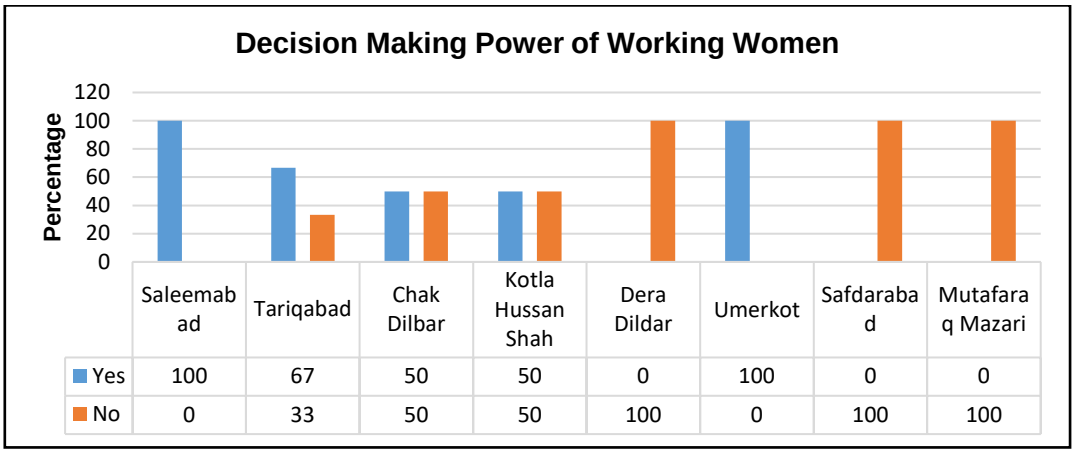


Figure 4.43: Participation in Decision Making

L. Participation in Decision Making for Domestic & Agriculture Affairs

Saleemabad, Tariqabad, Chak Dilber, Umer Kot and Kotla Hussan Shah have highest percentage of respondents who play an important role in decision making of their domestic and agriculture affairs. But another rural settlement. While the rest of the females from Dera Dildar, Safdarabad and Mutfaraq Mazari, didn't have any vital role in decision making.

Survey findings are summarized in **Figure 4.44** below:

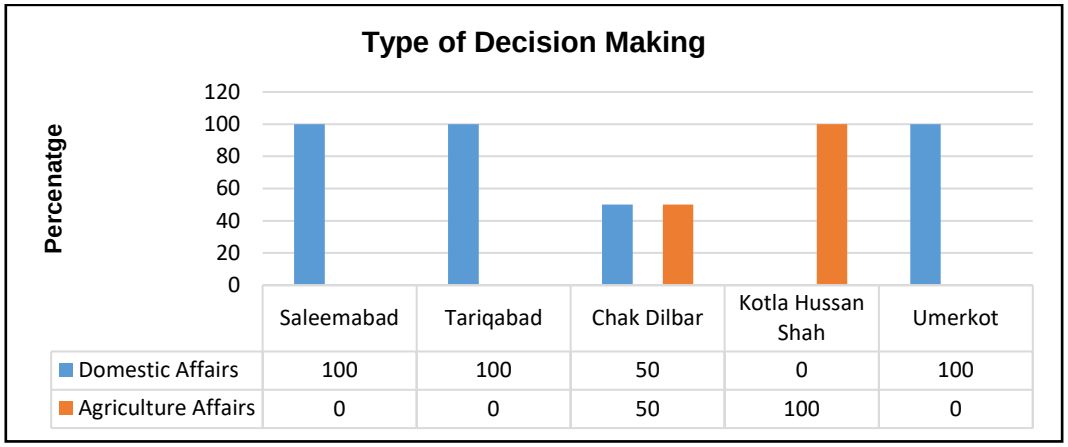


Figure 4.44: Participation in Decision Making for Domestic & Agriculture Affairs

M. Types of Household Tasks

The women were inquired about the household task that are in their daily practices. Many women with Sewing and embroidery skills share they perform all the household tasks including Laundry, doing dishes, cooking and cleaning house. The large percentage of respondents from all rural settlements claim that they only perform their own household chores because of lack of skills in any kind specific task like other as sewing etc. Survey findings are summarized in **Figure 4.45** below:

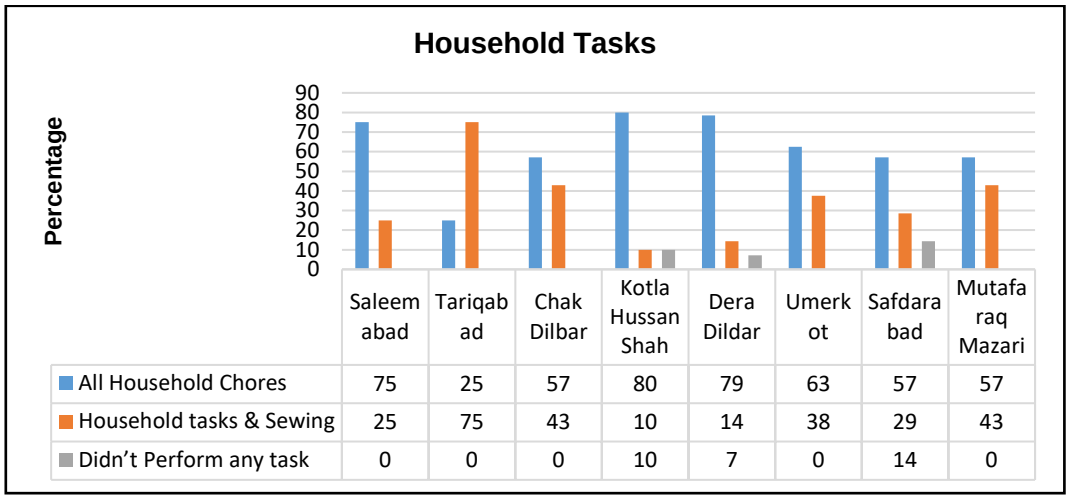


Figure 4.45: Types of Household Tasks of Women

N. Knowledge level of adolescent girls on Menstrual Hygiene

According to majority of respondents (100 percent) in all the settlements women were not aware about the menstrual hygiene. During consultation, women were inquired about their awareness level and safety precautions that they perform while menstrual cycle. And the response was quite negatives because many females didn't focus on their hygiene during cycle. After a brief lecture on the, adequate and clean water supply is necessary to maintain the menstrual hygiene, significant level of maintenance of hygiene and it impact on them and

their children health, majority of females show positive attitude and share their suggestion to have a training session about the usage of sanitary products and day to day activities to keep their body clean.

O. Type of sanitary material use during Menstrual Cycle

Females were less aware of menstrual hygiene but they know the importance of usage of Sanitary Hygiene product to keep them safe. But due to unavailability of product in local area market, and the trend to sell sanitary products was not found in majority of the villages. Females have to use cotton pads or Cloth menstrual pad which is made at home. While few numbers of females from Tariqabad, Dera Dilber and Mutfaraq Mazari, buy sanitary products from city. Few respondents were at the stage of menopause, but they also use cloth menstrual pads during their cycle previously. Responses are shown in **Figure 4.46**

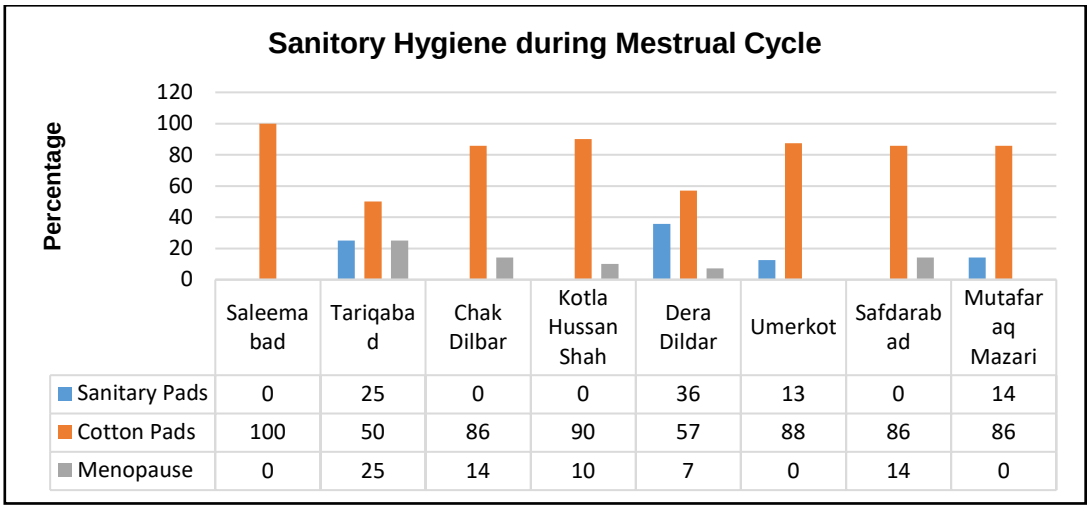


Figure 4.46: Type of sanitary material for use

P. Willingness/need to learn skills for earning the Livelihoods

To earn the livelihoods were sought by learning new skills. Because of less access to adequate trainings and less representation of women in activities requiring different skills, majority of the respondents showed an urge and need of learning new skills to earn their livelihood in all the villages. Females mention the skills they wanted to learn, as any vocational and training centers that many females already have skill of sewing and embroidery, beautician. So, if there is any institute for skills development than they can hire trainers from the community and it will be also convenient for the project team.

Q. Education of Women

The survey results reveal the low trend of educational attainment of young girls in the project area so the all of the women from all the villages are in favor of women education. Many females share the importance of attainment of education for children especially for females. They share the females have to build home and take of the family so it is important if female is well educated. They can pursue their career as well and help their family members

financially. The most important task of female as mother can be performed very well when the mother is educated and raised the children brilliantly.

R. Gender-based Violence or Domestic Violence

Survey findings show that the majority of respondents in all settlements do not face any gender-based violence or domestic violence. While the presence of domestic violence was report in Chak Dilber during consultation meeting but the female respondents show reluctancy to share their experiences in interview and deny the presence of domestic violence.

S. Free Movement of Women

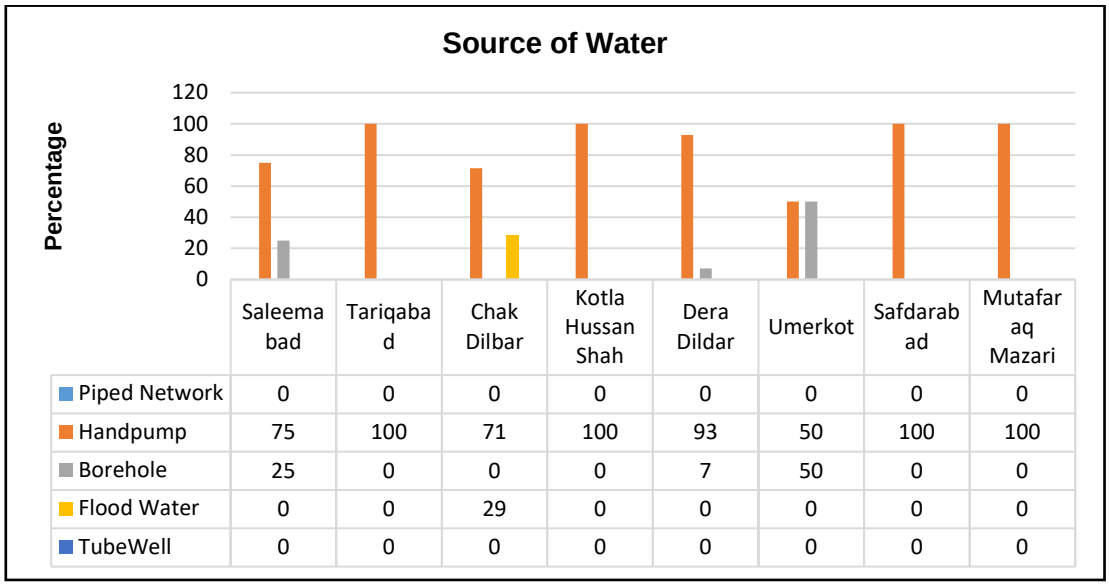
Women were enquired whether they are free to move around or not. The survey results reveal that in all the settlements of projected area, 100 percent females do not have restriction in mobility. Females feel safe and secure to move outside of their houses. All the population of the projected area live with harmony like families and know each other better than anyone.

T. Sexual Harassment

Higher percentages in survey findings show that all settlements do not face any sexual harassment in their areas. All the population of the projected area live with harmony like families and know each other better than anyone. Sexual Harassment (SH) and Sexual Exploitation and Abuse (SEA) issues reported as females do not feel secure to go anywhere.

U. Source of Water for Domestic Use

Figure 4.47 represents the source of water for domestic use. It is evident from the survey result that the main source of water supply for domestic use is handpumps in households and the second major source is bored water. 29 percent in Chak Dilber use Flood water for domestic purposes.

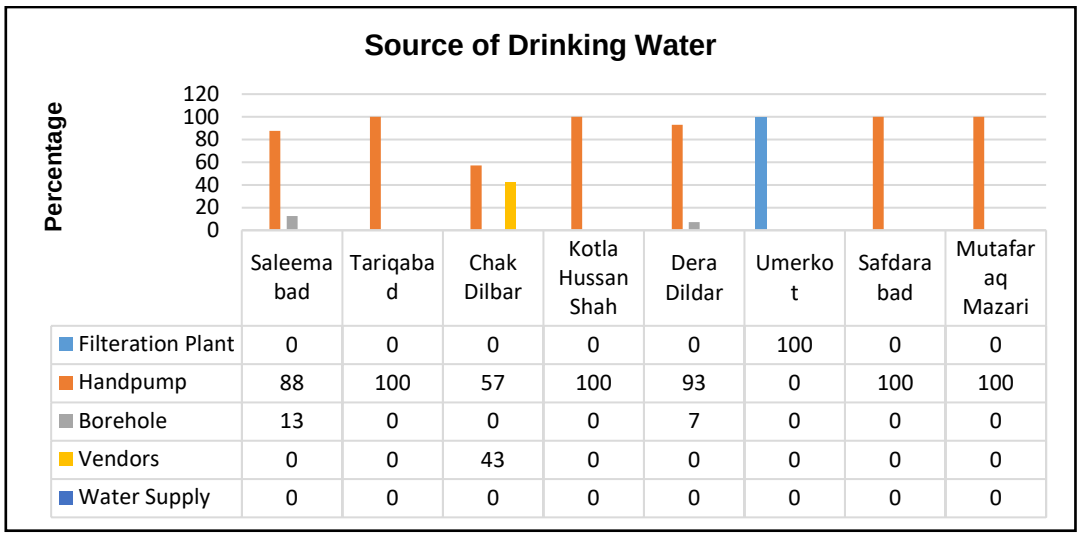


	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Piped Network	0	0	0	0	0	0	0	0
Handpump	75	100	71	100	93	50	100	100
Borehole	25	0	0	0	7	50	0	0
Flood Water	0	0	29	0	0	0	0	0
TubeWell	0	0	0	0	0	0	0	0

Figure 4.47: Source of Water for Domestic Use

V. Source of Drinking Water

In all villages of project areas majority of people use hand pumps at their houses, few of them used bored water, people from Chak Dilber and Umer Kot use nearby filtration plant for drinking purposes but water from filter is brackish. Therefore, people of Chak Dilber buy water from Rojhan by local venders for drinking purposes. However according to respondents' water is undrinkable and causes multiple diseases in local community. Source of water in community is shown in **Figure 4.48.**

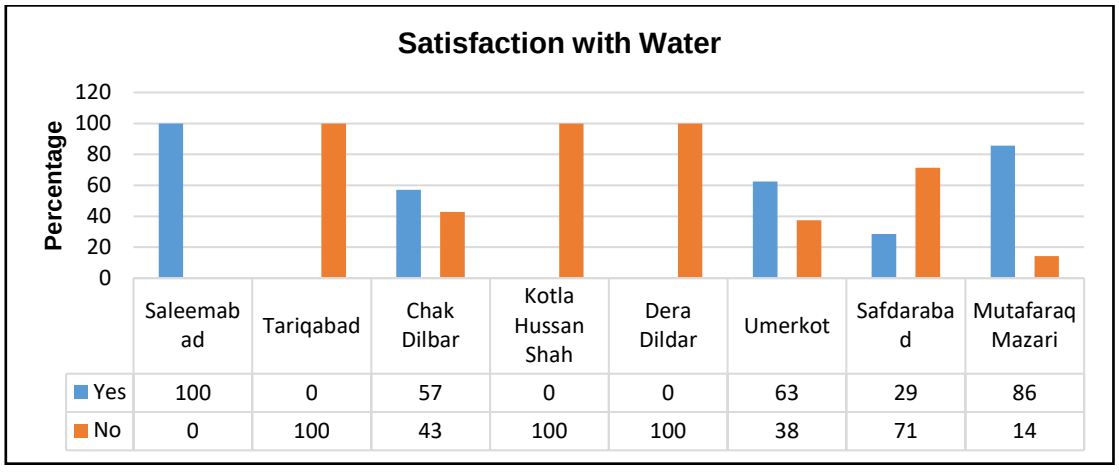


	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Filteration Plant	0	0	0	0	0	100	0	0
Handpump	88	100	57	100	93	0	100	100
Borehole	13	0	0	0	7	0	0	0
Vendors	0	0	43	0	0	0	0	0
Water Supply	0	0	0	0	0	0	0	0

Figure 4.48: Source of Drinking Water

N. Satisfaction with Water Quality

The survey is carried out to check whether the population is satisfied with the water quality or not. So, the respondent from Saleemabad and Mutfaraq Mazari show maximum level of satisfaction and respondent from Tariqabad and Kotla Hussan Shah show full dissatisfaction from the quality of water in their community. While the rest of the participants from other villages give negative concerns. Satisfaction with water quality has been shown in **Figure 4.49.**

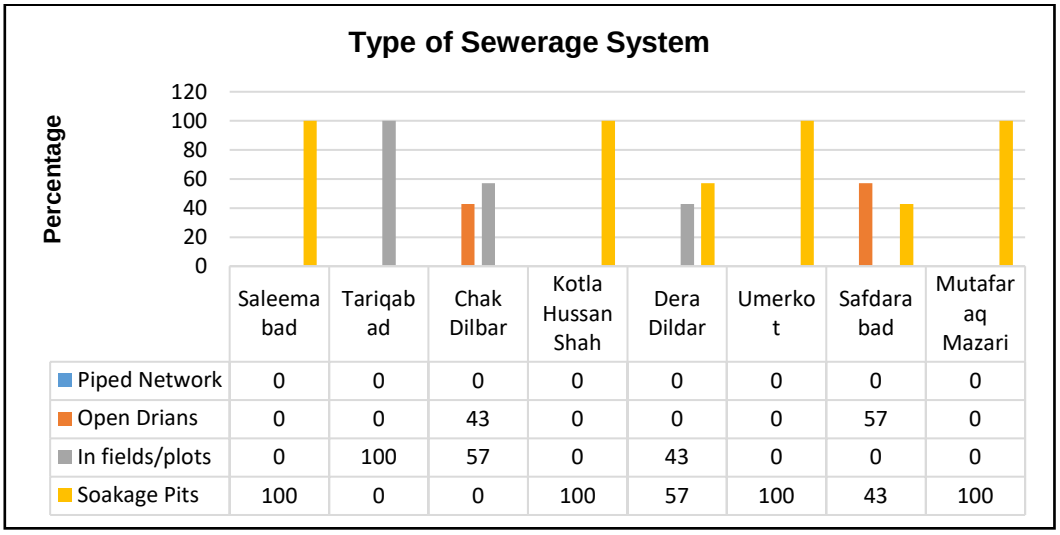


	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Yes	100	0	57	0	0	63	29	86
No	0	100	43	100	100	38	71	14

Figure 4.49: Satisfaction with the Water Quality

O. Type of Sewerage System

Two types of major sewerage system were reported in the survey i.e., soakage pits system while in rest of the population, there is no sewerage system and the sewage is being disposed of in open fields/Plots. Number of respondents from Chak Dilber and Safdarabad share to have open drain system for the disposal of waste water. Percentage of type of sewerage system in projected villages has been shown in **Figure 4.50.**

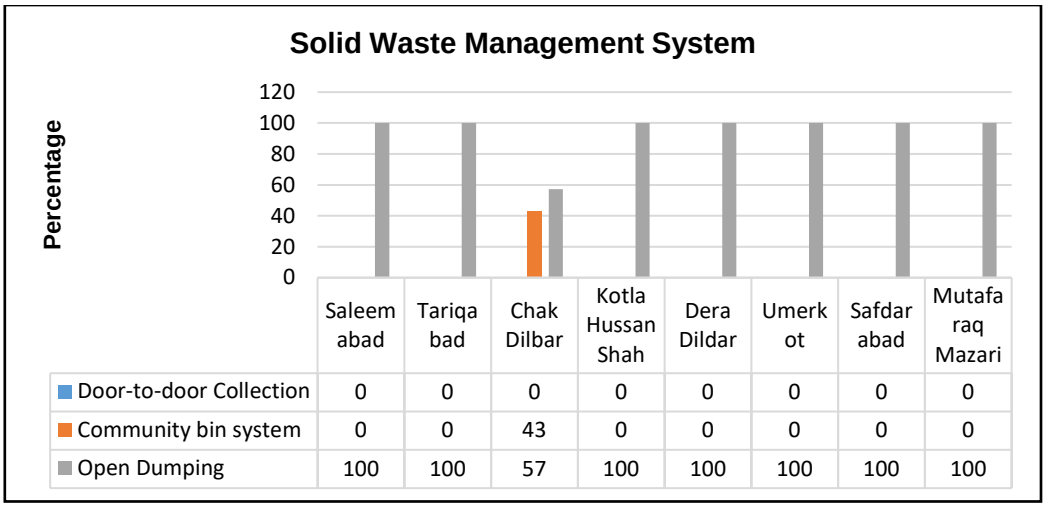


	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Piped Network	0	0	0	0	0	0	0	0
Open Drians	0	0	43	0	0	0	57	0
In fields/plots	0	100	57	0	43	0	0	0
Soakage Pits	100	0	0	100	57	100	43	100

Figure 4.50: Type of Sewerage System

P. Type of Solid Waste Management

According to survey analysis, almost all respondents (100 percent) in all the villages use open dumping method for the deposal of solid wastage, expect in Chak Dilber, there the availability of Community Bin is reported.



	Saleemabad	Tariqabad	Chak Dilbar	Kotla Hussan Shah	Dera Dildar	Umerkot	Safdarabad	Mutafaraq Mazari
Door-to-door Collection	0	0	0	0	0	0	0	0
Community bin system	0	0	43	0	0	0	0	0
Open Dumping	100	100	57	100	100	100	100	100

Figure 4.51: Type of Solid Waste Management System

W. Pressing Needs of Women in Project Area

Women were asked to share the pressing needs of Women in their areas. Women share the utmost need of the area is clear water supply system. Women are meant do the household chores and, engagement with water is higher in women than in men. So clear and sweet is one of the major needs upraise by females' respondents. Second, sewerage system and solid waste management should be prevailed in the community. Apart from these, female wanted the initiative to build educational facility as middle and higher schools for girls. Many young females wanted to continue their schooling but due to absence of schools and colleges they have to quiet, as they can't travel far from their houses. Females share that there should be health care facility at local level and female health care officer is mandatory. Females from Mutfaraq Mazari ensure that there is dispensary at local level but the satisfaction level is low. While majority of the female concerns to BHU in Umer Kot. As pregnant females have to travel to cities for their routine checkup. It will be convenient for women If any health care officer will be available at community level. Females of the projected area also suggested the provision of sui gas as they have to use woods and animal's fesses for domestic purposes.

4.1.5 CONCLUSION

The gender consultations meeting held at a common place and in encouraging atmosphere where all the women easily assembled and shared their opinions/apprehensions. The women participated actively in this gender consultation meeting and showed their significant support for the project execution. The key findings of gender consultations have been described hereunder;

- The gloomy situation of the female literacy can better be viewed by having a glimpse of the literacy rate persisting among the respondents of the project rea. Lack of educational facilities and prevailing ignorance add to less literacy among female population. Except Saleemabad, Mutfaraq Mazari and Tariqabad, where the most of female population literate up to primary, middle and intermediate level.

- Larger percentage of women falling in age group of 16-25 years participate in survey. Women in the age group of 26-35 years enthusiastically participated in the survey and their views have greater significance and have better vision than other age groups.

- Majority of respondents in all the villages are engaged in household activities and look after their children and other family members. While rest of female are working women and work as tailor, house maids to meet their household expenses. Majority of the women from Mutfaraq Mazari are from Livestock owner and other work as farmer in agriculture.

- The women financial empowerment was checked by their authorization to spend their money. Many of them revealed that they have power to spend their money the way they like.

- Women do not play a significant role in their houses regarding decisions making of business affairs but they can take decisions regarding household tasks and responsibilities. Except in Safdarabad and Mutfaraq Mazari.

- Most of the women reported that area is totally safe for women. In majority of the villages, female members have undergone through early marriages except in Tariqabad, the cases of early age marriage seem to be low.

- Majority of the women in their households are not satisfied with the water quality. In Saleemabad and Mutfaraq Mazari, females are much satisfied by the water quality.

- According to majority adequate and clean water supply is necessary to maintain the menstrual hygiene. Majority of women use an absorbent material or a cloth menstrual pad during menstrual cycle.

- Majority of respondents in all settlements do not face any gender-based violence or domestic violence.

- Provision of drinking water and water for domestic use was ranked as the utmost need of the women by all rural settlements. The second most demanding need is the provision of educational, Health institutes and Sui gas for cooking purposes.

- Women are willing to give about 100 to 200 rupees for improved water and sanitation services.

The women respondents were asked to express their view about the proposed project, majority showed positive attitude towards the proposed water supply and sewerage system and were optimistic about the effects and thought of abundant benefits like more development of the area, better standard of living, minimizing the drinking water and sewer issues and uplifting the water and sewerage system of the Project Area

5 PUBLIC CONSULTATION

5.1 General

This section describes the outcomes of the public consultation sessions held with different stakeholders that may be directly or indirectly affected by the proposed project. The consultation with stakeholders (Govt. departments, farmers, teachers, businessman, women's etc.) during project planning, designing and implementation stages is a key to sustainable development. Likewise, participation of stakeholders is essential to meet the objectives of meaningful consultation for preparation of EIA. The adequacy of the public consultation is one of the basic criteria used to determine the project compliance with the national / international safeguard policies.

5.2 Objectives and Principles of Consultation

The consultation process provides a forum where information relevant to the project is disseminated to and asked from the stakeholder. This participation is necessary because it paves a pathway between the investor and the public and enables the provision of much needed local knowledge and indigenous know-how which must be integrated into the project design. This not only fosters goodwill and success in the project but also leads to a conflict-free project implementation.

The stakeholders including government representatives, other regulators and the NGOs were met to appraise and discuss the environmental and social perspective of project activities. Their valuable concerns and suggestions were noted and thereafter incorporated in this section.

The objectives of the consultation process are to:

- Identify, Inform and involve all stakeholders and local residents including females, minorities and disables, in the consultative and participation process;
- Share information with stakeholders on the construction of the proposed project and expected impacts on the physical, biological and socio-economic environment;
- Understand stakeholders' concerns and perceptions regarding various aspects of the project, including the existing available facilities and the likely impacts of construction and operation related activities of proposed Project; and
- Provide an opportunity to the public to provide valuable suggestions in the project design in a positive manner;

5.3 Consultation and Participation Process

To ascertain the perceptions of different stakeholders about the project scope, its implementation, operation and evaluation, consultation meetings were conducted. A series of consultation sessions were carried out with stakeholders (Govt. departments, farmers, teachers, businessman, women's etc.) of Kotla Hassan Shah, Umer Kot, Tariqabad, Saleemabad, Safdarabad, Mutfaraq Mazari, Chak Dilber & Dera Dildar to gain solicit

responses for the project interventions. The tool used for the consultation and participation process has been attached as **Annex-VI.** The meetings were held in the month of April 2023.

The consultant staff preferably chose sites that are easily accessible and barrier-free to accommodate all persons. The consultative sessions/meetings are held mostly at Dera/ houses with both men and women separately. These consultative sessions were designed to exchange information, to discuss the strengths, weaknesses, opportunities, and threats of an idea or project. The consultation meetings proved very useful in information sharing and consensus building.

5.4 Identification of Stakeholders

Project stakeholders were engaged in the review and discussions on various project aspects, social and environmental issues at the early stage of impact assessments for feedback. There are two categories of stakeholders in the project:

Individual/Community Stakeholders

Project beneficiaries for instance, Residents of the project area, Shopkeepers, Employees, Teachers, Farmers and Gender.

Institutional Stakeholders

PRMSC, Livestock Department, BHU, Public Health, NGOs and Tehsil Headquarter Hospital THQ.

5.5 Information Dissemination

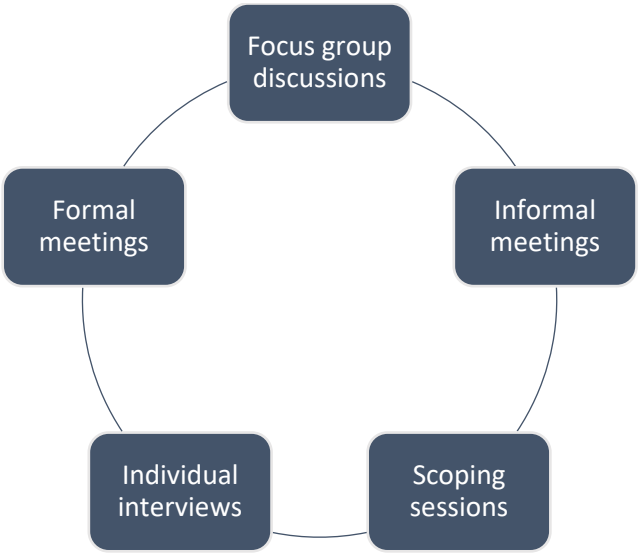
Following information was discussed and disclosed to the stakeholders during the consultation meetings:

- Introduction of the project;
- Description of various project components, their activities and impacts;
- Discuss social and environmental impacts;
- Needs, priorities and reactions of the affected people regarding the proposed projects' impacts; and
- Need of Grievance Redress Mechanism (GRM) in all villages to address the issues & concerns of stakeholders.

For information dissemination to community, culturally appropriate techniques and local language was used.

5.6 Methods of Public Consultation

Public Consultations were carried out in order to establish stakeholder's opinions regarding project implementation. The following methods were used for public consultation and stakeholder's participation:



5.7 Summary of Formal & Informal Meetings

The concerns raised by all stakeholders were considered in developing the EIA, in order to enhance project acceptability among the general public on social considerations. **Table 5.1** provides a summary of formal & informal consultation meetings with the local community (male & Female) & formal consultations with institutional stakeholders.

A. Formal Consultations with Local Community

Table 5.1: Schedule of Meetings with Local Community

Sr. No.	Name of Village	Date / Time	Venue (Place / Institution)	No. of Participants
1	Kotla Hasan Shah	04-04-2023 11:15 am to 12:45 pm	Dera Jamal Shah, Kotla Hasan Shah	21 Participants
2	Chak Dilber	04-04-2023 02:45 pm to 04:00 pm	Near Mosque Chak Dilber	43 Participants
3	Umer Kot	05-04-2023 12:50 pm to 02:15 pm	Dera Riaz Ahmad, Umer Kot	08 Participants
4	Tariqabad	05-04-2023 03:40 pm to 04:15 pm	Infront of Ghulam Qadir House, Tariqabad	30 Participants
5	Saleemabad	06-04-2023 01:30 pm to 03:00 pm	Govt. Elementary School, Saleemabad	24 Participants

Sr. No.	Name of Village	Date / Time	Venue (Place / Institution)	No. of Participants
6	Safdarabad	06-04-2023 04:15 pm to 05:20 pm	Haq Nawaz House, Safdarabad	13 Participants
7	Dera Dildar	07-04-2022 11:30 am to 01:00 pm	Dera Naseer-u-Din Mazari, Dera Dildar	15 Participants
8	Chak Mutfaraq Mazari	07-04-2023 03:15 pm to 04:15 pm	Ali Baksh House, Chak Mutfaraq Mazari	16 Participants
Gender Consultations				
9	Kotla Hasan Shah	04-04-2023 11:15 am to 12:45 pm	Dera Jamal Shah, Kotla Hasan Shah	11 Participants
10	Chak Dilber	04-04-2023 02:45 pm to 04:00 pm	Saleem House Chak Dilber	12 Participants
11	Umar Kot	05-04-2023 12:50 pm to 02:15 pm	Rafique House, Umar Kot	15 Participants
12	Tariqabad	05-04-2023 03:40 pm to 04:15 pm	Sadia House, Tariqabad	11 Participants
13	Saleemabad	06-04-2023 01:30 pm to 03:00 pm	Jam Talile House, Saleemabad	23 Participants
14	Safdarabad	06-04-2023 04:15 pm to 05:20 pm	Haq Nawaz House, Safdarabad	33 Participants
15	Dera Dildar	07-04-2022 11:30 am to 01:00 pm	Jahanzeb Mazari House, Dera Dildar	15 Participants
16	Chak Mutfaraq Mazari	07-04-2023 03:15 pm to 04:15 pm	Ali Baksh House, Chak Mutfaraq Mazari	14 Participants

B. Formal Consultations with Institutional Stakeholders

Table 5.2: Summary of Formal Consultation Meeting with Institutional Stakeholders

Sr. No.	Date	Department	Representatives of Departments	Consultant / Client Team
1	06-04-2023	Public Health Department	Mr. Habib Leghari (SDO)	Mr. Abdul Manan (Sr. Engineer) Mr. Muhammad Anns Ali (Jr. Engineer) Mr. Tanzeel (Tehsil Manager)

Sr. No.	Date	Department	Representatives of Departments	Consultant / Client Team
2	06-04-2023	NGOs (UNICEF & NRSP)	Syeda Nida Amen (Social Mobilizer NRSP) Mr. Shoaib Hafeez (Research & Development Officer UNICEF) Ms. Farah (Research & Development Officer UNICEF)	Mr. Abdul Manan (Sr. Engineer) Mr. Muhammad Anns Ali (Jr. Engineer) Ms. Javeria Islam (Social/ Gender Expert) Mr. Tanzeel (Tehsil Manager) Mr. Fahad (Assistant Manager) Mr. Hasan Bukhari (BCC Member)
3	07-04-2023	Livestock Department	Dr. Hassan Mujtaba (Additional Director)	Mr. Abdul Manan (Sr. Engineer) Mr. Muhammad Anns Ali (Jr. Engineer) Ms. Javeria Islam (Social/ Gender Expert) Mr. Tanzeel (Tehsil Manager) Mr. Hasan Bukhari (BCC Member)
4	07-04-2023	Tehsil Headquarter Hospital THQ	Dr. M. Fiaz (Deputy DHO)	Mr. Abdul Manan (Sr. Engineer) Mr. Muhammad Anns Ali (Jr. Engineer) Ms. Javeria Islam (Social/ Gender Expert) Mr. Hasan Bukhari (BCC Member Mr. Fahad (Assistant Manager)

5.8 Approach Adopted for The Consultation

To hold the meetings, people were informed one day before the meeting to assemble in the villages. In addition, the consultant team contacted the council members and community representatives of each village and informed about the purpose of these consultation meetings. The representatives played a positive role in information dissemination to locals of villages. The meetings held in an encouraging environment where people expressed their concerns and views freely. Formal meetings and interviews were also conducted with females and vulnerable of the community, to explore their needs, problems and priorities related to project execution.

5.9 Stakeholders Concerns Towards the Project

Concerns raised by the participants, particularly with regard to environmental and social impacts of the project have been listed in below **Table 5.3.** which shows concern and responses as derived from selected schemes of Tehsil Rojhan.

5.9.1 Concerns and Issues

Following **Table 5.3** shows concerns and responses of public consultation meetings while the photolog of consultation meetings/ Gender consultation meetings has been attached as **Annex-VII.**

Table 5.3: Findings of the Consultation Meetings

Sr. No	Concerns Raised	Response
1	In Kotla Hassan Shah and Mutfarq Mazari, majority of the respondent don't have the washroom facility, so they raised the concern about public toilet facility.	Provision of washroom/Toilet facilities is not the mandate of the proposed project; however, the concern has been noted and will be reported to the higher authorities.
2	In Chak Dilber (Gareebabad), respondents raised the concern that stand post should be constructed on the Govt. land so no one should claim the ownership of stand post.	The preference should be given to the Govt. land if no Govt land is available in project area then VLD is carried out.
3	In Chak Dilber (Bala-chani), respondents raised the concern that school and colleges are in the town and a great percentage of the boys and girls quit the education as it is difficult for them to go to the education facilities	Provision of educational facilities is not the mandate of the proposed project; however, the concern has been noted and will be reported to the higher authorities.
4	In Mutfarq Mazari and Salemabad, the water is not drinkable and there are several waterborne diseases in the project area	Provision of clean water is already part of our project, so waterborne diseases shall be reduced and there will be an improvement in public health.
5	In Mutfarq Mazari, the Govt. graveyard is 25 km from the village.	Provision of Govt. graveyard is not the mandate of the proposed project; however, the concern has been noted and will be reported to the higher authorities.
6	In Chak Dilber (Gareebabad) and Safdarabad, the village was affected by the Hill-torrent flood in 2014, 2022. These villages are on the downstream of the hills and the flood water has no access to the Indus River.	Provision of pathway for the water of hill torrent to the Indus River is not the mandate of the proposed project; however, the concern has been noted and will be reported to the higher authorities.
7	In Chak Dilber (Gareebabad), during the flood season, the road is flooded so there is no access road to the village	Provision of flood protection works and roads is not the mandate of the proposed project; however, the concern has been noted and will be reported to the higher authorities.
8	In Chak Dilber (Gareebabad), there is a stand post in the village whose O&M is carried by owner (Zahid Husain Mazari), the locals who get the water from that stand post pay the electricity bill. The locals insisted that solar system should be installed for operation of the	Initially the project will work on the WAPDA electricity later it should be shifted to the solar system to make the project sustainable.

Sr. No	Concerns Raised	Response
	proposed project (stand post) because it's difficult for them to pay the bill.	
9	The health facilities are inadequate	The proposed project is not envisioned to provide health facilities. However, use of clean drinking water and proper sanitation facilities to be provided under the proposed project will result in eradication of health issues.
10	There are mosques in the villages, and efforts should be made to minimize the impacts on them due to construction activities.	The construction work shall be planned to keep in view the prayer timings. Furthermore, the work will be executed in packages to minimize the disturbance.
11	Along the route the commuters will face mobility issues, which must be avoided to the maximum.	Traffic management plan shall be developed to avoid the disruption of commuters during construction time.
12	The residents of village also demanded that PRMSC should bind the contractor to hire the relevant skilled and unskilled labor/ workers from the local community.	The local community shall be preferred as skilled and semi-skilled labours.
13	The public water supply is not available in the selected villages and the people rely on conventional methods of water collection i.e., Boreholes etc.	The objective of the proposed project is to provide clean drinking water to all the residents of the community at their doorsteps through a piped network or public standposts in case of smaller community size.
14	There is no sewerage system and the sewage is being disposed of in open lands which create nuisance.	The sewage will be connected through a piped network and will be disposed of after adequate treatment through a wastewater treatment plant and through septic tanks/ soakage pits in case of smaller community size.
15	There is no collection of solid waste and the waste is dumped directly in the open plots and streets which create nuisance	A comprehensive solid waste collection system will be developed and waste container/ room shall be placed/ built at appropriate location in the villages. PRMSC will collect the solid waste through bins and will transport it to the designated disposal site.
16	Noise and dust will be generated from construction activities and may cause health issues.	Regular sprinkling of water will be carried out to control the dust emissions at the construction site, whereas construction activities will be avoided during night time.
17	Recreation facilities such as parks and playgrounds should be provided.	Provision of recreation facilities is not the mandate of the proposed project; however, the concern has been noted and will be reported to the higher authorities.
18	Solid waste produced during construction time is a major concern, should not be piled up in the project area.	The construction and other waste generated at the site shall be collected, stored and transported to the final disposal site by the contractor on daily basis.

5.10 Gender Consultations

Following **Table 5.4** shows concerns and responses of gender consultation meetings while the photolog of consultation meetings has been attached as **Annex-VII.**

Table 5.4: Findings of the Consultation Meetings

Sr. No	Concerns Raised	Response
1	There are no public water supply and people rely on the conventional methods of water collection i.e., Boreholes and handpump.	The objective of the proposed project is to provide clean drinking water to all the residents of the community.
2	In Umer Kot majority of the people use nearby filtration plant for drinking purposes, which is brackish sometimes.	The issue will be resolve after the provision of project.
3	The water is not drinkable and there are several waterborne diseases in the projected area.	After the execution of the project the villagers can use clean water for their domestic use.
4	In Chak Dilber and Safdarabad, majority of the population use flood water for their domestic use as the projected area is flood effective.	After the execution of the project the villagers can use clean water for their domestic use.
5	People of Basti Gareebabad from Chak Dilber, purchases water from Rojhan for drinking purposes.	The objective of the proposed project is to provide clean drinking water to all the residents of the community. water sources will be provided from where people will fetch the clean drinking water for their potable use.
6	Cases of Hepatitis, Malaria, Kidney stones, Typhoid and gastrointestinal issues found in every settlement of Rojhan.	Waterborne diseases shall be reduced and there will be an improvement in public health with the provision of clean and healthy drinking water.
7	Ratio of Kidney stones in children by birth is high in Tariqabad. Children being born without kidney also reported from Chak Tariqabad.	Waterborne diseases shall be reduced and there will be an improvement in public health with the provision of clean and healthy drinking water.
8	In Dera Dildar, majority of the respondents have appendix issues.	The issue has been noted and will be reported to the higher authorities.
9	Majority of the population of projected area build soakage pits for drainage wastewater. While the rest population, there is no sewerage system and the sewage is being disposed of in open fields/Plots which create nuisance.	Septic tanks and soakage pits shall be provided at the household levels which will provide primary treatment to the wastewater. The wastewater will percolate through the subsurface. This will resolve the issue of wastewater ponding in the open plots and will result in environmental improvement of the area.
10	Most of the women population of projected area raised the concern to build washrooms. They have to go in fields, or even simple plot	Washrooms are not mandate of the proposed project; however, proper sewerage system will be provided in the

Sr. No	Concerns Raised	Response
	at night. Which raise privacy concerns of the women.	area, while the local community have to build washrooms for the connection.
11	Female respondents share the issue of solid waste management, as there is no proper system and the waste is directly dumped in an open plot cause many viral infections and inconvenient for the mobility.	Provision of solid waste management system is not the mandate of the current assignment. However, a waste transfer station will be established in each village. The PRMSC will hire contractor for collection of solid waste who will be responsible to collect the waste at household level and transfer to the designated transfer station site. Collected solid waste from the transfer stations will be transferred to the landfill site, frequently.
12	Majority of the women share the importance of female health care officer in community as many women of the projected area have irregular menstrual cycle and abnormal abdomen pain.	The issue has been noted and will be reported to the higher authorities.
15	The respondents raised the issue of unavailability of any health care facility and BHU in local area. The projected population have to go to Umer Kot or Rojhan for any kind medical issues.	The proposed project is not envisioned to provide health facilities. However, use of clean drinking water and provision of improved sanitation facilities will result in net health improvement of the project areas
16	Woman from Mutfarq Mazari share that the male community of the area is reluctant against the National Identity card of female, as they don't want to bring their female outside the house.	The issue has been noted and will be reported to the higher authorities.
17	Cases of early age marriages is common in most of the projected area. In Chak Dildar, one female being married at the age of 4 years old.	The issue has been noted and will be reported to the higher authorities.
18	Women from Dera Dildar wanted to have pacca houses, as they have to live in tents due to flood.	The proposed project is not envisioned to provide housing facilities. However, the concern has been noted and will be reported to the higher authorities.
19	Females of the projected area suggested the provision of sui gas as they have to use woods and animal's fesses for domestic purposes.	Provision of Sui Gas Facility is not the mandate of the but the issue has been noted and will be reported to the higher authorities.
20	Provision of schools and colleges highlighted from young females, as most of higher education institute are in the town and majority of students quite studying due to difficulty in access.	Provision of educational facilities is not the mandate of the proposed project; however, the concern has been noted and will be reported to the higher authorities
21	Females suggest the provision of schools and Vocational training centres. Which help to pursue the professional career of many women in community.	Allocation of vocational training centres is not the mandate of the project; however, awareness campaigns and training will be ensured in selected villages.

Sr. No	Concerns Raised	Response
22	Females from Mutfarq Mazari and Saleemabad suggested, training for the proper maintenance of hygiene and usage of sanitary material during menstrual hygiene.	The suggestion has been noted and will be reported to the higher authorities.
23	Majority of the villager are labour by profession so they were not able to pay a high amount tariff.	It is suggested that by considering the economic condition of local community instead of water supply scheme, stand post should be proposed so that people should be able to pay a normal tariff.
24	Females from Umer Kot suggested that if the amount of tariff would be divided into financially stable houses. Because it is difficult for the poor people of the community to pay bill.	The suggestion has been noted and will be reported to the higher authorities.

5.11 Consultation with Institutional Stakeholders

Table 5.5 shows the concerns of institutional stakeholders while the photolog of the consultation meeting in each department has been attached as **Annex-VII.**

Table 5.5:Concerns of Relevant Government Departments

Sr. No.	Department	Points of Discussion /Apprehensions	Response
1	**Public Health Department** Mr. Habib Leghari (SDO)	Consultant's team described the project location and proposed activities to Sub Divisional Officer and inquired about their apprehensions/ suggestions regarding the project; • In Dera Dilber (project area) TDS is high so RO plant is effective. • Sewerage in Umer Kot is under construction • Due to lack of funds construction activity in Umer Kot were stopped. • In past infrastructure was removed by few people (two families) and divide the soiling bricks among themselves. • BCC training should be carried out.	All the suggestions shall be incorporated and efforts shall be made to arrange the training programs.
2	**NGO (UNICEF & NRSP)** Syeda Nida Amen (Social Mobilizer NRSP) Mr. Shoaib Hafeez	The consultant's team described the project location and proposed activities and inquired about their apprehensions/ suggestions regarding the project; • Social Mobilizer NRSP Ms. Syeda Nida Amen informed about the major activities performed by the NRSP like RO plant, House construction facility, washroom/Public toilet facility,	All the projects of NGOs are running successfully, so it is believed that local community helps in the making this project successful. And works voluntarily in the tariff collection.

Sr. No.	Department	Points of Discussion /Apprehensions	Response
	(Research & Development Officer UNICEF) Ms. Farah (Research & Development Officer UNICEF)	agriculture equipment and animals for business are provided by the NRSP on BISP score criteria. • Research & Development Officer UNICEF informed that in Rojhan every fourth child is stunting. And suffering from Malnutrition. • And tells about the lack of education in women due to the lack of resources and tribal issues.	
3	**Livestock Department** Mr. Dr. Hassan Mujtaba (Additional Director)	The consultant's team described the project location and proposed activities to Additional Director and inquired about their apprehensions/ suggestions regarding the project; • Waterborne disease and viral disease in animals were discussed • They provide us census data of animals and birds for Tehsil Rojhan. Which are as follows ➢ 109066 Cows ➢ 39482 Buffalos ➢ 104541 Sheep ➢ 131624 Goat ➢ 69626 Rural Poultry ➢ 6446 Fancy Bird ➢ 4858 Camel ➢ 899 Equines	The proposed project will provide clean drinking water to all the residents of the selected villages and the provision of water for portable use include water for the animal's activities. Waterborne diseases in animals will be resolved after the implementation of this project.
4	**Tehsil Headquarter Hospital THQ** Dr. M. Fiaz (Deputy DHO)	Consultant's team described the project location and proposed activities to Deputy DHO and inquired about their apprehensions/ suggestions regarding the project; • Majority people consult to doctor. • Show some serious concern regarding water borne diseases. • Common disease ➢ Diarrhea ➢ Vomiting / Stomach ➢ Typhoid ➢ Hepatitis • Due to lack of infrastructure and transportation facilities in villages, it become difficult for the patient to reach the THQ.	The objective of the proposed project is to provide clean drinking water to all the residents of the selected villages. Waterborne diseases will be resolved after the implementation of this project.

5.12 Pressing Needs of the Consulted Villages Suggested by Local People

Local people were also inquired about the pressing needs of the project area as perceived by them. The foremost preferred needs are providing water supply and sewerage systems. Apart from this, schools, hospital/ dispensary, roads, preference to locals in construction work. Due to restricted mobility, they suggested that a friendly grievance mechanism should be developed in all villages to address their concerns during construction time. Guidance and support to local people in the preparation of required documents for compensation were also recommended.

6 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

6.1 General

This chapter identifies the beneficial as well as the potentially significant adverse environmental and social impacts of the proposed project activities during design/ pre-construction, construction and operational phases of the proposed project on the physical, ecological and socio-economic domains of the environment. The appropriate mitigation and remedial measures are proposed in this chapter. A brief description of each aspect and the affected environment in the project area are presented below.

6.2 Scoping of Impacts

Potential environmental and social impacts from the proposed Project on key environmental and socio-economic features in the Project area were identified through the following actions:

- Demarcation of the Area of Influence (AoI);
- Desk study of engineering investigations, studies and designs;
- Environmental monitoring of air, noise, surface water, wastewater and groundwater;
- Detailed review and analysis of primary and secondary data available for all environmental parameters in Project area such as physical, ecological and social resources;
- Socio-Economic survey to assess the extent of land acquisition, occupation, income and poverty levels of the affected households;
- Consultations with executing and implementing agencies, local government, affected community, and traditional and religious leaders of community;
- Stakeholder consultations with relevant departments, government agencies, NGOs and locals; and
- Knowledge assimilation of international best practices on environmental assessment of infrastructure projects.

6.3 Methodology

Selection of an appropriate and customized methodology for the impact assessment is critical for the EIA study. The impacts have been assessed on the basis of proposed project life cycle i.e., Pre-Construction, Construction and Operational and Maintenance (O&M) stages. For the identification of the potentially significant and non-significant environmental and social impacts, different tools were utilized as detailed below:

6.3.1 Screening Checklist

Based on the findings of desk studies and processed satellite imageries, screening checklists was prepared to screen out the potentially significant adverse environmental and social impacts during pre-construction, construction and operational phase of the proposed project. The objective of the impact screening is to assess the significance of the issues related to the atmosphere, climate, water resources, land resources, ecological environment, socio-economic environment, transport, infrastructure and communication, natural risks, hazards and external constraints of the Project for the proposed development. After the compilation of

baseline information, processing of acquired satellite imagery, the screening checklist was filled to screen out the adverse impact of the proposed Project during the pre-construction, construction and operational phases. Then a screening report was prepared and submitted for the perusal to the PRMSC and WB.

6.3.2 Notion of Significance

The "notion of significance" is based on the following criteria:

Extent: The scale of impact, i.e., limited to the immediate areas of development activity (the site); limited to within a distance reach of the development or affecting the region as a whole; or occurring at a national or international scale;
Duration and Frequency: A prediction/forecasting of the lifetime of the impact: i.e., short-term; medium term; long term with the impact ceasing after the operational life of the development; or considered permanent and how many times the event will occur during that period;
Intensity: A description of the intensity (magnitude/size) of the impact: i.e., high, medium, low, or negligible (no impact). The specialist studies must attempt to quantify the magnitude of impacts and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact;
Reversible/Irreversible: Changes considered irreversible, for example, the loss of biodiversity due to a change in water quality;
Probability: The likelihood that the event will actually occur; and
Legal Restriction: If the action is likely to affect, or be affected by a legal restriction.

Taking into account these criteria, potential significance was classified as either:

Low: an impact for which no mitigation is necessary;
Medium: an impact that requires effective mitigation; and
High: an impact, which, if not mitigated, could stop the Project from proceeding.

The potentially significant impacts were then further investigated in more detail to make a comprehensive assessment of the actual impacts.

6.3.3 Study Area/ Area of Influence

Refer Chapter 4: Description of the Environment, **Section 4.3**.

6.4 Anticipated Impacts during Pre-Construction/Design Phase

Impacts envisaged during Pre-construction/ Design Phase and the recommended mitigation measures are given below:

6.4.1 Layout Planning & Design

Potential Impact

Incompatible layout plans and engineering designs of the proposed project can undermine the overall aesthetics and ambience of the project area. Misutilization of the available spaces may result in design with low social acceptability and functionality. This impact will be permanent and moderate adverse in nature.

Mitigation Measures

- All structural, layout and engineering designs of the project are in strict accordance with the applicable national and international guidelines/ codes/ standards and engineering practices;
- The layouts of water supply and sewerage networks have been adjusted to cover the whole project area. The water supply system is based on loop design and sewerage system is based on gravity where the slopes have been provided to ensure gravity flow with adequate velocity.

6.4.2 Environmentally Responsive Design Considerations

Potential Impact

Designing of the project components without considering the prospective and futuristic needs can result in structures with low social acceptability and functionality. Improper designed sewers may not carry the waste load, leading to system-failure and financial loss. The alignment of sewer lines and locations of sewerage pumping station, stand post, septic tank/ soakage pits and STP must be properly planned, else it may lead to both technical and social problems along with environmental issues of backflow creating foul smell and unhygienic conditions.

There are chances of infiltration from sewers which may contaminate the soil and underground water resources. The seepage may also affect the water supply lines and contaminate the potable water.

The construction of high-rise overhead water tanks may cause visual obstruction. The surrounding community may face privacy issues and it may also cause blockage of direct sunlight.

Mitigation Measures

- All sewer lines including trunk, lateral and branch sewer lines have been designed considering the future population and waste generation rate;
- Limited the sewer depth where possible;
- Sewers will be laid away from water supply lines (at least 1 m, wherever possible);
- In all cases, the sewer lines shall be laid below water pipeline (the difference between top of the sewer and bottom of water pipeline shall be at least 300 mm);

- For shallower sewers, use of small inspection chambers in lieu of manholes;
- Designed manhole covers to withstand anticipated loads & ensure that the covers can be readily replaced if broken to minimize silt/ garbage entry;
- Ensured sufficient hydraulic capacity to accommodate peak flows & adequate slope in gravity mains to ensure self-cleansing velocity in order prevent to built-up of solids and hydrogen sulfide generation;
- All structural, layout and engineering designing are in strict accordance with the applicable by-laws and engineering parameters;
- The location of groundwater storage tanks, overhead water tanks, pumping stations and STP have been finalized in close consultation with local community and representatives of local authorities.

6.4.3 Groundwater

Potential Impact

Groundwater contamination may occur during construction by the improper handling of construction material (fuel, lubricant, bitumen, asphalt etc.) or sanitary water from construction camps and domestic sewage. During operation probability of seepage through the sewers may also contaminate groundwater. This impact is permanent and moderate negative in nature.

Mitigation Measures

- Efficient seepage control measures have been considered in selection of pipe materials during the planning stage;
- Procedure for efficient jointing of selected sewer pipes will be applied to avoid leakage from pipes;
- Alternate sewage disposal arrangements have been suggested in design to cater the sewage flow, generated from the project area, during construction phase.

6.4.4 Surface Water

Potential Impact

There is no existing piped sewerage network or pumping station in the village. Thus, endangering the environment of the vicinity. The openly flooded sewage causes nuisance in terms of foul smell and serves as breeding ground for disease causing vectors. Some sewage is also used to irrigate nearby crops.

There will be net environmental improvement in terms of sewage collection thus reducing sewage ponding in the project area and enabling adequate treatment of wastewater.

Mitigation Measures

- The sewage will be collected through a piped network or disposed into septic tank and soakage pit;
- An STP based on ABR technology will be established to treat the sewage for pipe network

system;
- The treated effluent will be discharged into the existing watercourses for agricultural purposes.

6.4.5 Seismic Hazard

Potential Impact

According to the seismic zoning map of Pakistan, the project area is located in Seismic Zone 2A, where 2A (moderate damage) represents peak horizontal ground acceleration from 0.8 to 0.16 g. A low to moderate intensity earthquake impacting the project site can adversely impact the development. This factor requires special consideration of the designers as project structures (especially overhead water tanks, septic tanks, soakage pits and STP) may be affected negatively in case of earthquake tremors and the significance of damage depends upon the severity of earthquake.

Mitigation Measures

- The components of the proposed project include laying of underground water supply network, sewer lines, construction of overhead water tanks, pumping station and STP have been designed to withstand moderate earthquakes; and
- To mitigate the seismic hazard, Seismic Building Code of Pakistan 2007 (SBC-07) has been adopted. This code specifies minimum requirements for seismic safety of buildings/ structures and has to be applied and used by engineers in conjunction with the necessary understanding of the concepts of structural, geotechnical and earthquake engineering.

6.4.6 Damage to Existing Infrastructure

Potential Impact

The proposed project interventions are mostly subsurface activities and are likely to affect the existing infrastructure. There are no public utilities except the electric poles which might get affected during construction activities and movement of machinery and the community will face temporary electricity cuts. Furthermore, the roads will be cut for laying of water and sewerage pipes and will create accessibility issues.

Mitigation Measures

- Alignment has been selected carefully to minimize disturbance to public utilities;
- Relocation of the public utilities shall be planned and approved in consultation with relevant departments/authorities/stakeholders before project commencement if any, to avoid inconvenience to the public;
- The local community will be informed before relocation of services (if any) and schedule of relocation services will be prepared after consultation with the community to minimize inconvenience to the public;
- Construction contractor will be directed to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. and;

- The sanitation plan (**Annex-VIII**) will be adopted to avoid sanitation related issues.

6.4.7 Physical Cultural Resources

Potential Impact

No historical/ archeological site is present in the project area. However, some cultural resources including mosques, graveyard and shrines are present. Physical and cultural resources identified in the project area are listed in sub-section J of **Section 4.6.6**. People visit the mosques five times a day. Shrines and graveyard are visited occasionally by the surrounding community and devotees. These will not be directly affected but the people may face access issues in visiting these facilities.

Mitigation Measures

- The alternative access routes will be provided in case the access has to be restricted during execution period; and
- There must not be any physical impact on the physical and cultural resources in the project area.

6.4.8 Ecology

A. Flora

Potential Impact

No trees are envisaged to be disturbed due to proposed project activities since the sewers/ water lines and septic tanks/ soakage pits are mostly laid on roads/streets and overhead water tanks & STP have been proposed in open lands with no surrounding trees. However, setting up of construction camp and movement of heavy vehicles will require significant space due to which available vegetation is expected to be disturbed. This impact is site-specific, temporary, reversible, possible, low significant and needs to be encountered prior to the start of construction stage.

Mitigation Measures

- The camps, mobility of machinery and construction activities will be properly planned to avoid any loss to local green cover;
- It is recommended to establish the construction camps where minimum or no vegetation exists;
- Similarly, the alternate routes for movement of machinery, roads and points for camps are recommended where no loss of vegetation is expected;
- The location of construction camp will be selected so, as to have limited environmental effect during construction phase and to reduce the cost and land requirement; and

B. Fauna

Potential Impact

The impact on fauna of the project area will be insignificant, except few insects that will be disturbed/ killed during excavation operations. Most of the fauna found in the project area are the livestock and are unlikely to be affected by the project interventions except disturbance due to noise. The movement and installations of machinery and vehicles and setting up of camps will disturb the animals and birds and the birds may have to move from their natural habitats. The waste from contractor's camp may attract the animals and birds and can be hazardous to them, furthermore, they can be the victim of poaching/ hunting. This impact is site-specific, temporary, reversible, possible, and low significant.

Mitigation Measures

- Muffling devices will be used in the construction machinery to minimize the noise due to machinery movements and installations;
- The camps shall be properly fenced and gated to check the entry of animals in search of eatable goods; and
- Similarly, wastes of the camps shall be properly disposed of to prevent it being eaten by animals.

6.4.9 Fire Fighting System

Potential Impact

In case of fire hazards, inefficient firefighting system at campsite may cause severe damage to the camp site and surrounding crops and houses. This will be a moderate adverse impact.

Mitigation Measures

- Contractor will provide firefighting system for construction camp, workshop and construction site; and
- A separate fire alarm system will also be installed at construction camp and near the construction site.

Following provisions for fire safety shall also be made in the proposed project site during the design phase. These will be:

- Sufficient number of emergencies exits and routes;
- Assigning of special telephone number to be dialed to inform about the fire to emergency response team;
- Smoke detection equipment; and
- Alarms required to warn people of fire.

6.4.10 Land Acquisition

Potential Impact

Major part of the project involves laying of sewers/ water supply lines, septic tanks, soakage pits. Right of Way (ROW) of existing streets/ roads will be used for this purpose. Additional land will be required for establishment of overhead tanks, pumping stations and STP for which the state land will be preferred. In some villages private land acquisition will be required on voluntary land donation bases (VLD). Locals are willing to donate their land voluntarily.

6.5 Anticipated Impacts during Construction Phase

Anticipated Impacts during Construction Phase and the recommended mitigation measures are given below:

6.5.1 Topography

Potential Impact

The construction activities are not expected to impact the topography of the area significantly except for those areas where physical activities i.e., earthwork is involved as well as stocking of material. The excavated material is to be mostly backfilled and the excessive material will be transported to strengthen the roadsides or will be dumped at the designated locations. This impact is site-specific, temporary, reversible, possible, and low significant.

Mitigation Measures

- Material stockpiles will be removed as soon as work is completed and the area will be reinstated;
- Temporary storage sites will be allocated for the storage of excavated material;
- Temporary storage sites will be lined and must not allow infiltration;
- The stockpiles must be covered with tarpaulin sheets or other adequate material;
- Pilling of material at large extent will not be allowed and the contractor will timely remove excavated material from the site.

6.5.2 Soil Erosion

Potential Impact

The soil would be exposed to erosion due to excavations for laying of sewers and water supply pipes. Construction activities such as clearing, excavation, filling, grading and setting up construction camps will affect the existing soil condition in the study area/ AoI. The clearing of vegetation can also loosen the soil and make it more susceptible to erosion due to wind and rain. There is also a possibility of silt runoff during rainy season causing soil erosion. During the rain, the eroded soil will mix with stagnant water to transform into slush, which can affect movement of vehicles and machinery and construction workers as well as limit the movements

of local people. This impact can be categorized as low adverse, site-specific, long term, permanent, highly probable and reversible.

Mitigation Measures

- Good engineering practices will help to control or minimize the soil erosion both at the construction sites and in peripheral areas. Special slope protection measures will be adopted during the construction stage;
- Use of heavy machinery will be restricted as far as possible to avoid the destruction of soil structure;
- Confining excavations to the specified spots as per the approved engineering drawings and unnecessary excavations should be avoided;
- Stored excavated material shall be covered and preferably reused, e.g., in construction as backfill etc.

6.5.3 Soil Contamination

Potential Impact

Contamination of soil may be caused by oil and chemical spills from construction machinery or uncontrolled runoff from equipment washing yards. This impact is permanent and minor negative in nature.

Mitigation Measures

- Chemicals/ hazardous products and wastes will be stored on impermeable surfaces in secure, covered areas with clear labelling of containers and with a tray or bund to contain leaks;
- All construction wastes from the site will be regularly removed and transported to approved waste disposal sites;
- Washing yards will be paved to avoid seepage of runoff from the yard;
- Awareness in emergency spill response procedures will be conducted through trainings;
- Oil leakages, chemicals and other liquids spills will be avoided/ minimized by providing appropriate storage places depending on the type of material for storage. Oil and other lubrication material will be stored in water proof tanks especially built for oil storage. These tanks will be stored away from the main road and residential areas or safety purposes. Access to these tanks will only be allowed to the authorized personnel. Safety equipment like fire extinguishers will be placed near these places along with signs for danger and fire;
- Supervisors must be familiar with the Material Safety Data Sheets (MSDS) of each chemical used at site. MSDS are provided with each chemical drum. Chemicals will be stored as per the instructions of MSDS. Utmost care will be taken during the handling of these chemicals. Precautions will be taken to prevent spills and all workers will be trained in proper handling, storage and disposal of hazardous or toxic materials.

6.5.4 Trench Failure

Potential Impact

The major construction activities involve excavation operations for laying water supply and sewerage lines. The major hazard associated with the excavation operations is trench failure. The unstable slopes may fail and settle in the trenches which may cause injuries and fatalities to the workers. This impact is probable, site specific and high adverse in nature.

Mitigation Measures

- Provision of adequate shuttering in the trenches;
- Leftover shuttering may also be used in case of loose soil strata.

6.5.5 Construction Camps/Camp Sites

Potential Impact

Improper construction camp location and mismanagement of construction camp activities can lead to various social and environmental impacts which may include noise, health and safety, traffic problems, soil degradation, loss of vegetation and assets on the selected land, solid waste and water pollution. Furthermore, cultural differences, behavior of construction workers, potential disregard for local cultural norms can lead to increased tension between local communities and workers residing in the construction camps. This impact is temporary and moderate negative in nature.

Mitigation Measures

- Working hours of noisy activities will be limited to normal daytime working hours when near identified sensitive receptors;
- Waste Management Plan will be implemented to include procedures for the classification, storage and disposal of all construction wastes and the training of employees who handle hazardous materials; and
- Construction camps will be established away from populated areas.
- Regular training of workers will be carried out regarding local cultural norms, human behaviour, gender issues by the contractor during construction activities at site.

6.5.6 Water Quality

Potential Impact

Runoff from the construction works site may contain increased load of sediments, suspended solids and other contaminants. Potential sources of pollution from the site include:

- Runoff and erosion from exposed soil surfaces, earthwork areas and stockpiles e.g., grouting and cement material with the rain;
- Wash water from dust suppression sprays;

- Fuel and lubricants from maintenance of construction vehicles and mechanical equipment;
- Spillage of liquids stored on-site such as oil, diesel, and solvents etc. are likely to result in water pollution; and
- Uncontrolled discharge of debris and garbage such as packaging, construction material and refuse.

Construction waste, if left unattended will result in forming leachate that will percolate through the soil strata and will reach underground water table and hence, will end up contaminating groundwater. There is a probability that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater and channels carrying water.

Mitigation Measures

- Protection of groundwater reserves from any source of contamination such as the construction and oily waste by making the ground impermeable through sheets or compaction;
- Stockpiles of cement and other construction materials will be kept covered when not being used;
- Maintenance of vehicles will be carried out only on impermeable areas where any oil spillages can be contained;
- Careful planning of the works to avoid soil excavation works during rainy seasons;
- No activity will be undertaken in monsoon and careful attention must be paid to weather forecast before excavation operations.
- All kinds of waste will be stored in covered containers and disposed of safely as soon as possible; and
- The contractor will ensure that construction debris do not find their way into the drainage or irrigation canals which may get clogged.

6.5.7 Air Quality

Potential Impact

Air quality will be affected by various construction activities. Emissions may be spread over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability. In certain climatic condition such as hot summer, airborne dust can become a major nuisance if control techniques are not properly employed. The critical sources of air pollution during the construction phase will be:

- Unpaved road surface;
- Transportation of materials;
- Excavation operations
- Construction equipment;
- Vehicular exhaust; and
- Burning of fuel for cooking by workers.

The air emissions may cause health impacts such as dryness and roughness of the throat, eyes, nose, etc. to the workers, staff of the contractor and the residents of area. These emissions may also affect the bio-physical environment. List of air sensitive receivers is given in **Section 4.4.** The impact is major negative and temporary in nature.

Mitigation Measures

- All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition, properly tuned and maintained in order to minimize the exhaust emissions;
- Open burning of solid waste from the contractor's camps will be strictly banned;
- Fuel with substantially lower sulphur content will be preferred;
- Personal Protective Equipment (PPEs) like masks, goggles and gloves etc. will be provided to workers;
- PEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery will be enforced during construction works.
- Regular water sprinkling on the site and access roads will be carried out to suppress excessive dust emission(s);
- Excavated trenches will be restored immediately to original level and paved after laying of sewer pipes;
- Blowing of dust and particulate matter from stockpiled loose materials (e.g., sand, soil) will be avoided either by sheeting them with tarpaulin or plastic sheets or by sprinkling them with light shower of water;
- Vehicle speed in the project area will be prescribed not more than 20 km/hr and controlled accordingly;
- Diversion will be provided for local traffic movement; and
- The vehicles carrying construction materials and the construction material storage areas will be covered with tarpaulin.

6.5.8 Dust

Potential Impact

During construction stage, the dust level may increase considerably. Earthworks, site clearing, stockpiling and hauling of materials will generate dust and affect the local air shed. Local people and the workers may be exposed to high dust levels during landscaping, access road and site preparation. This impact is site-specific, temporary, reversible, likely and medium significant.

Mitigation Measures

- Blowing of dust from potential sources at the worksite will be avoided by shielding them from the exterior, for example using polythene curtains or raising a fence of corrugated sheets around areas of active constructions;
- Blowing of dust and particulate matter from stockpiled loose materials (e.g., sand, soil) can be avoided either by sheeting them with tarpaulin or plastic sheets or by sprinkling them with light shower of water;

- Preventive measures against dust will be adopted for on-site mixing and unloading operations. Regular water sprinkling of the site will be carried out to suppress excessive dust emission(s);
- All excavation work will be sprinkled with water to control dust;
- Tyres of all the vehicles leaving the site will be washed. No earth, mud, dust and the like will be deposited on the public road; and
- Construction workers will be provided with masks for protection against the inhalation of dust.

6.5.9 Noise

Potential Impact

Noise level is expected to increase during construction activities. Main sources of noise and vibration will be heavy machinery such as excavators and other equipment. Noise generated by construction machinery is likely to affect sensitive receptors located within AoI. Health risks associated with exposure to continuous noise levels include high blood pressure, hypertension, annoyance and sleep disturbance, temporary threshold shift etc. The impacts of noise will be temporary and highly adverse in nature.

Mitigation Measures

- Construction workers will be provided suitable hearing protection like ear cap, or earmuffs and training them in their use;
- Selection of up-to-date and well-maintained equipment with reduced noise levels will be ensured by suitable in-built damping techniques or appropriate muffling devices; and
- Residents will be notified earlier before commencement of excavation operations.

6.5.10 Municipal and Construction Waste/ Wastewater

Potential Impact

Due to construction activities municipal and construction waste will be generated from construction activities. The construction waste will include wastewater, oil spillage from machinery, domestic waste and construction waste etc.

Improper dumping of waste may generate odor and attract mosquitoes and other disease vectors. Empty containers containing the toxic, flammable and corrosive materials may pose hazard to the workers. This may result in health risk to workforce and public, if disposal site is improperly selected. This impact is temporary and minor negative in nature.

Mitigation Measures

- Solid waste generated during construction and camp sites will be safely disposed of in demarcated waste disposal sites and the contractor will provide and implement a comprehensive waste management plan;
- Burning of waste will be prohibited;

- Proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc;
- Emergency Response plan will be prepared to address the accidental spillage of fuels and hazardous goods;
- Containers with covers will be provided on site to store waste; and
- Training of workforce involved in the storage, handling and transportation of hazardous material regarding emergency procedures.

6.5.11 Chance of Finding Artifacts

Potential Impact

During excavation, there is a chance of finding artifacts. In case of finding any artifact, the contractor will immediately stop the activities and report through Supervision Consultant to Directorate General (DG) of Archeology, Government of Punjab to take further appropriate action to preserve those antiques or sensitive remains. Chance Finds Procedure (as given in **Annex-IX**) will be adopted in case of any accidental discovery of cultural heritage.

6.5.12 Resource Conservation

Potential Impact

The materials used in construction of proposed project would include coarse aggregates (crush), fine aggregates (sand), brick ballast, water and cement etc. Almost all the materials to be used in the construction of proposed project are non-renewable and therefore their sustainable use is necessary for the future use.

Diesel and residual fuel oils will be used to operate construction machinery and equipment. Sustainable use of energy resources is very important not to continue future use but it will also help to reduce air emissions. For conservation of energy, efficiency of the engines and burning processes is very important.

Mitigation Measures

- Wastage of water will be reduced by training the workers involved in water use;
- Wastage of water will be controlled through providing proper valves and through controlling pressure of the water;
- Water jets and sprays will be used for watering surfaces rather than using overflow system;
- Source of water will be carefully selected. Water use will not disturb the existing community water supplies;
- Reuse of construction waste materials will be considered;
- Unnecessary equipment washings will be avoided;
- The efficient and well-maintained equipment and machinery will be used;
- The equipment and machinery will be turned off when not in use;
- Regular maintenance of machinery to avoid fuel leakages; and
- Resource conservation plan (attached as **Annex-X**) will be followed.

6.5.13 Biodiversity Conservation

Flora

Potential Impact

On account of construction of the proposed water supply, sewerage system, septic tank/ soakage pits and stand post no trees are envisaged to be cut/disturbed. Hence there will be no direct impact on the flora of project area. However, the dust emissions due to excavation operations will stick on the leaves of existing trees and may close their stomata thus hindering the photosynthesis process. Reduced photosynthesis may also reduce the productivity of existing trees. This impact is however temporary but minor negative in nature.

Exhaust of noxious gases from movement of heavy machinery to be used for digging, will further pollute air which will adversely affect health and vigor of plants.

Further, during construction activities the Contractor's workers may damage the vegetation and trees (for use as fire-wood to fulfill the camps requirements).

Mitigation Measures

- Campsites will be established on vacant land as far as possible, at least 500 m away from the residential areas;
- Construction vehicles, machinery and equipment will remain confined within their designated areas of movement;
- The Contractor's staff and labour will be strictly directed not to damage any vegetation such as trees or bushes. They will use the paths and tracks for movement and will not be allowed to trespass through farmlands;
- Contractor will provide gas cylinders at the camps for cooking purposes and cutting of trees/ bushes for fuel will not be allowed.

Fauna

Potential Impact

The local animals mostly cats, dogs and jackals and specially the livestock i.e., goats and cows will get disturbed due to construction activities, especially the noisy activities. However, there will be no damage to their health and life. Some reptiles and insects may get killed/ injured during excavation operations.

Mitigation Measures

- Excavations will be limited to the approved engineering drawings;
- Harassing of animals will be prohibited.

6.5.14 Health and Safety

A. Occupational Health and Safety

Potential Impact

Health risks and workers safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment. The health and safety issues are also associated with the operation of construction machinery and equipment, which may cause minor and severe injuries to workers. It will be a long term and severe negative impact. Health & Safety plan is attached as **Annex-XI.**

Mitigation Measures

- Obligatory insurance against accidents for labourers/workers;
- Providing basic medical training to specified work staff and basic medical service and supplies to workers;
- Layout plan for camp site, indicating safety measures taken by the contractor, e.g., firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents;
- Work safety measures and good workmanship practices will be followed by the contractor to ensure no health risks for labourers, including use of Personal Protective Equipment (PPE) i.e., oxygen masks/ kits etc.;
- Protection devices (ear muffs) will be provided to the workers doing job in the vicinity of high noise generating machines i.e., excavators;
- Elaboration of a contingency planning in case of major accidents; and
- Adequate signage, lightning devices, barriers, yellow tape and persons with flags during construction to manage traffic at construction sites, haulage and access roads.
- Use of safety signs at the construction site, as shown below.



B. Community Health and Safety

Potential Impact

The construction activities and vehicular movement at construction sites may result in roadside accidents particularly inflicting local communities who are not familiar with presence of heavy equipment. This is a temporary and moderate negative impact. Quality of groundwater resources available in the nearby local communities may be affected due to the construction activities, oil spillage and leakage, roadside accidents etc. The labors with different transmittable diseases (e.g., COVID-19) may cause spread out of those diseases in the local

residents. Open trenches and deep manhole may cause accidents for the local residents. The piling of excavated material on the site may cause health issues to the locals and passerby.

Mitigation Measures

- There will be proper control on construction activities and oil spillage leakage of vehicles;
- The laborers with different transmittable diseases will be restricted within the construction site;
- The site will be restricted for the entry of irrelevant people particularly children;
- Efforts will be made to create awareness about road safety among the drivers operating construction vehicles;
- Timely public notification on planned construction works;
- Seeking cooperation with local educational facilities (school teachers) for road safety campaigns;
- Provision of proper safety and diversion signage, particularly at sensitive/accident-prone spots;
- Setting up speed limits in close consultation with the traffic police; and
- Prevention of larval and adult propagation of vectors through sanitary improvements and elimination of breeding habitat close to human settlements and by eliminating any unusable impounding of water;
- During construction work, pedestrian and vehicular passages will be provided for crossing near settlement;
- Wastes will be temporarily stored at appropriate locations and then will be transferred to the ultimate disposal point;
- COVID-19 SOPs will be followed at work site and construction camps; and
- Open trenches and deep excavated manholes will be protected by fence/barricade to avoid any accident.

C. Emergency Response (Natural and Man-Made Disasters)

Potential Impact

Natural disasters and accidents such as fire, falls, slips and trips may result in injuries, financial losses and may even lead to deaths. The workers will be trained and facilitated to cope with such emergencies.

Mitigation Measures

- The Emergency Response Plan (**Annex-XII**) will be implemented in close consultation with the fire-fighting department, bomb disposal squad and paramedics, as required;
- Training of the staff/employees regarding the emergency procedures/plans will be regularly conducted;
- Emergency numbers will be clearly posted; and
- Minor incidents and near misses will be reported and preventive measures will be formulated accordingly.

6.5.15 Traffic Management

Potential Impact

The traffic influx within the villages is very low. Most of the traffic within the villages include motorbikes and few cars. The project interventions will not create traffic congestion issues in the project area. However, their movement will be disturbed due to the excavation and construction works and people may face accessibility issues. This impact is temporary and major negative in nature.

Mitigation Measures

- The construction activities will be carried out in pockets/reaches, once a patch has been completed (i.e., pipes are laid and covered) then excavation on new patch shall be started;
- Local community will be taken on board to plan alternate access routes in connecting streets to ensure mobility of local traffic; and
- Plan work in a minimum possible time.

6.5.16 Nuisance/ Disturbance to Social Sensitive Areas (Educational, Health and Religious Places)

Potential Impact

Since the proposed interventions will be carried out within the village's boundaries, therefore, the socially sensitive sites/places including schools, hospitals and religious centers will be temporarily affected due to dust, noise and the community will face accessibility issues due to open trenches. Dust due to earthworks will create health hazard to children and people with ailments. This impact is temporary and major negative in nature.

Mitigation Measures

- No work will be conducted near the religious places during religious congregations;
- Material transport to the site will be scheduled considering school timings;
- Notify concerned schools, hospitals/dispensary etc. 2 weeks prior to the work; conduct a 30 minutes awareness program on nature of work, likely disturbances and risks and construction work, mitigation measures in place, entry restrictions and dos and don'ts; and
- Implement all measures suggested elsewhere in this report – dust and noise control, public safety, traffic management, strictly at the sites.

6.5.17 Accessibility

Potential Impact

Excavation for soakage pits/ septic tank and pipe/sewer laying work in the project area will obstruct access to residences, commercial buildings and businesses adjacent to the proposed project alignment. Disruption of access to commercial establishments may affect livelihood. The potential impacts are negative and moderate but short-term and temporary.

Mitigation Measures

- Leave space for access between mounds of excavated soil;
- Consult affected business people to inform them in advance about the work schedule;
- If there are any holidays (i.e., Eid or Muharram etc.), the Contractor will complete the backfilling work of the trenches and will not leave any trench open before holidays;
- Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints; and
- Rehabilitate the site after completion of work following the Site Rehabilitation Plan (attached as **Annex-XIII**)

6.5.18 Resilience to Climate Change

Potential Impact

The project site has never been hit by flash floods in the past. However, due to climate change, the project area is vulnerable to recurrent urban flooding. Torrential rains and heavy rainfall mostly occur in the month of July under the effect of tropical storms.

There are chances that the open trenches may get flooded during rainy season. Flooding can hamper the construction of overhead storage tanks, pumping station, soakage pits/ septic tanks, stand posts and STP. This impact can be categorized as direct, local, medium term, temporary and reversible.

Mitigation Measures

- Project components have been designed to withstand flooding;
- The capacity of the sewerage/ drainage system has been designed and constructed based on extreme weather conditions predicted under international climate change models for Rojhan region to cater for extreme storm water runoff.

6.5.19 Liquid and Solid Waste from Construction Camps

Potential Impact

Development of construction camps will generate significant quantities of liquid and solid waste. A total of eight (8) nos. construction camps will be established in all eight villages accommodating approximately 110 skilled and unskilled staff for all villages.

The water consumption at the campsites will be approximately 5 gallon/capita/day and will subsequently generate about 70 to 80% of this water as sewage. Disposal of wastewater without treatment will pollute the soil and surface water/ groundwater resources of the area.

Hence water demand will be 550 gallons/day for all eight camps during the construction stage and estimated generated wastewater will be about 440 gallons/day for all eight camps.

Construction Camps will generate about 0.28 kg/capita/day domestic solid waste comprising kitchen waste, garbage, putrescible waste, rubbish, and small portion of ashes and residues. Estimated quantity of solid waste will be approximately 30.8 kg/day from all site. This impact is medium term, reversible, possible and low adverse.

Mitigation Measures

To dispose the liquid and solid waste generated from the construction activities, the following steps will be taken by the Contractor:

- The waste generated from the camp site will be disposed of at existing dumping site of the Tehsil Rojhan by the Contractor;
- Construction workers and supervisory staff will be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste;
- Domestic and chemical effluents from the construction camp will be disposed of by the development of on-site sanitation systems i.e., septic tank prior to discharge to nearby drain. Septic tank will be located adjacent to the construction camp. Proper monitoring to check the compliance of PEQS will be carried out;
- All the solid waste from the camps will be properly collected at source by placing containers and disposed of through proper SWM system. Toxic waste will be handled, stored, transported and disposed separately;
- The waste will be properly sealed in containers with proper labels indicating the nature of the waste; and
- Solid waste will be segregated at source so that it can be re-used or recycled.

6.5.20 Flammable and Hazardous Materials

Potential Impact

Flammable materials to be used during the construction activities include diesel, furnace oil, petrol, Liquefied Petroleum Gas (LPG), kerosene oil and machinery fuels. These materials present little risk to the environment, if properly transported stored and used; otherwise, they are potentially very dangerous. Improper storage and handling practices for these flammable and explosive materials can pose dangers of fire and blasts in the area. Training of employees involved in the transportation of hazardous material regarding emergency procedures should be ensured.

Unsafe disposal of excavated material may not only create the environmental degradation but also a nuisance for the surrounding community. Moreover, trenches, if left open, may prove to be hazardous to labor and locals of the area. This impact is site-specific, temporary, reversible, possible, and low significant.

Mitigation Measures

- Safety procedures will be followed by the contractor and labors strictly while using, handling and storage of these materials;
- Trainings will be provided to the contractor's staff for handling and using of flammable

materials and explosives;

- For safety of construction labors and immediate communities, it is suggested that contractor's staff will be trained about the procedures of safe use, handling and storage of materials;
- Emphasis will be to decrease the volume of mucking material by reusing and then the disposal at the marked area in environment friendly way. In order to reduce the volume of disposal material, maximum part of the excavated material can be used in other activities filling of borrow areas and natural depressions in the project area. In order to increase the aesthetics of the area, native grass can be planted by dumping the surplus material in the proposed area with suitable soil cover.

6.5.21 Gender Based Violence (GBV)

Potential Impacts

During construction phase, gender-based violence might arise due to discrimination made against women by unequal work distribution and unequal pay structure among others. Sexual harassment against women might occur as a consequence of mixing of men and women at the construction site, and moving on the roads and markets. This impact is negative in nature during construction stage.

Mitigation Measures

With the effective measures and monitoring, the risk of gender-based violence could be minimized by adopting the following mitigation measures:

- Awareness will be created among the females at individual and community levels about the construction sites;
- Workers will not be allowed to crowd in the residential communities within the site;
- Alternative routes for pedestrian will be provided to avoid mixing of women with workers;
- Raise awareness among the communities of the potential risks of GBV, and establish response services in the nearby communities that can respond to instances of GBV (particularly those related to issues of labor influx);
- The Contractor will make sure that no discrimination is made on the basis of gender while hiring of workers;
- Provisions of gender disaggregate bathing, changing, and sanitation facilities; and
- Contractor will take proper measures to address and resolve issues relating to harassment, intimidation, and exploitation, especially in relation to women.

6.5.22 Influx of Labor

Potential Impacts

For the implementation of project activities, skilled and unskilled labor is required by the contractor. Mostly, skilled and unskilled workers have been associated with the contractor since long which they utilize, where they are required for the projects, and while other workers

are hired from the different areas that belong to different cultural backgrounds. Social problems and conflicts that are associated with labor influx are as follows:

- Risk of social conflict: Conflicts may arise between the local community and the construction workers, which may be related to religious, cultural or ethnic differences, or based on competition for local resources;
- Increased risk of illegitimate behaviour and crime: The influx of workers and service providers into communities may increase the rate of crimes and a perception of insecurity by the local community. Such illegitimate behaviour and crimes can include theft, physical assaults, substance abuse, sexual assault and human trafficking;
- Increased risk of communicable diseases and burden on local health services: The influx of people may bring communicable diseases to the project area, including sexually transmitted diseases (STDs), or the incoming workers may be exposed to diseases to which they have low resistance. Workers with health concerns relating to substance abuse, mental issues or STDs may not wish to visit the project's medical facility and instead go anonymously to local medical providers, this can result in an additional burden on local health resources; and
- Local inflation of prices, accommodations and rents: A significant increase in demand for goods and services due to labor influx may lead to local price hikes and crowding out of community consumers. Depending on project worker income and form of accommodation provided, there may be increased demand for accommodations, which again may lead to price hikes and crowding out of local residents.

Mitigation Measures

- Labour camp(s) will be established away from residential population;
- Preference will be given to the local people to work with contractor, and contractor should hire maximum labour force from the project area because this will reduce the labour influx;
- Awareness will be created among the work force to ensure respect for local customs;
- Construction work will be completed within the stipulated time to move workers to next location;
- Labor force will be shuffled with the time;
- An effective GRM has been established for the project to resolve all issues related to the community. Thus, progress regarding resolving the issues should be monitored closely.
- Create awareness among workers on proper sanitation and hygiene practices to endorse proper health and maintain good housekeeping practices at all project sites;
- Provide adequate personal hygiene facilities in good condition with adequate supply of clean water;
- Make arrangements to treat the affected workers on time to control the movement of vectors disease;
- Sensitize workers and surrounding communities on awareness and prevention of HIV/AIDS and sexually transmitted infections (STI) through training, awareness campaigns and workshops during community meetings;
- Provide proper and free HIV/AIDS and STI health screening and counselling for site workers and community members;
- Develop and enforce a strict code of conduct for workers to regulate behaviour in the local

communities;

- Prohibiting drugs, alcohol, weapons, and ammunition on the worksite among personnel;
- Site security preparations must be contained within the Bills of Quantities (BOQs) to avoid any delays which might be caused due to insecurity;
- Appropriate fencing, security check points, gates and security guards should be provided at the construction sites to ensure the security of all plant, equipment, machinery and materials, as well as to secure the safety of site staff; and
- The Contractor must guarantee that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft.

6.5.23 Social/ Cultural Conflicts

Potential Impact

During the construction phase of the project, conflicts may arise between labor force and local community. Use of local resources and products by the construction workers can generate stress on the local biophysical resources. Furthermore, difference in cultural values may also cause discomfort to local residents. This impact is temporary and minor negative in nature.

Mitigation Measures

- Public notification through announcements in local mosques during the entire construction phase to avoid any inconvenience in accessibility to the locals;
- Establishment of formal links with affected communities;
- Plan for social grievance redress mechanisms including the local leaders and community representatives;
- Local labor will preferably be employed for construction works;
- Careful planning and training of workforce to minimize disturbance to the local people; and
- Contractor will preferably arrange their own sources of water.

6.5.24 Child Labor

Potential Impact

Due to poverty and feeble financial situation of the area, the underaged children might get involved with the contractor various construction works. This will be the violation of the Child Labor Act. Furthermore, SEA/SH issues might arise which will create social conflicts. This impact is adverse and temporary in nature.

Mitigation Measures

- Standard clause in the contracts related to child labor explicit prohibitions, etc. and contractor will ensure compliance to the contractual provisions on bonded and child labor, equal wages for similar work explicit prohibitions, etc.

6.5.25 Economic Activity

Potential Impact

Due to the construction of the proposed Project, economic activity will be generated in the project area as the laborers and semi-skilled staff will have an opportunity to work in the project area. This will provide them an opportunity to develop their skills and capacities. It will also benefit the local vendors of the project area. This is a positive impact.

6.6 Anticipated Impacts during Operational Phase

Anticipated impacts during Operational Phase and the recommended mitigation measures have been described under biophysical and socio-economic categories as follows:

6.6.1 Soil

Potential Impact of STP

The soil quality may be affected due to leakage/ infiltration from sewer lines and STP bed. The sludge generated from cleaning/ maintenance of pumping stations, manholes, sewers and STP may contaminate the soil. The liner of the STP, while desludging may get dried and cracks may lead to the seepage of wastewater and thus contaminate the soil. Improper disposal of scum and sludge is another concern. This is a moderate negative impact.

Potential Impact of Leachate from Dumping Site

The collected solid waste will be dumped into the existing dumping site of Tehsil Rojhan. There is no arrangement of leachate collection and no liner material is present there which will result in contamination of soil due to leachate. The situation will exacerbate in the rainy seasons. This is moderate negative impact.

Mitigation Measures

- Sludge shall be treated prior to ultimate use/disposal. Various options for sludge treatment include Digestion, Drying/ Dewatering, Composting, Lime Stabilization, Heat Treatment must be considered etc;
- The liner of STP & septic tank must be regularly maintained and checked for any cracks and leakages;
- An engineering landfill site must be constructed (under a separate project) to avoid the issues of leachate contamination.

6.6.2 Air Quality

Potential Impact of Sewerage System

The operation of sewerage scheme will result in generation of gases including H_2S and CH_4. H_2S is a foul-smelling poisonous gas which might be harmful for the sewer-men and could be

fatal sometimes. CH_4 is natural gas also referred to as a greenhouse gas. Pakistan is signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and adopted Kyoto Protocol in 1997. Under the Kyoto Protocol, Pakistan is committed to reduce GHG emissions into the environment to prevent interference with climate change. The GHG emissions for the proposed project are a concern due to the anaerobic conditions in the sewer lines and wet wells of the disposal station and septic tanks/ soakage pits.

Potential Impact of STP

The proposed STP is based on Anaerobic Baffled Reactor (ABR) technology which will generate significant amount of CH_4. Methane is the primary contributor to the formation of ground-level ozone, a hazardous air pollutant and greenhouse gas. This impact is permanent and high adverse in nature.

Mitigation Measures

- Provision of exhaust gas vents at appropriate locations in the design;
- Sewer-men will cover their faces with gas mask while entering the sewer for cleaning or maintenance purposes;
- It's better to use sucking machinery for cleaning of sewers;
- Use gas detector before inspection;
- Adequate tree plantation must be done around the STP to control the spread of odour; and
- Options for capture CH_4 and H_2S that can be used commercially may be considered.

6.6.3 Odour

Potential Impact of STP

STP & septic tank/soakage pits are designed on adequate waste loading and function well if they are not overloaded. The overloading will result in malfunctioning of STP & septic tank/soakage pits and it will result in significant odour generation in the vicinity. This impact is temporary and high adverse in nature.

Mitigation Measures

- The STP & septic tank/soakage pits should not be overloaded and personnel dealing in operation should be trained to avoid operational issues;
- Adequate tree plantation must be undertaken to avoid spread of odour in the vicinity.

6.6.4 Solid Waste

Potential Impact of Sewerage System

Domestic and hazardous wastes would be generated during cleaning and maintenance activities. The solid waste during operational phase will consist of plastics, metal and organic wastes

present in sewer lines which can cause blockage in sewerage system. This impact is major negative and permanent in nature.

Potential Impact of STP

Solid waste will be separated from the wastewater through screens. If these wastes are not properly handled, odour will be generated and efficiency of STP will be reduced over time. This impact is moderate negative and temporary in nature.

Protentional Impact of Solid Waste Management

The waste containers, if not emptied timely, will create nuisance and attract mosquitoes and diseases vectors. The situation will exacerbate in the rainy seasons. Furthermore, there would be littering during transportation of waste from the villages to the dumping site.

Mitigation Measures

- Waste shall be collected, stored and disposed of according to relevant standards in approved facilities;
- An organized collection system and its implementation through a licensed contractor;
- The containers will be timely removed and the fine will be imposed on contractor in case of violations;
- Closed containers will be used for transportation of waste to the dumping site;
- Schedule inspection of the sewer lines and STP to keep it clean and to identify any hazardous material; and
- Solid waste bins shall be placed at appropriate locations to avoid its mixing in wastewater.

6.6.5 Sludge

Potential Impact

Sludge is semi solid material which will be settled at the bottom of the STP & septic tank/ soakage pit. Significant amount of sludge will not be produced in ABR; however, periodic desludging will be done to achieve good removal efficiency. The removed sludge in wet form, if left unattended will create nuisance i.e., odor, soil contamination, groundwater contamination (through percolation/ seepage) and will serve as breeding ground for disease vector.

Mitigation Measures

- Appropriate sludge treatment must be undertaken before disposal of sludge;
- The sludge must never be left unattended and should be transferred to designated dumping site after adequate treatment;
- Dried sludge can be used as a land conditioner in the fields.

6.6.6 Water Quality

Potential Impact of STP

The major portion of treated wastewater from the STP will be discharged in watercourses and will be used for agricultural purposes. However, accidental discharges of untreated wastewater due to the overflow, syphoning or disruption in operation during maintenance of the treatment plant may cause contamination.

There is probability of the seepage of wastewater from the bed of STP that may contain high concentrations of organic matter and heavy metals. Improper functioning or choking of inlet or outlet of the treated wastewater may also cause the groundwater contamination. The impact is moderate negative and permanent in nature.

Mitigation Measures

- Use the suitable lining material to control the seepage and groundwater contamination;
- In case of maintenance/sludge removal, alternative ponds shall remain functional; and
- Inlet and outlet pipework access/maintenance pits should be inspected regularly for blockages. These pits should be covered at other times.

6.6.7 Resilience to Climate Change

Potential Impact of STP

Temperature is the controlling factor and most important parameter of STP. The STPs are designed to treat wastewater within specified range of temperature which is based on past meteorological data. The climatic changes in temperature may affect the functioning of STP.

Furthermore, flooding and unpredicted rainfall events may halt the STP operations.

Mitigation Measures

- The design of STPs is robust and they can handle the wide range of temperatures;
- The water must be bypassed during rain and flooding.

6.6.8 Community Health Hazards

Potential Impact of Sewerage System

During desludging and cleaning operations the sludge will be piled up temporarily along the manholes and will be a hazard for passers-by and local community. This impact is temporary and moderate negative in nature.

Potential Impact of STP

The treated wastewater from STP will be used in agricultures in nearby areas. The community using the part will be exposed to the effects of treated wastewater. This impact is permanent and moderate negative in nature.

Mitigation Measures

Proper management of the STP is essential to avoid the adverse impacts. Moreover, proper methods to manage the treated effluent from STP have to be undertaken to ensure that it does not affect the environment around the area or cause health hazards to the people living there. Health and safety hazards during the operation phase can be prevented by appropriate precaution measures. To minimize the adverse impacts mitigation measures to be adopted are as follows:

- The treated wastewater shall be routed to the agricultural area in a way that there must not be physical contact of the community;
- The community must be educated on the effects of treated wastewater to avoid health issues;
- The sludge must be timely removed from the site and the area must be barricaded during desludging and cleaning periods.

6.6.9 Occupational Health and Safety Hazards

Following occupational hazards are associated with treated wastewater handling:

Potential Impact

Infections

- Infections resulting from direct contact with treated wastewater, and from infected wounds; and
- Intestinal infections that are transmitted by flies feeding on the STP.

Chronic Diseases

- There is a chance of spreading of an epidemic of coronavirus disease (COVID-19) due to close interaction of the work force during operation of the STP.

Mitigation Measures

The mitigation measures proposed to be adopted are as follows:

- The Contractor should prepare OHS and ERPs during operation phase;
- Instructing the workforce on handling of treated wastewater;
- Provide basic medical training to the specified work staff and basic medical service and supplies to workers;
- Obligatory insurance of work laborers against accidents;
- Provision of safety measures such as emergency sirens, firefighting equipment, first aid, and contingency measures in case of accidents; and
- Management should strictly enforce the recommended SOP to avoiding spreading of coronavirus disease.

6.7 Positive Impacts

6.7.1 Improved Water Supply System

Clean water is the dire need of eight selected villages of Rojhan. Provision of adequate water supply system/ stand posts with reasonable supply of water will provide relief to the community and will resolve the major issue of “water” in the project area. Further there will be net improvement in community’s health.

6.7.2 Improved Sewerage System

The proposed project will improve the overall sewerage and drainage system of the project area. Currently, the open wastewater drains in the streets result in foul odor, serves as breeding ground for disease vector and results in inconvenience to the road users and local community. The project will improve this situation by controlling overflows and proper disposal of wastewater/ storm water.

6.7.3 Improvement in Public Health, Hygiene and Sanitation

With the improvement in sewerage and drainage system, improvement in health, hygiene and sanitation will also be observed. Foul odor will be eliminated and there would be no breeding grounds for diseases vectors. Thus, the project will improve public health, hygiene and sanitation conditions in the project area.

6.7.4 Landscape

Potential Impact

During the operation stage, new saplings of different plants would be planted to enhance the aesthetics to create a buffer zone and to compensate the environmental losses. This will have a positive impact of permanent nature. The presence of adequate flora at available spaces along the boundary of STP will help in absorbing flue gases and other air quality related impacts of proposed project operation. The plants will be beneficial in dust and noise suppression for the nearby community.

Mitigation Measures

- The saplings planted in the project area against the trees affected and for enhancement of environment should be properly maintained throughout their growth.

6.7.5 Other Positive Impacts

Some other positive impacts include the following:

- Economic development
- Employment generation
- Development of deprived areas

- Formation of model villages of tehsil Rojhan

6.8 Operational Sustainability

The sewer pipes, STP and other components of the project will not function without maintenance, as silt inevitably collects in areas of low flow over time. Improper operation and maintenance of sewerage system may result in illegal ingress of municipal solid waste into manholes/sewers, deposition of silt/sludge reducing capacity of sewers significantly.

Mitigation Measures

- Routine/ preventative maintenance and desilting shall be carried out as with the passage of time depositing silt becomes so hard that the blockage problems are experienced;
- Major causes of deposition of silt and floating matters in the sewers are the mixing of solid waste and smaller diameter sewer pipes. Placement of sufficient number of solid waste litter bins/containers shall be ensured along the roads and in streets to avoid entrance of solid waste into sewers;
- Immediate response to all sewer/drainage related complaints followed by prompt correction of defective condition;
- Regular cleaning of sewer lines to remove grease, grit, and other debris that may lead to sewer backups. Cleaning shall be conducted more frequently for problem areas;
- Inspection of the condition of sanitary sewer structures and identifying areas that need repair or maintenance. Items to note may include cracked/deteriorating pipes; leaking joints or seals at manhole; frequent line blockages; lines that generally flow at or near capacity; and suspected infiltration or ex-filtration;
- Any repairs will be conducted by sealing off the affected sewer and pumping the contents into tankers, after which the faulty section will be exposed and repaired following the same basic procedure as when the sewer was built. Trenches will be dug around the faulty section and the leaking joint will be re-sealed, or the pipe will be removed and replaced.

6.9 Cumulative Impacts

The project activities will be undertaken within the boundaries of all eight villages. Currently, no development and construction activity are being undertaken within these villages, therefore, there will be no cumulative impact of these activities.

6.10 Induced Impacts

Beside some direct environmental and social impacts, the proposed project may have some induced impacts to the physical features of environment. The project is envisaged to improve the sewerage system of the project area but the ultimate disposal of sewage is the point of concern. However, the sewage is planned to be disposed of into the treatment plant which will ultimately discharge into the watercourses after adequate treatment.

7 ENVIRONMENTAL & SOCIAL MANAGEMENT & MONITORING PLAN

7.1 General

This section aims to address the measures which need to be adopted during each phase of the project to avoid, contain, mitigate or compensate for the potential impacts identified in **Section 6**. The Environmental & Social Management & Monitoring Plan (ESMMP) is the major part of this section and forms the gist of this study. ESMMP not only includes Best Management Practices (BMPs) but also includes monitoring indicators, frequency, responsibility, and estimated environmental budget. This ensures that mitigation, monitoring, and management consideration form a part of the documentation used for decision making and the basic benefit of defining the responsibilities is to make sure that the suggested mitigation measure will be implemented at the construction and operation stages of the project. A summary of the mitigation measures for potential impacts have also been given in this section to support ESMP. Moreover, a framework for the implementation of ESMP has been discussed in this section.

7.2 Objectives of ESMMP

The main objectives of ESMMP are to:

- Provide details of the project impacts along with the proposed mitigation measures and the corresponding implementation activities;
- Define the roles and responsibilities of the Project Proponent, Contractor, Supervisory Consultants, and other players and effectively communicate environmental issues among them;
- Define a monitoring mechanism, and reporting frequency and identify monitoring parameters to ensure that all the mitigation measures are completely and effectively implemented, and identify the resources required to implement the ESMP and outline the corresponding financing arrangements.
- Ensure that the project will adopt COVID-19 best international standard operating procedures (SOPs) during the construction and operational phases.

7.3 Implementation of Environmental & Social Management & Monitoring Plan (ESMP)

The institutional arrangement for the implementation of ESMMP for PRSWSSP is presented in **Figure 7.1**. The proponent PIMU-PRMSC will be responsible for compliance of with environmental and social safeguard requirements of the proposed project.

The proposed project activities will be monitored and managed by the PIMU-PRMSC. The Environmental and Social Cell (ESC) staffed by qualified environmental and social specialists has already been established under PRSWSSP. The ESC will be the custodian of the ESMP. ESC will support ensuring the compliance of ESMP. ESC will submit progress reports for the implementation of the ESMP to EPD as per environmental approval/ NOC conditions for the PRSWSSP.

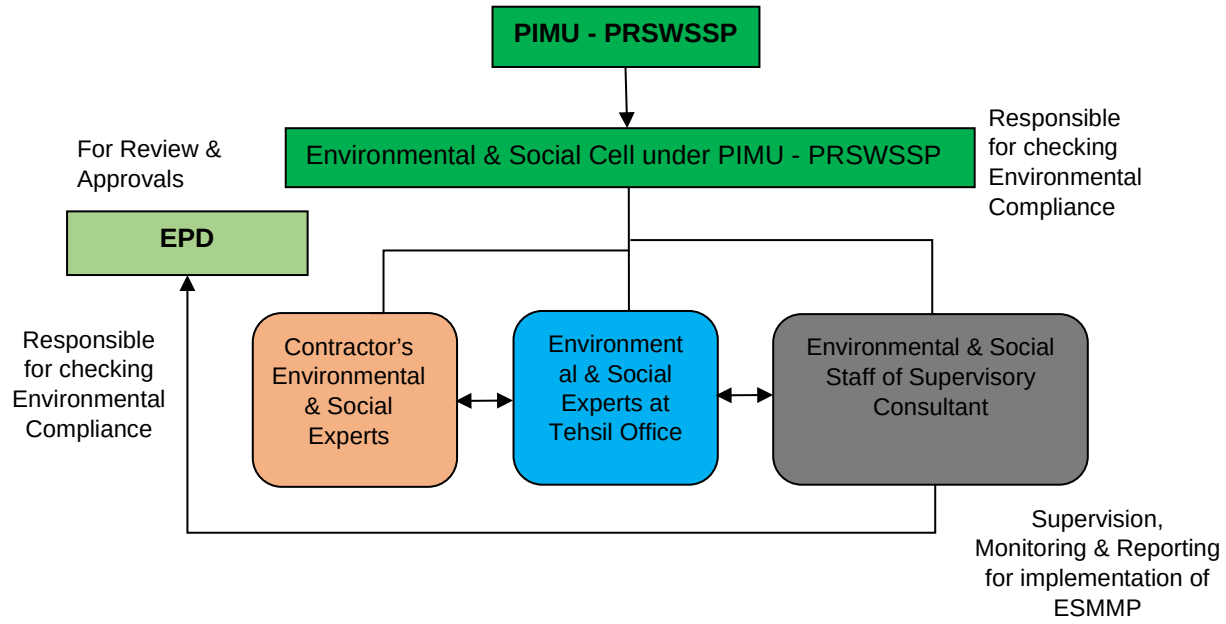


Figure 7.1: Organizational Setup for implementation of ESMMP

7.3.1 Roles and Responsibilities of the Functionaries involved in ESMMP Implementation

A. Environmental Protection Department

As per Punjab Environmental Protection (Amendment) Act, 2012, Punjab EPD is responsible for environmental protection and pollution control. The Punjab EPD is responsible for the approval of the EIA/ IEE of all the developmental projects under their jurisdictions. As per Punjab Environmental Protection (Review of Initial IEE/EIA) Regulations 2022, Schedule-II, EIA is required for 'Water Supply, Sewerage System and Treatment (Category F) & Waste Storage and Disposal (Category G). Based on the EIA and ESMP, Punjab EPD will monitor (as and when required) the project activities.

B. PIMU-PRMSC

The Project Director of PIMU-PRMSC is the in-charge for the financial and technical matters related to PRSWSSP. His responsibilities for monitoring the ESMP will consist of:

- Ensuring that the required environmental training is provided to the concerned PIU staff;
- To carry out random site visits to the construction sites to review the environmental performance of the Contractor;
- Review monitoring reports for the progress of environment-related activities;
- Make sure that the Contractor is implementing the additional measures suggested by the Supervision Consultant (SC) in environmental monitoring reports;
- To assist the Contractor in obtaining necessary approvals from the concerned departments;

- Maintaining interface with the other line departments/ stakeholders; and
- Reporting to the Punjab EPD on the status of ESMMP implementation.

C. Environmental and Social Cell (ESC)

ESC has already been established in the PIMU-PRMSC which is responsible to:

- Make sure that all the contractual obligations related to environmental and social compliance are met;
- Monitor the progress regarding the implementation of environmental and social safeguards as provided in the ESMMP;
- Oversee the compliance of all the monitoring programs as given in ESMMP;
- Check randomly whether monitoring of the environmental aspects of the proposed project during construction and operational phases is being properly carried out;
- Document and disclose monitoring results and identify necessary corrective and preventive actions in the periodic monitoring reports, and make follow-up on these actions to ensure progress toward the desired outcomes;
- Make sure that the contractor implements the additional measures suggested by the SC and PIMU; and
- Report the status of ESMMP compliance to the Project Director, PIMU-PRMSC.

D. Supervisory Consultant (SC)

The roles and responsibilities of SC will be:

- To oversee the performance of the Contractor to make sure that the Contractor is complying with ESMMP;
- Ensuring that the day-to-day construction activities are carried out in an environmentally and socially sound and sustainable manner;
- Strong coordination with the Contractor and PIMU-PRMSC;
- Preparing training materials and implementing programs;
- Ensure the implementation of the mitigation measures suggested in ESMMP;
- To supervise and monitor environmental activities being performed at the site;
- Periodic reporting as mentioned in ESMMP; and
- Suggest any additional mitigation measures (if required).

E. Construction Contractor (CC)

Contractors will be bound to appoint site-based Environmental and Social managers with relevant educational backgrounds and experience for PRSWSSP. The contractors' Environmental and Social manager will carry out the following activities:

- Implementation of the mitigation measures at the construction site;
- Contractor will be bound through the contract to take actions against all the special and general provisions of the contract document;

- Contractor will make sure the compliance of ESMMP recommendations related to construction and will also be responsible for effective liaison with local heads of the community;
- Provision of proper Personal Protective Equipment (PPE) to the workers and train them for their proper use;
- Compliance with international best SOPs for COVID-19;
- To conduct the environmental and health & safety trainings to the workers/labour; and
- Coordinate with the Environmental Specialist and Social Development Specialist (SDS) of SC and PIMU.

In addition to the above, the CC shall also follow the Environmental Code of Practice (ECOPs) attached as **Annex –XIV**.

A. Environmental & Social Experts at Tehsil Office

The Tehsil Office will be responsible for:

- Monitoring of environmental compliance in close liaison with the SC;
- Reporting to ESC-PRMSC regarding compliance status;
- Identifying gaps in the implementation of ESMP and support the Contractor in rectifying the gaps.

B. Design Consultant (DC)

The DC will be responsible for:

- Preparation of environmental responsive design;
- Incorporation of technical design features in consideration of baseline environmental features;
- Designing of components based on futuristic and prospective needs of the project area.

7.3.2 Institutional Arrangement for Implementation of ESMMP by PIMU-PRMSC during O&M Phase

The proposed project will be administrated by PIMU-PRMSC during the O&M phase. The Project Director, PRMSC with his ESC will be responsible for the following:

- Compliance with ESMMP requirements for the O&M phase;
- Coordinating with the operational staff working under the ESC to monitor environmental compliance during project operation;
- Advising on, and monitoring tree plantations along the buffer zone of the project area;
- Reporting on the progress of environmental compliance to the Punjab EPD;
- Assessing the long-term environmental impacts of project operation;
- Sustaining a working partnership among the PIMU-PRMSC, Punjab Local Government Department, Punjab EPD, Agriculture, Irrigation, Forest and Wildlife departments of

Punjab, NGOs, and other related public-private sector organizations.

7.4 Reporting

The contractor will prepare and submit monthly monitoring reports for compliance of implementation to the supervision consultant (SC) environmental team.

The distribution of periodic reports is given in **Table 7.1.**

Table 7.1: Distribution of Periodic Reports

Report	Prepared by	Reviewed by	Distribution
Monthly	Contractor	Reviewed by PIMU-Environmental Unit; PRSWSSP	The Engineer and PRMSC and EPD
Quarterly	Contractor	Reviewed by PIMU-Environmental Unit; PRSWSSP	The Engineer and PRMSC and EPD
Annual	Contractor	Reviewed by PIMU-Environmental Unit; PRSWSSP	The Engineer and PRMSC and EPD
Final	Contractor	Reviewed by PIMU-Environmental Unit; PRSWSSP	The Engineer and PRMSC and EPD

7.5 Non-Compliance with the ESMMP

The implementation of the proposed ESMMP involves inputs from various functionaries as discussed earlier. The contractor will be primarily responsible for ensuring the implementation of the mitigation measures proposed in the ESMMP, which will be part of the contract documents. The provision of the environmental mitigation cost will be made in the total cost of the project. However, if the contractor fails to comply with the implementation of ESMMP and submission of the monthly compliance reports, deductions will be made from the payments to the Contractor claimed under the heads of environmental components.

7.6 Contractors ESMMP

The contractor will prepare a site-specific Contractor's ESMP (C-ESMP) based on the current ESMP and will get it approved by PIMU-PRMSC before the start of work. This will ensure the implementation of the ESMP based on the site conditions at the time of execution, by the contractor.

The C-ESMP will include the following sub-plans:

- Traffic management plan;
- OHS plan;
- Pollution prevention plan; and
- Camp management plan.

7.7 Inclusion of ESMMP in Bidding/ Contract Documents

The present ESMP will be included in the bidding/ contract documents and their implementation will be contractual binding for the contractors.

7.8 Environmental and Social Monitoring Plan

Monitoring will be carried out to ensure that the mitigation plans are regularly and effectively implemented. It will be performed at three levels. At the PIMU level, the ESC will do ESMMP monitoring to ensure that the mitigation plans are being effectively implemented. The environmental engineer of the Supervision Consultant will regularly monitor the ESMMP implementation by the contractor. At the contractor's level, the environmental monitoring checklist will be filled on daily basis by their environmental manager and countersigned by the environmental engineer (EE) of the Supervision Consultant.

Table 7.2 outlines the parameters that will be monitored, the expected frequencies of monitoring, and the responsible agency for monitoring.

Table 7.2: Environmental Management & Monitoring Plan (ESMMP)

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Pre-Construction / Design Phase							
Layout Planning & Design	Incompatible layout plans and engineering designs of the proposed project can undermine the overall aesthetics and ambiance of the project area	• All structural, layout and engineering designs of the project are in strict accordance with the applicable national and international guidelines/ codes/ standards and engineering practices;	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
Groundwater	During operation probability of seepage through the sewers may also contaminate groundwater.	• Efficient seepage control measures have been considered in selection of pipe materials during the planning stage	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
		• Procedure for efficient jointing of selected sewer pipes will be applied to avoid leakage from pipes	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
Damage to Existing Infrastructure	There are no public utilities except the electric poles which might get affected during construction activities and movement of machinery and the community will face temporary electricity cuts.	• Alignment has been selected carefully to minimize disturbance to public utilities;	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
		• Relocation of the public utilities shall be planned and approved in consultation with relevant departments/authorities/stakeholders before project commencement if any, to avoid inconvenience to the public.	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
Physical Cultural Resources	No historical/ archeological site is present in the project area.	• The alternative access routes will be provided in case the access has to be restricted during the execution period	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	However, some cultural resources including mosques, graveyards and shrines are present. These will not be directly affected but the people may face access issues in visiting these facilities.						
Fire Fighting System	In case of fire hazards, inefficient firefighting system at campsite may cause severe damage to the camp site and surrounding crops and houses. This will be a moderate adverse impact.	• Contractor will provide firefighting system for construction camp, workshop and construction site;	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
		• A separate fire alarm system will also be installed at construction camp and near the construction site.	DC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	PIMU	N/A
Anticipated Impacts during the Construction Phase							
Topography	The construction activities are not expected to impact the topography of the area significantly except for those areas where physical activities i.e., earthwork is involved as well as	• Material stockpiles will be removed as soon as work is completed and the area will be reinstated;	CC, SC, PIMU-PRMSC	Stockpiles and heaps of waste visible at the site.	Weekly	SC and PIMU	N/A
		• Temporary storage sites will be allocated for the storage of excavated material;	CC, SC, PIMU-PRMSC	Site allocation and preparation	Once	SC and PIMU	N/A
		• Temporary storage sites will be lined and must not allow infiltration	CC, SC, PIMU-PRMSC	Site allocation and preparation	Once	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	stocking of material. The excavated material is to be mostly backfilled and the excessive material will be transported to strengthen the roadsides or will be dumped at the designated locations. This impact is site-specific, temporary, reversible, possible, and low significant	• The stockpiles must be covered with tarpaulin sheets or other adequate material;	CC, SC, PIMU-PRMSC	Provision of tarpaulin	Once	SC and PIMU	N/A
		• Pilling of material at large extent will not be allowed and the contractor will timely remove excavated material from the site.	CC, SC, PIMU-PRMSC	Stockpiles and heaps of waste visible at the site.	Weekly	SC and PIMU	N/A
Soil Erosion	The soil would be exposed to erosion due to excavations for laying of sewers and water supply pipes. Construction activities such as clearing, excavation, filling, grading and setting up construction camps will affect the existing soil condition in the study area/ AoI. The clearing of vegetation can also loosen the soil and	• Good engineering practices will help to control or minimize soil erosion both at the construction sites and in peripheral areas including provision of shuttering;	CC, SC, PIMU-PRMSC	Provision of shuttering	Once	SC and PIMU	N/A
		• Use of heavy machinery will be restricted as far as possible to avoid the destruction of soil structure;	CC, SC, PIMU-PRMSC	Movement of machinery	Hauling of machinery	SC and PIMU	N/A
		• Confining excavations to the specified spots as per the approved engineering drawings and unnecessary excavations should be avoided;	CC, SC, PIMU-PRMSC	Excavations beyond the specified spots	During excavation works	SC and PIMU	N/A
		• Stored excavated material shall be covered and preferably reused, e.g., in construction as backfill etc.	CC, SC, PIMU-PRMSC	Wastage of excavated material; Backfilling	During backfilling	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	make it more susceptible to erosion due to wind and rain. There is also a possibility of silt runoff during rainy season causing soil erosion. During the rain, the eroded soil will mix with stagnant water to transform into slush, which can affect movement of vehicles and machinery and construction workers as well as limit the movements of local people. This impact can be categorized as low adverse, site-specific, long term, permanent, highly probable and reversible.						

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Soil Contamination	Contamination of soil may be caused by oil and chemical spills from construction machinery or uncontrolled runoff from equipment washing yards. This impact is permanent and minor negative in nature.	• Chemicals/ hazardous products and wastes will be stored on impermeable surfaces in secure, covered areas with clear labelling of containers and with a tray or bund to contain leaks;	CC, SC, PIMU-PRMSC	Monitoring compliance to Regular disposal of Chemical/ Hazardous waste; Photographic record;	Monthly	SC and PIMU	N/A
		• All construction wastes from the site will be regularly removed and transported to approved waste disposal sites	CC, SC, PIMU-PRMSC	No fall of transported material; Damaged road repaired. Record of harmful incidents that occurred.	Weekly	SC and PIMU	N/A
		• Washing yards will be paved to avoid seepage of runoff from the yard;	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A
		• Awareness in emergency spill response procedures will be conducted through trainings;	CC, SC, PIMU-PRMSC	Training Sessions	Once	SC and PIMU	
		• Oil leakages, chemicals and other liquids spills will be avoided/ minimized by providing appropriate storage places depending on the type of material for storage	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Trench Failure	The major construction activities involve excavation operations for laying water supply and sewerage lines. The major hazard associated with the excavation operations is trench failure. The unstable slopes may fail and settle in the trenches which may cause injuries and fatalities to the workers. This impact is probable, site specific and high adverse in nature.	• Provision of adequate shuttering in the trenches;	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A
		• Leftover shuttering may also be used in case of loose soil strata.	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A
Construction Camps/Camp Sites	Improper construction camp location and mismanagement of construction camp activities can lead to various social and environmental impacts which may include noise, health and safety, traffic problems, soil degradation, loss of vegetation and	• Working hours of noisy activities will be limited to normal daytime working hours when near identified sensitive receptors;	CC, SC, PIMU-PRMSC	Field Observations	Weekly	SC and PIMU	N/A
		• Waste Management Plan will be implemented to include procedures for the classification, storage and disposal of all construction wastes and the training of employees who handle hazardous materials;	CC, SC, PIMU-PRMSC	Compliance to waste management plan;	Monthly	SC and PIMU	N/A
		• Construction camps will be established away from populated areas.	CC, SC, PIMU-PRMSC	Camp established at least 500m away from the	Once	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	assets on the selected land, solid waste and water pollution. Furthermore, cultural differences, behavior of construction workers, potential disregard for local cultural norms can lead to increased tension between local communities and workers residing in the construction camps. This impact is temporary and moderate negative in nature.			nearest community; Local hired workforce;			
		• Regular training of workers will be carried out regarding local cultural norms, human behaviour, gender issues by the contractor during construction activities at site.	CC, SC, PIMU-PRMSC	Any complaint from the local community.	Weekly check complaint register	SC and PIMU	N/A
Water Quality	Runoff and erosion from exposed soil surfaces, earthwork areas and stockpiles e.g., grouting and cement material with the rain. Construction waste, if left unattended will result in forming leachate that will percolate through	• Protection of groundwater reserves from any source of contamination such as the construction and oily waste by making the ground impermeable through sheets or compaction;	CC, SC, PIMU-PRMSC	Monitoring compliance; Water quality testing.	Quadrimesterly	SC and PIMU	N/A
		• Stockpiles of cement and other construction materials will be kept covered when not being used;	CC, SC, PIMU-PRMSC	Use of tarpaulin for protection; Visual Inspection	Weekly	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	the soil strata and will reach underground water table and hence, will end up contaminating groundwater. There is a probability that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater and channels carrying water.	• Maintenance of vehicles will be carried out only in impermeable areas where any oil spillages can be contained;	CC, SC, PIMU-PRMSC	Any spill observed; Availability of sealed containers for used oils and lubricants; Disposal options (e.g., local vendor) explored.	Weekly	SC and PIMU	N/A
		• Careful planning of the works to avoid soil excavation works during rainy seasons;	CC, SC, PIMU-PRMSC	Visual Inspection	During rainy season	SC and PIMU	N/A
		• No activity will be undertaken in monsoon and careful attention must be paid to the weather forecast before excavation operations.	CC, SC, PIMU-PRMSC	Visual Inspection	During rainy season	SC and PIMU	N/A
		• All kinds of waste will be stored in covered containers and disposed of safely as soon as possible;	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A
		• The contractor will ensure that construction debris do not find their way into the drainage or irrigation canals which may get clogged.	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Air Quality	Air quality will be affected by various construction activities. Emissions may be spread over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability. In certain climatic condition such as hot summer, airborne dust can become a major nuisance if control techniques are not properly employed	• All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition, properly tuned and maintained in order to minimize the exhaust emissions;	CC, SC, PIMU-PRMSC	Dust emission controlled;	Weekly	SC and PIMU	N/A
		• Open burning of solid waste from the contractor's camps will be strictly banned;	CC, SC, PIMU-PRMSC	Monitoring compliance to disposal of waste;	Weekly	SC and PIMU	N/A
		• Fuel with substantially lower sulphur content will be preferred;	CC, SC, PIMU-PRMSC			SC and PIMU	N/A
		• Personal Protective Equipment (PPEs) like masks, goggles and gloves etc. will be provided to workers;	CC, SC, PIMU-PRMSC	Implementation of HSE; Visual Inspection	Daily	SC and PIMU	See Table. 7.5. PPE cost is included in HSE.
		• PEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery will be enforced during construction works.	CC, SC, PIMU-PRMSC	Monitoring of machinery and equipment;	Daily	SC and PIMU	N/A
		• Regular water sprinkling on the site and access roads will be carried out to suppress excessive dust emission(s)	CC, SC, PIMU-PRMSC	Visual Monitoring	Daily	SC and PIMU	N/A
		• Excavated trenches will be restored immediately to original level and paved after laying of sewer pipes;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
		• Vehicle speed in the project area will be prescribed not more than 20 km/hr and controlled accordingly;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		• Diversion will be provided for local traffic movement;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		• The vehicles carrying construction materials and the construction material storage areas will be covered with tarpaulin.	CC, SC, PIMU-PRMSC	Use of tarpaulin for protection	Daily	SC and PIMU	N/A
Dust	During construction stage, the dust level may increase considerably. Earthworks, site clearing, stockpiling and hauling of materials will generate dust and affect the local air shed. Local people and the workers may be exposed to high dust levels during landscaping, access road and site preparation. This impact is site-specific, temporary, reversible, likely and medium significant.	• Blowing of dust from potential sources at the worksite will be avoided by shielding them from the exterior, for example using polythene curtains or raising a fence of corrugated sheets around areas of active constructions	CC, SC, PIMU-PRMSC	Visual Inspection Air levels measured.	Daily	SC and PIMU	N/A
		• All excavation work will be sprinkled with water to control dust;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		• Tires of all the vehicles leaving the site will be washed. No earth, mud, dust and the like will be deposited on the public road;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Noise	Noise level is expected to increase during construction activities. Main sources of noise and vibration will be heavy machinery such as excavators and other equipment. Noise generated by construction machinery is likely to affect sensitive receptors located within AoI. Health risks associated with exposure to continuous noise levels include high blood pressure, hypertension, annoyance and sleep disturbance, temporary threshold shift etc. The impacts of noise will be temporary and highly adverse in nature.	• Construction workers will be provided suitable hearing protection like ear cap, or earmuffs and training them in their use;	CC, SC, PIMU-PRMSC	Visual inspections; Noise levels measured.	Daily	SC and PIMU	N/A
		• Selection of up-to-date and well-maintained equipment with reduced noise levels will be ensured by suitable in-built damping techniques or appropriate muffling devices	CC, SC, PIMU-PRMSC	Visual inspections; Noise levels measured.	Daily	SC and PIMU	N/A
		• Residents will be notified earlier before commencement of excavation operations.	CC, SC, PIMU-PRMSC	Visual inspections;	Daily	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Municipal and Construction Waste/ Wastewater	Due to construction activities municipal and construction waste will be generated from construction activities. The construction waste will include wastewater, oil spillage from machinery, domestic waste and construction waste etc.	• Solid waste generated during construction and camp sites will be safely disposed of in demarcated waste disposal sites and the contractor will provide and implement a comprehensive waste management plan;	CC, SC, PIMU-PRMSC	Monitoring compliance;	Weekly	SC and PIMU	N/A
		• Burning of waste will be prohibited;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		• Proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc;	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A
		• Emergency Response plan will be prepared to address the accidental spillage of fuels and hazardous goods;	CC, SC, PIMU-PRMSC	Visual Inspection	Weekly	SC and PIMU	N/A
		• Containers with covers will be provided on site to store waste	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
Resource Conservation	The materials used in construction of proposed project would include coarse aggregates (crush), fine aggregates (sand), brick ballast, water and cement etc. Almost all the materials to be used in the construction of proposed project are non-renewable and	• Wastage of water will be reduced by training the workers involved in water use;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		• Wastage of water will be controlled through providing proper valves and through controlling pressure of the water;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		• Water jets and sprays will be used for watering surfaces rather than using overflow system;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		• Source of water will be carefully selected. Water use will not disturb the existing community water supplies	CC, SC, PIMU-PRMSC	Any conflict on the water availability.	Fortnightly	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	therefore their sustainable use is necessary for the future use. Excessive water consumption for drinking and washing purposes by the construction staff may undermine water resources in the project area and in certain cases may disturb the existing water supplies in the project area.	• Reuse of construction waste materials will be considered;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		• Unnecessary equipment washings will be avoided;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		• The equipment and machinery will be turned off when not in use;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		• Regular maintenance of machinery to avoid fuel leakages;	CC, SC, PIMU-PRMSC	Log of vehicle and equipment repairs;	Daily	SC and PIMU	N/A
Biodiversity Conservation	**FLORA** On account of construction of the proposed water supply and sewerage system, no trees are envisaged to be cut/disturbed. Hence there will be no direct impact on	• Campsites will be established on vacant land as far as possible, at least 500 m away from the residential areas;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		• Construction vehicles, machinery and equipment will remain confined within their designated areas of movement;	CC, SC, PIMU-PRMSC	Log Book of vehicle inventory	Daily	SC and PIMU	N/A
		• The Contractor's staff and labour will be strictly directed not to damage any vegetation such as trees or bushes.	CC, SC, PIMU-PRMSC	Any conflict with locals.	Daily	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	the flora of project area. However, the dust emissions due to excavation operations will stick on the leaves of existing trees and may close their stomata thus hindering the photosynthesis process.	They will use the paths and tracks for movement and will not be allowed to trespass through farmlands;					
		• Contractor will provide gas cylinders at the camps for cooking purposes and cutting of trees/ bushes for fuel will not be allowed.	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
	FAUNA The local animals mostly cats, dogs and jackals and specially the livestock i.e., goats and cows will get disturbed due to construction activities, specially the noisy activities. However, there will be no damage to their health and life. Some reptiles and insects may get killed/ injured during excavation operations.	• Excavations will be limited to the approved engineering drawings;	CC, SC, PIMU-PRMSC	Visual inspections; Photographic records.	Daily	SC and PIMU	N/A
		• Harassing of animals will be prohibited	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Health and Safety	Health risks and worker's safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment. The health and safety issues are also associated with the operation of construction machinery and equipment, which may cause minor and severe injuries to workers. It will be a long term and severe negative impact.	• Obligatory insurance against accidents for labourers/workers;	CC, SC, PIMU-PRMSC	Accident/ Incident reported.	If happened	SC and PIMU	N/A
		• Providing basic medical training to specified work staff and basic medical service and supplies to workers;	CC, SC, PIMU-PRMSC	Maintained Training Record; Pictorial evidence	Weekly	SC and PIMU	N/A
		• Layout plan for camp site, indicating safety measures taken by the contractor, e.g., firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents;	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		• Work safety measures and good workmanship practices will be followed by the contractor to ensure no health risks for labourers, including use of Personal Protective Equipment (PPE) i.e., oxygen masks/ kits etc.;	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	See Table. 7.5 below. PPE Cost is included in HSE
		• Protection devices (ear muffs) will be provided to the workers doing job in the vicinity of high noise generating machines i.e., excavators;	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		• Use of safety signs at the construction site, as shown below.	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		• COVID-19 SOPs (attached as **Annex-XV)** will be followed at work site and construction camps;	CC, SC, PIMU-PRMSC			SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Traffic Management	The traffic influx within the villages is very low. Most of the traffic within the villages include motorbikes and few cars. The project interventions will not create traffic congestion issues in the project area. However, their movement will be disturbed due to the excavation and construction works and people may face accessibility issues. This impact is temporary and major negative in nature.	• The construction activities will be carried out in pockets/reaches, once a patch has been completed (i.e., pipes are laid and covered) then excavation on new patch shall be started;	CC, SC, PIMU-PRMSC	Visual inspection	Daliy	SC and PIMU	N/A
		• Local community will be taken on board to plan alternate access routes in connecting streets to ensure mobility of local traffic;	CC, SC, PIMU-PRMSC	Alternate route maps	Daily	SC and PIMU	N/A
		• Plan work in a minimum possible time.	CC, SC, PIMU-PRMSC	Check targeted timeline	Daily	SC and PIMU	N/A
Nuisance/ Disturbance to Social Sensitive Areas	Since the proposed interventions will be carried out within the villages boundaries, therefore, the socially sensitive sites/places including schools, hospitals and religious centers will	• No work will be conducted near the religious places during religious congregations;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A
		• Material transport to the site will be scheduled considering school timings;	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		• Notify concerned schools, hospitals/dispensary etc. 2 weeks prior to the work; conduct a 30 minutes awareness program on	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	be temporarily affected due to dust, noise and the community will face accessibility issues due to open trenches. Dust due to earthworks will create health hazard to children and people with ailments. This impact is temporary and major negative in nature.	nature of work, likely disturbances and risks and construction work, mitigation measures in place, entry restrictions and dos and don'ts					
		• Implement all measures suggested elsewhere in this report – dust and noise control, public safety, traffic management, strictly at the sites.	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
Accessibility	Excavation of trenches and pipe/sewer laying work in the project area will obstruct access to residences, commercial buildings and businesses adjacent to the proposed project alignment. Disruption of access to commercial establishments may affect livelihood. The	• Leave space for access between mounds of excavated soil;	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		• Consult affected business people to inform them in advance about the work schedule;	CC, SC, PIMU-PRMSC	Consultation meeting; Pictorial evidence	Weekly	SC and PIMU	N/A
		• If there are any holidays (i.e., Eid or Muharram etc.), the Contractor will complete the backfilling work of the trenches and will not leave any trench open before holidays;	CC, SC, PIMU-PRMSC	Visual inspection Designated borrow and quarry areas used for access material;	Daily	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	potential impacts are negative and moderate but short-term and temporary.	• Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints;	CC, SC, PIMU-PRMSC	Visual inspection	Weekly	SC and PIMU	N/A
Resilience to Climate Change	There are chances that the open trenches may get flooded during rainy season. Flooding can hamper the construction of overhead storage tanks, pumping station and STP. This impact can be categorized as direct, local, medium term, temporary and reversible.	• Project components have been designed to withstand flooding;	CC, SC, PIMU-PRMSC	Design provisions	Once (after completion of Detailed Design)	SC and PIMU	N/A
		• The capacity of the sewerage/ drainage system has been designed and constructed based on extreme weather conditions predicted under international climate change models for Rojhan region to cater for extreme storm water runoff.	CC, SC, PIMU-PRMSC	Check Meteorological department prediction of rain	Before construction	SC and PIMU	N/A
Liquid and Solid Waste from Construction Camps	Development of construction camps will generate significant quantities of liquid and solid waste. A total of eight (08) nos. construction camps will be established in all eight villages accommodating i.e., total 110 workers for all villages.	• The waste generated from the camp site will be disposed of at existing dumping site of the Tehsil Rojhan by the Contractor;	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		• Construction workers and supervisory staff will be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste;	CC, SC, PIMU-PRMSC	Through Trainings Photographic record;	Monthly	SC and PIMU	N/A
		• Domestic and chemical effluents from the construction camp will be disposed of by the development of on-site sanitation systems i.e., septic	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
		tank prior to discharge to nearby drain. Septic tank will be located adjacent to the construction camp. Proper monitoring to check the compliance of PEQS will be carried out;					
		• All the solid waste from the camps will be properly collected at source by placing containers and disposed of through proper SWM system. Toxic waste will be handled, stored, transported and disposed separately;	CC, SC, PIMU-PRMSC	Monitoring compliance to Regular disposal of waste; Photographic record;	Weekly	SC and PIMU	N/A
		• The waste will be properly sealed in containers with proper labels indicating the nature of the waste;	CC, SC, PIMU-PRMSC	Covered disposal containers placed at camp;	Weekly	SC and PIMU	N/A
		• Solid waste will be segregated at source so that it can be re-used or recycled	CC, SC, PIMU-PRMSC	Covered disposal containers placed at camp;	Weekly	SC and PIMU	N/A
Flammable and Hazardous Materials	Flammable materials to be used during the construction activities include diesel, furnace oil, petrol, Liquefied Petroleum Gas (LPG), kerosene oil and machinery fuels. These materials	• Safety procedures will be followed by the contractor and labors strictly while using, handling and storage of these materials;	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		• Trainings will be provided to the contractor's staff for handling and using of flammable materials and explosives;	CC, SC, PIMU-PRMSC	Monitoring compliance to handling of flammable material through inventory register;	Daily	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	present little risk to the environment, if properly transported stored and used; otherwise, they are potentially very dangerous. Improper storage and handling practices for these flammable and explosive materials can pose dangers of fire and blasts in the area.			Photographic record;			
		• For safety of construction labors and immediate communities, it is suggested that contractor's staff will be trained about the procedures of safe use, handling and storage of materials;	CC, SC, PIMU-PRMSC	Visual observation	Twice a week	SC and PIMU	N/A
		• Emphasis will be to decrease the volume of mucking material by reusing and then the disposal at the marked area in environment friendly way. In order to reduce the volume of disposal material, maximum part of the excavated material can be used in other activities filling of borrow areas and natural depressions in the project area. In order to increase the aesthetics of the area, native grass can be planted by dumping the surplus material in the proposed area with suitable soil cover.	CC, SC, PIMU-PRMSC	Visual inspection	Weekly	SC and PIMU	N/A
Gender Based Violence (GBV)	During construction phase, gender-based violence might arise due to discrimination made against women by unequal work distribution and unequal pay structure among	• Awareness will be created among the females at individual and community levels about the construction sites;	CC, SC, PIMU-PRMSC	Through Consultations	Monthly	SC and PIMU	N/A
		• Workers will not be allowed to crowd in the residential communities within the site;	CC, SC, PIMU-PRMSC	Visual observation	Twice a week	SC and PIMU	N/A
		• Alternative routes for pedestrian will be provided to avoid mixing of women with workers;	CC, SC, PIMU-PRMSC	Visual Inspection	Daily	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	others. Sexual harassment against women might occur as a consequence of mixing of men and women at the construction site, and moving on the roads and markets. This impact is negative in nature during construction stage.	• Raise awareness among the communities of the potential risks of GBV, and establish response services in the nearby communities that can respond to instances of GBV (particularly those related to issues of labor influx);	CC, SC, PIMU-PRMSC	Reported issues; Visual inspections	Daily	SC and PIMU	N/A
		• The Contractor will make sure that no discrimination is made on the basis of gender while hiring of workers;	CC, SC, PIMU-PRMSC	Hiring Criteria	Before Hiring	SC and PIMU	N/A
		• Provisions of gender disaggregate bathing, changing, and sanitation facilities;	CC, SC, PIMU-PRMSC	Design provisions	Once (before construction of construction camps)	SC and PIMU	N/A
		• Contractor will take proper measures to address and resolve issues relating to harassment, intimidation, and exploitation, especially in relation to women.	CC, SC, PIMU-PRMSC	Visual inspection; Complaints reported	Daily	SC and PIMU	N/A
Influx of Labor	Risk of social conflict: Conflicts may arise between the local community and the construction workers, which may be related to religious, cultural or ethnic differences, or based on competition for local resources; Increased risk of illegitimate	• Labour camp(s) will be established away from residential population;	CC, SC, PIMU-PRMSC	As per approved site	Once	SC and PIMU	N/A
		• Preference will be given to the local people to work with contractor, and contractor should hire maximum labour force from the project area because this will reduce the labour influx	CC, SC, PIMU-PRMSC	Hiring Criteria	Once before hiring	SC and PIMU	N/A
		• Awareness will be created among the work force to ensure respect for local customs;	CC, SC, PIMU-PRMSC	Monitor training record	Monthly	SC and PIMU	N/A
		• Construction work will be completed within the stipulated time to move workers to next location;	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	behaviour and crime: The influx of workers and service providers into communities may increase the rate of crimes and a perception of insecurity by the local community. Such illegitimate behaviour and crimes can include theft, physical assaults, substance abuse, sexual assault and human trafficking;	• Labor force will be shuffled with the time;	CC, SC, PIMU-PRMSC	Visual inspection	Weekly	SC and PIMU	N/A
		• Create awareness among workers on proper sanitation and hygiene practices to endorse proper health and maintain good housekeeping practices at all project sites;	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		• Provide adequate personal hygiene facilities in good condition with adequate supply of clean water;	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		• Make arrangements to treat the affected workers on time to control the movement of vectors disease	CC, SC, PIMU-PRMSC	Visual inspection; Complaint reported	Daily	SC and PIMU	N/A
		• Sensitize workers and surrounding communities on awareness and prevention of HIV/AIDS and sexually transmitted infections (STI) through training, awareness campaigns and workshops during community meetings;	CC, SC, PIMU-PRMSC	Complaint reported	Weekly	SC and PIMU	N/A
		• Provide proper and free HIV/AIDS and STI health screening and counselling for site workers and community members;	CC, SC, PIMU-PRMSC	Hiring protocols	Before hiring	SC and PIMU	N/A
		• Develop and enforce a strict code of conduct for workers to regulate behaviour in the local communities;	CC, SC, PIMU-PRMSC	Visual inspection; Complaint reported	Weekly	SC and PIMU	N/A
		• Prohibiting drugs, alcohol, weapons, and ammunition on the worksite among personnel;	CC, SC, PIMU-PRMSC	Visual inspection; Complaints reported	Daily	SC and PIMU	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
		• The Contractor must guarantee that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft.	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
Social/ Cultural Conflicts	During the construction phase of the project, conflicts may arise between labor force and local community. Use of local resources and products by the construction workers can generate stress on the local biophysical resources. Furthermore, difference in cultural values may also cause discomfort to local residents. This impact is temporary and minor negative in nature.	• Public notification through announcements in local mosques during the entire construction phase to avoid any inconvenience in accessibility to the locals;	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		• Establishment of formal links with affected communities;	CC, SC, PIMU-PRMSC	Visual inspection	Weekly	SC and PIMU	N/A
		• Plan for social grievance redress mechanisms including the local leaders and community representatives;	CC, SC, PIMU-PRMSC	During construction of the work	Weekly	SC and PIMU	N/A
		• Local labor will preferably be employed for construction works;	CC, SC, PIMU-PRMSC	Hiring Policies	Once (Before Hiring)	SC and PIMU	N/A
		• Careful planning and training of workforce to minimize disturbance to the local people;	CC, SC, PIMU-PRMSC	Visual inspection	Daily	SC and PIMU	N/A
		• Contractor will preferably arrange their own sources of water.	CC, SC, PIMU-PRMSC	Visual observations	Daily	SC and PIMU	

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Child Labor	Due to poverty and feeble financial situation of the area, the underaged children might get involved with the contractor various construction works. This will be the violation of the Child Labor Act. Furthermore, SEA/SH issues might arise which will create social conflicts. This impact is adverse and temporary in nature.	• Standard clause in the contracts related to child labor explicit prohibitions, etc.) and contractor will ensure compliance to the contractual provisions on bonded and child labor, equal wages for similar work explicit prohibitions, etc.).	CC, SC, PIMU-PRMSC	Visual Observation	Daily	SC and PIMU	N/A
Anticipated Impacts during Operational Phase							

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
Soil	The soil quality may be affected due to leakage/ infiltration from sewer lines and STP bed. The sludge generated from cleaning/ maintenance of pumping stations, manholes, sewers and STP may contaminate the soil. The liner of the STP, while desludging may get dried and cracks may lead to the seepage of wastewater and thus contaminate the soil. Improper disposal of scum and sludge is another concern. This is a moderate negative impact.	• Sludge shall be treated prior to ultimate use/disposal. Various options for sludge treatment include Digestion, Drying/ Dewatering, Composting, Lime Stabilization, Heat Treatment must be considered etc;	PIMU-PRMSC	Visual inspection	Weekly	PIMU-PRMSC	N/A
Air Quality	The operation of sewerage scheme will result in generation of gases including H_2S and CH_4. H_2S is a foul-	• Provision of exhaust gas vents at appropriate locations in the design	PIMU-PRMSC	Visual inspection	Monthly	PIMU-PRMSC	N/A
		• Sewer-men will cover their faces with gas mask while entering the sewer for cleaning or maintenance purposes;	PIMU-PRMSC	Visual inspection; Use of PPEs	Weekly	PIMU-PRMSC	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	smelling poisonous gas which might be harmful for the sewer-men and could be fatal sometimes. CH_4 is natural gas also referred to as a greenhouse gas	• It's better to use sucking machinery for cleaning of sewers;	PIMU-PRMSC	Availability	Once	PIMU-PRMSC	N/A
		• Use gas detector before inspection;	PIMU-PRMSC	Visual inspection	Daily	PIMU-PRMSC	N/A
		• Adequate tree plantation must be done around the STP to control the spread of odour;	PIMU-PRMSC	Visual inspection	Weekly	PIMU-PRMSC	N/A
Odour	STP are designed on adequate waste loading and function well if they are not overloaded. The overloading will result in malfunctioning of STP and it will result in significant odour generation in the vicinity. This impact is temporary and high adverse in nature.	• The STP should not be overloaded and personnel dealing in operation should be trained to avoid operational issues;	PIMU-PRMSC	Visual inspection	Daily	PIMU-PRMSC	N/A
		• Adequate tree plantation must be undertaken to avoid spread of odour in the vicinity.	PIMU-PRMSC	Implementation of tree plantation plan	Once	PIMU-PRMSC	N/A
Sludge	Sludge is semi solid material which will be settled at the bottom of the STP due to anaerobic decomposition of biomass. Significant amount of sludge will not be	• Suction trucks must be used for removal of sludge from the soakage pits and septic tanks	PIMU-PRMSC	Visual inspection	Monthly	PIMU-PRMSC	N/A
		• The sludge must not be disposed outside the demarcated boundaries of the nominated dumping site.	PIMU-PRMSC	Visual inspection	Monthly	PIMU-PRMSC	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	produced in ABR, however, periodic desludging will be done to achieve good removal efficiency. The removed sludge in wet form, if left unattended will create nuisance i.e., odor, soil contamination, groundwater contamination (through percolation/ seepage) and will serve as breeding ground for disease vector.						
Community Health Hazards	During desludging and cleaning operations the sludge may get piled up temporarily along the manholes and will be a hazard for passers-by and local community. This impact is temporary and moderate negative	• Suction trucks must be used for removal of sludge from the soakage pits and septic tanks;	PIMU-PRMSC	Visual inspection	Daily	PIMU-PRMSC	N/A
		• The sludge must not be disposed outside the demarcated boundaries of the nominated dumping site;	PIMU-PRMSC	Through Seminars	Yearly	PIMU-PRMSC	N/A
		• No manhole will be left uncovered and replaced soon it gets damaged.	PIMU-PRMSC	Visual inspection	Monthly	PIMU-PRMSC	N/A

Activity	Impacts	Mitigation Measures	Implementation Responsibility	Monitoring Indicators	Monitoring Frequency	Monitoring Responsibility	Cost
	in nature. The open manhole covers are a threat to health and increase the vulnerability of the accidents.						
Occupational Health and Safety Hazards	Infections resulting from direct contact with treated wastewater, and from infected wounds; and Intestinal infections that are transmitted by flies feeding on the STP.	• The Contractor should prepare OHS and ERPs during operation phase;	PIMU-PRMSC	Implementation of OHS & ERPs	Daily	PIMU-PRMSC	N/A
		• Instructing the workforce on handling of treated wastewater;	PIMU-PRMSC	Visual inspection	Daily	PIMU-PRMSC	N/A
		• Provide basic medical training to the specified work staff and basic medical service and supplies to workers;	PIMU-PRMSC	Visual inspection;	Daily	PIMU-PRMSC	N/A
		• Obligatory insurance of work laborers against accidents;	PIMU-PRMSC	Visual inspection	Fortnightly	PIMU-PRMSC	N/A
		• Provision of safety measures such as emergency sirens, firefighting equipment, first aid, and contingency measures in case of accidents;	PIMU-PRMSC	Visual inspection	Monthly	PIMU-PRMSC	N/A

KEY

CC	Construction Contractor
DC	Design Consultant
EPA	Environment Protection Agency
SC	Supervision Consultant
PIMU-PRMSC	Project Implementation Unit – Punjab Rural Municipal Services Company

7.9 Gender Action Plan

A Gender Action Plan (GAP) is a systematic framework for ensuring that women participate in and benefit from development programs and projects. The objective of a Gender Action Plan (GAP) is to ensure the mainstreaming of gender issues and concerns into all aspects of the project throughout the project lifecycle through detailed planning, implementation, monitoring, and evaluation activities.

The GAP will safeguard the interest of the community women adjacent to the project sites; promote their participation in project planning and activities (if applicable) and ensure safer and healthier living conditions for them. It will also contain actions that will be adhered to by all the agencies (Contractors, Sub-Contractors) involved in the implementation of the project during the project lifecycle along with the project proponent.

7.9.1 Objectives of Gender Action Plan

The GAP illustrates the specific activities to address gender-specific concerns and social impacts associated with the proposed project. The objectives of the GAP are as follows:

- To undertake preparatory work to address gender issues in the project;
- To include special features in the project design to address gender impacts;
- To promote women's participation in the project;
- To maximize women's access to project benefits;
- To ensure tangible benefits to women;
- To minimize the higher vulnerability of women arising due to the project activities like securing land, and security concerns during construction;
- To propose specific measures to enable the affected women-especially those who are poor/vulnerable, to cope with project impacts;
- To ensure implementation of the gender design elements and gender monitoring and evaluation.

Table 7.3: Gender Action Plan

Issues	Measures	Responsible Agency	Monitoring Indicators
Pre-Construction Phase			
Announcement for Employment Opportunities	• Announce employment opportunities and recruitment notices widely, targeted at affected women as well as men. • Encourage women's participation and provide pieces of training regarding employment opportunities	CC and PIMU-PRMSC	• Notice of employment opportunities by the distribution of brochures and pamphlets/leaflets, outside the construction site. • As most of the females are uneducated, announcements should be made in local mosques as well consultative meetings may be convened for the hiring of the female workforce.
Communication/ Consultations and Information Dissemination	• Information dissemination to the community including female members through continuous consultative meetings and distribution of brochures and pamphlets/leaflets. • Involve the females in the regular consultative process of the project.	PIMU-PRMSC	• Lack of awareness among females about the project impacts and its mitigation measures.
Construction Phase			
Women Workforce	• Preference may be given to women from project-affected families to work as unskilled workers/ labor (wherever feasible) during the construction phase and they receive equal wages for the work	CC and PIMU-PRMSC	• Less labor force participation of women than men
Equal Wage	• Ensure equal pay for equal work of women and men for all construction and maintenance work	CC and PIMU-PRMSC	• Women doing the same work as men but receive unequal wages (reflected in payrolls)
Restrictions on Women's Mobility	• Identify barriers to women's mobility and take reforms to fix those barriers.	PIMU-PRMSC	• Unrestricted movement of females. They could not go outside without male or along with another woman

Issues	Measures	Responsible Agency	Monitoring Indicators
An influx of Labor, especially if from outside the project area.	• Awareness training for community and Labor. • Referrals to prevention and treatment services • Strengthen prevention in contractor documents create or strengthen SEA/SH referral helplines	Contractor	• Sexual Harassment (SH) and Sexual Exploitation and Abuse (SEA) issues reported as females do not feel secure going anywhere.
Safety and Security concerns	• Labor camps to be established away from the residential areas • Presence of security personnel on the project site during the execution	Contractor	• Safety and security concerns of females during construction time
Gender Sensitive Grievance Redress Mechanism and Complaints Handling	• Develop Gender-sensitive GRM to address all complaints of the local females • Awareness about the Gender-sensitive GRM and complaint-handling process through consultative meetings, distribution of pamphlets, and mobile penetration. • Ensure that the existing GRM is accessible to the local community is gender-sensitive, and has SEA/SH Protocols • Carrying out project implementation activities in consultation with the community/ local women to avoid peak hours working activities of women. • There should be female staff to interact with local females. • Training – capacity development for gender-inclusive project design	PIMU-PRMSC	• Complaints about the disorder of pressing needs of women/ local community relating to the project that may affect women's mobility during the construction activities • Difficulties in having access to social amenities • Disturbance in privacy during construction activities.
Through the Project Lifecycle			
Women in Decision Making	• Women should be trained and empowered to be part of decision-making processes – their	PIMU-PRMSC to facilitate training with help of any local NGO/ CBO	• No decision-making regarding households and business affairs.

Issues	Measures	Responsible Agency	Monitoring Indicators
	understanding and knowledge about their households and business affairs.		• No freedom to decide on career or marriages • Less participation in decision-making of different matters
Area Safety	• Support the relevant departments in enhancing the safety and security of women in public spaces, focusing on gender-based violence, harassment issues, and female vulnerability and risk.	PIMU-PRMSC	• Reporting of GBV and harassment issues
Lack of Security	• Security arrangements in liaison with line departments	CC and PIMU-PRMSC	Safety and security concerns of females
Need for Skill Training and Capacity Building	• Improve and develop practical skills and opportunities for women population to enhance their participation in earning the livelihoods/businesses	PIMU-PRMSC to facilitate training with help of any local NGO/ CBOs	• Deficiency of knowledge about skill training • Less access to adequate training • Less representation of women in activities requiring different skills
Educational Attainment	• Spread awareness to provide education to young girls • Support reforms aimed at improving the education system and increasing capital accumulation with links to skills acquisition and school to-work transition	PIMU-PRMSC	• The low trend of educational attainment of young girls • Lack of emphasis in the educational system on the skills required for effective and sustainable school-to-work transition
Gender Discrimination in Educational Attainment	• Identify barriers and take reforms for removing gender discrimination in the education system	PIMU-PRMSC	• Young girls are often taken out of school to share the family responsibilities such as caring for younger siblings, etc. • If a family has to choose between educating a son or a daughter because of financial restrictions, typically the son is chosen. Negative parental attitudes towards educating

Issues	Measures	Responsible Agency	Monitoring Indicators
			daughters can also be a barrier to a girl's education. • Many parents view educating sons as an investment because the sons will be responsible for caring for aging parents
Poor Transportation System	• Transport infrastructure should be provided for girls to fulfill certain all social needs • Support reforms aimed to provide better access to all means of transport •	PIMU-PRMSC	• Girls in rural areas do not have adequate public transport to get to secondary school • Access and mobility are one of the key problems faced by the women
Child, Early and Forced Marriages	• Interpretation and enforcement of legislations/laws exist to address child, early and forced marriages • Training to law enforcement on gender discrimination and violence against women, including investigations into child marriages; • Implementing support programs that empower girls at risk or who are currently in child marriages. • Increasing access to education for girls, including by providing incentives for families to keep their daughters in school • Enhance economic opportunities for girls and their families through employment options and supports • Increasing and improving access to reproductive healthcare for all girls and women in rural areas • Providing continuing formal education and vocational training opportunities for married girls and women.	PIMU-PRMSC	• A huge proportion of young girls are forced to marry under the age of 18 due to socioeconomic and cultural reasons.

Issues	Measures	Responsible Agency	Monitoring Indicators
Unavailability of Mother Child Care Centers and other Medical Facilities	• Reforms and policies to improve maternal and child undernutrition, increase education quality mother-child care health and nutrition, and other medical facilities. Appointment and availability of doctors in the communities to treat mother-child care and other health-related issues;	PIMU-PRMSC	• Lack of Mother-child care centers and other medical institutions • Not having enough money to afford private doctors and their costly treatments in the big cities
Occurrence of Diseases	• Support health institutions to take reforms for improving health quality and provide a safe and healthy environment	PIMU-PRMSC	• Reporting of various diseases like hepatitis, diarrhea, skin issues, cough, etc. due to the usage of brackish water, improper sewerage, and sanitation system.
Menstrual Hygiene Awareness	• Built awareness programs and generate data to aware women of menstrual hygiene. • Conduct pieces of training using female trainers • Encourage women's participation in awareness programs • An adequate water supply is necessary to maintain a hygienic environment.	PIMU-PRMSC	• Females were less aware of menstrual hygiene. • The majority of women use pieces of cloth because of less awareness about sanitary materials. • Females have less money to buy the sanitary pads
Customer Service Centers	• Provision of Customer Service Centers for the registration of complaints/grievances regarding water and sanitation-related issues. • Hiring of female staff to interact with local females	PIMU-PRMSC	• Inadequate Customer Service Centers in the rural area
Gender based Violence / Domestic Violence	• Provision in GRM for GBV related issues • Agencies can direct resources toward programs best suited to their communities. • Increased awareness can be spread to communities and service providers alike about the diverse ways that GBV may be experienced, particularly at various intersections of social oppression and marginalization	PIMU-PRMSC and local NGOs/ CBOs	• Reporting of GBV related issues

Issues	Measures	Responsible Agency	Monitoring Indicators
Reporting of Sexual Harassment (SH) and Sexual Exploitation and Abuse (SEA) issues	• Harassment cases should be properly addressed and reported through GRM • Awareness training for • community and Labor. • Referrals to prevention and • treatment services • Strengthen Prevention in • Contractor Documents • Create or Strengthen SEA/SH • Referral Helplines	PIMU-PRMSC and local NGOs/ CBOs	• Sexual Harassment (SH) and Sexual Exploitation • and Abuse (SEA) issues reported as females do not feel secure to go anywhere.

7.10 Grievance Redressal Mechanism (GRM)

The Grievance Redress Mechanism (GRM), outlines the policy and procedure for documenting, addressing, responding, and employing methods to resolve project grievances and complaints that may emerge during and after PRSWSSP sub-projects implementation. It will also cater to managing any disconnects that emerge from the field level and that have significant implications for the effective implementation of the sub-project interventions.

In an effort to deter fraud and corruption, the use of a dedicated mobile application has been proposed for reporting grievances from the field level to district and provincial headquarters. This will not only provide a coherent system of checks and balances but will also enable swift redressal and effective monitoring of complaints.

The PIMU at the LG&CDD level will serve as the Secretariat for the Grievance Redressal Committee (GRC Directorate) that will be responsible for providing oversight on the entire GRM process at a strategic level and monitoring complaints management.

Water supply & sanitation are imperative daily basis facilities. Due to, continuous use and all-time requirement, there is a tendency for routine O&M requirements of the facilities. O&M will be needed as soon as project interventions are completed in the village. Due to the huge number of beneficiaries spread, a comprehensive complaint redressal model is indispensable for Service Delivery Unit (SDU). The Grievance Redress Mechanism (GRM) will be consistent with the Component 4 Project Management and Monitoring sub-component 4.2 Grievance Redressal Model is part of the Project of PRSWSSP. Project activities may cause social friction if Projects do not have an effective GRM.

7.10.1 Objectives

The overall objective of the GRM is therefore to provide a robust system of procedures and processes that provides for transparent and rapid resolution of concerns and complaints identified at the village level.

The GRM will be accessible to diverse members of the community, including women, senior citizens, and other vulnerable groups. Culturally, appropriate communication mechanisms will be used at all sub-project sites both to spread awareness regarding the GRM process as well as complaints management. This GRM will be integrated with the PRSWSSP overall project GRM hotline

7.10.2 Disclosure of GRM

The final processes and procedures for the GRM will be translated into local languages and disseminated at all sub-project locations. These shall be made available (in both leaflet and poster format) to all subproject locations through the offices of each SDU. Dedicated male and female Grievance Focal Persons for each sub-project location will play an instrumental role in spreading awareness regarding the GRM, including the use of information technology for reporting and monitoring complaints.

7.10.3 Records and Monitoring

The Project Director's Office will maintain an electronic database at the PIMU that will provide a summary of complaints received and mitigations. The PD office will also provide an analysis of the grievances at each sub-project location using a pre-designed Monitoring and Evaluation (M&E) template that will give insight into the type of complaints received and a qualitative and quantitative review of grievance redressal. The PD's office will also be responsible for uploading the actions and results for each grievance for each sub-project location on a periodic basis to the Project website. The dedicated mobile application that will be used to communicate grievances will provide the basis for recording complaints both at the provincial and district levels.

Apart from the electronic database that will be maintained at the PIMU level, a manual register of all complaints and actions taken will be maintained by the Environmental and Social Focal Persons at the Office of the SDU-TOs and a manual register of all day-to-day complaints and their grievance redressal details will be maintained by VOs their office.

7.10.4 Proposed Institutional Mechanisms

It is proposed to establish the following prior to commencing project implementation activities including pre-construction activities:

Tehsil Level-Public Complaints Center (PCC) in SDU-TO will be responsible to receive, log, and resolve complaints at the site and in Village-level. The complainant would be able to launch a complaint on a toll-free number, mobile application, message, or telephone.



Tier 1: Village level –Panchayat/Village Councils made under Punjab Local Government (Amendment) Ordinance 2021 will act as the 1st tier of GRM at the village/community level.

Tier 2: Grievance Redress Committee (GRC-Tehsil Level) in SDU-TO will be established for each district that will manage GRM aspects for all sub-project locations in each district including decisions to be taken, actions and monitoring of complaints resolution at the sub-project level.

Tier 3: PIMU Level-GRC at PMIU (LG&CDD) will be responsible to oversee the overall functions of the GRM at a strategic level including monthly review.

7.10.5 GRM Process Implementation

The grievance redress process is described hereunder:

Through the envisaged system, the complainant would be able to launch a complaint on a toll-free number, mobile application, message, or telephone (GRM can accept anonymous grievances).

Details of the complaints and the complainants will be entered into the system and a complaint number will be provided to the complainant through SMS.

In SDU a specific person will be designated to monitor the system and issue necessary instruction to relevant quarter for necessary action.

The GRM will provide an interface to complainants to check the status of their complaint and a dashboard for SDU & PIMU to monitor the progress on the complaints.

The system will bridge the gap between the masses and the service provider.

Monitoring officers will precisely know the details of pending complaints in every SDU. The performance of the SDU could also be easily monitored through it.

The GRM will have a built-in escalation system for moving unresolved complaints to higher levels.

7.10.6 Mode of Complaint

The complainant can lodge their complaints by opting the following modes:

				
Written Application	**Telephonically**	**Verbally**	**Android Application**	**Website**

7.10.7 GRM Procedures and Timelines

The tracking and documenting of grievance resolutions will include the following elements:

- Tracking complainant(s) from subprojects sites (field and community level) to PIMU;
- Dedicated staff to update the database routinely;
- Promote transparency, publicize how complaints are being handled, and periodically evaluate the overall functioning of the mechanism;
- Processes for informing stakeholders about the status of a case; and
- Procedures to retrieve data for reporting purposes, including the periodic reports, from Village and Tehsil and document them into the monthly progress reports at PIMU.

GR (Village level) will be responsible to receive, log, and resolve complaints at the village level. The Grievance Redress Committee at the village Panchayats will review and identify actions to be taken to address the complaints at its weekly meeting. If not resolved timely then complaint would be referred to GRC-Tehsil Level (SDU-TO) within 3 days after receiving.

GRC-SDU-TO will try to resolve the complaints in a satisfactory manner anyhow, if not satisfactorily resolved by the village panchayats/councils and Tehsil level, then the grievance will be referred for consideration by GRC at the PIMU/LG&CDD level within one week.

Every effort will be made to address or resolve grievances within the following fixed timelines, which will be an indicator of the performance of the handling system. Acknowledgment of a written submission will be issued to the complainant within three working days.

If the complainant is not satisfied, the complaint will have the option to seek redress through the court of law.

7.11 Cost for testing of Ambient Air, Noise, Water

Testing and analysis for ambient air, noise, and ground and surface water will be undertaken during the construction and operational phases to ensure the effectiveness of the proposed mitigation measures. Certain environmental parameters will be selected and quantitative analysis will be carried out. The results of the analysis will be compared with the guidelines; standards and pre-project conditions to investigate whether the ESMP and its implementation are effective for the mitigation of impacts or not. The cost of environmental monitoring is 2,992,000/- PKR for the parameters to be analyzed during construction and operation phase of the project.

7.12 Institutional Capacity & Strengthening

In order to ensure that the ESMP provisions are implemented efficiently and effectively, training and capacity building/ strengthening of the implementing parties are required. Therefore, based on the assessment of the institutional capacities of the parties involved in the implementation of the ESMP, the following broad areas of capacity building/strengthening have been identified and recommended for effective implementation of the ESMP.

Table 7.4 shows the positions proposed for institutional strengthening for effective implementation of environmental and social mitigation measures along with their responsibilities while the cost of institutional strengthening is 9,000,000/- PKR.

7.13 Training Program

The environmental and social training will help to ensure that the requirements of the ESMP are clearly understood and followed by all project personnel. The primary responsibility of providing this training to all project personnel will be that of the contractor and ESC. The training will be provided to different professional groups separately such as managers, skilled personnel, unskilled labors, and camp staff. Capacity building will be aimed at strengthening the ESC, and operational staff in the field of environmental management and social development. Training cost is 11,200,000/- PKR**.**

Table 7.4: Institutional Strengthening

Institutional Strengthening	Position	Scheduling (Months)	Responsibility
Contractor	Environmental/ HSE Expert	01 (Intermittent Input)	▪ Responsible for the overall implementation of ESMF processes and procedures in the light of WB policies and Guidelines and local policies and procedures; ▪ Closely follow up the integration of safeguard assessment information and inclusion of safeguards self-screening process at the project development and design stage; ▪ Provide technical support during proposal development, project design, appraisal process, and resource mobilization plan for the sub-projects in all locations; ▪ Undertake follow-up monitoring to ensure that proposed mitigation measures are implemented according to an agreed-upon environmental and social mitigation implementation plan; ▪ Closely provide assistance and design capacity building/training program for the overall implementation of ESMF from PIMU to village level and deliver capacity building training to the field teams to close knowledge/skill gaps and minimize the likelihood of risks happening to sub-projects; ▪ Ensure that appropriate environmental and social mitigation measures are proposed and met; ▪ Undertake to follow-up monitoring to ensure that proposed mitigation measures are implemented according to an agreed-upon environmental and social mitigation and implementation plan; ▪ At the PIMU level, maintain the record of all information, documents evidence, and reports including progress reports, TPV Reports, training reports, ESMPs, Screening Checklists, etc.; ▪ Closely work with SSS and Gender Specialists at the PIMU level and provide technical assistance and advice to the Environment/ Water Quality Officers based at SDU-TO

Institutional Strengthening	Position	Scheduling (Months)	Responsibility
	Social / Resettlement Expert	01 (Intermittent Input)	▪ Responsible for the overall implementation of social safeguard of ESMF and RPF and VLD processes and procedures in the light of WB policies and Guidelines and local policies and procedures; ▪ Closely follow up the integration of safeguard assessment information and inclusion of safeguards self-screening process at the project development and design stage; ▪ Provide technical support during proposal development, project design, appraisal process, and resource mobilization plan for the sub-projects in all locations; ▪ Review all the E&S Screening checklists from social safeguards point of view and ensure the correct categorization of each subproject and visit the project sites for Resettlement Checklists (if required); ▪ Overall responsible for the implementation of GRM and Public Disclosure of Information processes and procedures; ▪ Undertake follow-up monitoring to ensure that proposed mitigation measures are implemented according to an agreed-upon mitigation and implementation plan Closely provide assistance and design capacity building/training program for the overall implementation of social safeguards and RPF from PIMU to village level and deliver capacity building training to the field teams to close knowledge/skill gaps and minimize the likelihood of risks to happen to sub-projects; ▪ Ensure that appropriate social mitigation measures are proposed and met prepare SMPs either separately or integrated with ESMPs; ▪ Undertake follow-up monitoring to ensure that proposed mitigation measures are implemented according to an agreed-upon social mitigation and implementation plan; ▪ Assist PIMU in hiring consultants (if required for preparation of ARAPs); ▪ At the PIMU level, maintain the record of all information, documents evidence and reports including progress reports, TPV Reports, training reports, SMPs/ ARAPs and Screening Checklists etc. ▪ Closely work with ESS and Gender Specialists at PIMU level and SDU-TO team.

Institutional Strengthening	Position	Scheduling (Months)	Responsibility
	Gender Specialist	01 (Intermittent Input)	▪ Provide direct technical assistance and guidance on women's economic empowerment to the PRSWSSP and its delivery partners; ▪ Support the development of tools, systems, processes and approaches that continuously improve technical excellence and impact in the area of transformative approaches to women's economic empowerment; ▪ Lead, coordinate, support, and/or conduct gender and power analyses, effectiveness and efficacy studies, appraisal, evaluation and needs assessments as required by the PRSWSSP; ▪ Assist with quantitative/qualitative assessments in targeted communities to assess effectiveness of interventions and impact; ▪ Support delivery partners to understand the role of gender equality and women's economic empowerment for the PRSWSSP impact groups; ▪ Ensure gender equality and women's economic empowerment criteria are well integrated into market systems approaches; ▪ Work closely with other technical specialists to integrate gender across all PRSWSSP components; ▪ Facilitate and support a strong learning and knowledge-sharing community around gender-transformative practices amongst delivery partners; ▪ Represent work being done in gender transformation and women's economic empowerment under the PRSWSSP in relevant internal and external forums.

7.14 Cost for Health and Safety

Cost of Health and Safety during construction phase is worked out is to be 8,131,000 PKR. This includes the cost of PPEs and other safety items.

7.15 ESMP Cost

The total cost for implementation of ESMP has been worked out as **PKR 31,323,000/-**. The cost in the construction phase shall be the responsibility of the Contractor while PRMSC shall bear the cost in the operational phase. Breakup given in below **Table 7.5.**

Table 7.5: ESMP Cost

Sr No.	Description	Amount PKR
1	Environmental Monitoring	2,992,000
2	Training	11,200,000
3	Health & Safety	8,131,000
4	Institutional Strengthening (Intermittent Input)	9,000,000
	Grand Total (RS.)	**31,323,000**
	Grand Total in Million (RS.)	**31.32**

Annexures

Annex-I

Minutes Of Meeting

PUNJAB RURAL MUNICIPAL SERVICES COMPANY
(A Company registered under Section 42 of the Companies Act, 2017)

No. PRMSC/PRSWSSP/EDCS/South-III/ 493 Date: 27/01/2023

To,

M/s. National Engineering Services Pakistan (PVT) Ltd.
Address: NESPAK 1-C, Block N, Model town Extension,
Lahore.

Subject: **PROGRESS REVIEW MEETING WITH WORLD BANK TEAM ENGINEERING DESIGN & CONSTRUCTION SUPERVISION CONSULTANT, PUNJAB RURAL SUSTAINABLE WATER SUPPLY AND SANITATION PROJECT (PRSWSSP), CLUSTER SOUTH-III**

In pursuance of the progress review meeting with the World Bank Technical Team dated 26.01.2023 regarding the Engineering Design and Construction Supervision of Cluster South-III.

2. It was agreed in the meeting that the Consultant shall submit the Feasibility Report, Rough Cost Estimate, ESPM, and PC-I of 40 Nos Revenue Villages as per the following schedule;

Sr. #	Revenue Villages	Feasibility Report I/C Rough Cost Estimate	PC-I I/C ESPM
1	06 Nos. Priority Villages	February 06, 2023	February 06, 2023
2	12 Nos Revenue Villages	February 20, 2023	February 28, 2023
3	12 Nos Revenue Villages	March 13, 2023	March 21, 2023
4	10 Nos Revenue Villages	April 05, 2023	April 15, 2023

3. The agreed decision regarding the proposed intervention of water supply, sewers, and solid waste management and design parameters is in **annexure-A.** The Consultant shall submit all drawings of topographic survey and maps on minimum A3 size.

4. It is, once again, you are directed to submit above mentioned deliverables as per the agreed timeline positively. Failure to meet the target date will be considered poor performance by the Consultant.

27/1/2023
Chief I & D

C.C. to;

1. The Chief Executive Officer/PD, PRMSC.
2. P.S. to the Chairman, Planning & Development Board.
3. P.S. to the Secretary LG&CDD/Chairman of BOD, PRMSC.
4. Mr. Mohammad Farhanullah Sami, Team Leader, World Bank.
5. The Tehsil Manager, PRMSC.

3-A, Canal View Cooperative Society, Lahore, Tel:42-35294649, Email: cid.prmsc@punjab.gov.pk

Annexure-A

AGREED DECISIONS WITH EDCS CONSULTANTS

1. For settlements having less than 40 Households, only Behavior Change and Communication campaign will be run and no water and sanitation interventions will be provided
2. The settlement ranges from 40-150 HH, a public stand posts (tank with chlorination and solar) for South Clusters.
3. The settlements above 150 HH, Piped Solution for South Clusters.
4. The settlements above 200 HHs, piped solution for Central and North Clusters.
5. The settlements range from 40-150 HHs, Communal Septic Tanks including soakage pits in 3rd chamber should be proposed.
6. In the settlements above 150 HHs, the wastewater collection will be done through pipes and Wastewater treatment facilities i.e., ABRs, packed tower trickling filters, or BTFs will be proposed.
7. For small settlements, PVC pipes will be used from septic tanks to soakage pits.
8. Terminal pressure should be 15 psi at the consumer end.
9. Maximum 70 liters per capita per day demand will be taken by all consultants.
10. No Intermittent pumping station will be provided for the water supply network.
11. Mechanical components i.e. tube wells on maximum day demand and distribution network will be designed on 2.25 of average day demand.
12. Water Meters cost need to be reduced. Water Meters of $5 are currently available and also check rates from the market.
13. The cost of ABR needs to be revised, no prior treatment is needed.
14. Add the cost of the solar system without the battery, a play area for recreation, chairs along the parks, and tuff tiles/brick soling for one of the main streets. There will be a boundary wall only where solar systems are proposed.
15. The ABR will be above ground and the effluent will be as per NEQs. It can be discharged into agriculture fields after chlorination, or in a stagnant pool, or in a drain.
16. The infrastructure will not be proposed without VLD or the availability govt land. The construction will be done after the completion of the paperwork for the VLD process by PRMSC.
17. Submersible pumps will be used for water supply and sewerage systems in order to reduce the cost of Dry well and to achieve maximum efficiency and economy.
18. For the distribution network, pipe PN-4 (if commercially standard manufactured) and joints of PN-6 will be proposed.

PRMSC

19. Use market rates and add those costs to the rate analysis. Use Chinese meters, motors, and pumps of reasonable quality.
20. Population growth rate of 1.5 or below should be used for revenue villages. Make justification with fertility rate, rural-urban migration, and reducing trend of growth rate.
21. Minimum of 2 inches of pipe diameter for water supply in hilly areas can be used in case of pressure at the consumer end are satisfied.
22. For a standpoint solution, a Water Tank of brick masonry or plastic will be proposed. A mix of tank brick and mortar and plastic material should be proposed by each consultant.
23. The Consultants should exclude the cost of water meters and solid waste management (trucks and bins) from the tender documents. However, propose them separately.
24. For the solid waste management system, only the cost of civil works of collection point according to the volume of solid waste will be added comprising of a room having the roof of galvanized sheet.
25. Add the cost of sludge drying beds separately in the cost estimates as Annexure.
26. The collection of waste from each household would be 18% of total waste generation as it is assumed that 64% would be composted and the remaining 18% will be sold to the vendors for recycling.
27. Phasing of each component should be proposed by the consultants.
28. Revised Feasibility, Detailed Engineering Design, ESMP and PC-1s for model villages should be submitted by 6th February.
29. First package submission date is 28th February, 2nd package is 21st March and the last package date is 15th April.



Re: Planning of proposed Water Supply and Sewerage System in Liaqatpur Villages- Cluster South-III

From: Chief Infrastructure & Development (cid.prmsc@punjab.gov.pk)

To: faisalbuttce_786@yahoo.com

Cc: aamir.munir@nespak.com.pk; alihamid.nespak@gmail.com; umairali@punjab.gov.pk

Date: Friday, February 3, 2023 at 10:32 AM GMT+5

Dear Faisal

Your technical proposal sounds good. We agree with your technical proposal. please submit the PC-I and rough cost estimate on or before Feb 06, 2023 positively

Regards

Engr. Ch. Jamil Ahmad
Chief Infrastructure & Development
PRMSC
Ph: 042-35294649, Cell: 03214625322

From: Faisal Butt <faisalbuttce_786@yahoo.com>
Sent: Thursday, February 2, 2023 5:50:53 PM
To: Chief Infrastructure & Development
Cc: Aamir Munir; alihamid; MUHAMMAD UMAIR ALI | Infrastructure Engineer
Subject: Planning of proposed Water Supply and Sewerage System in Liaqatpur Villages- Cluster South-III

Dear Sir,

Please refer to minutes of meeting held on 26.01.2023 among the World Bank Team, Client and representatives of all the Consultants of Pilot Phase issued vide letter No. PRMSC/PRSWSSP/EDCS/South-III/493 dated 27.01.2023. Subsequently, site visit of Liaquat priority villages was conducted on 31.01.2023 by yourself accompanied by design engineers of NESPAK and PRMSC Tehsil Staff. During the visit, planning of water supply and sewerage system was deliberated and locations of proposed tube wells, OHWTs and pumping stations were also jointly visited. Following matters were highlighted by yourself and discussed with design engineers of NESPAK and way forwarded was decided as follows:

i) The sources of water (2R and 3R canal distributaries) are not much promising as the same are lined canals with limited seepage/recharge of aquifer. Although design of tube-wells (capacities, bore depth, c/c distance etc) are prepared by NESPAK's hydrogeologist according to recharge capacity of the aquifers, nevertheless it is mentioned in the Groundwater Study Report that in case of over-pumping through tube-wells than recommended pumping duration i.e. 4-6 hours per day (2 hours at a time) especially during summer season (to meet total water demand of 15gpcd), up-coning of saline water may occur.

ii) In order to overcome this risk which may occur due to negligence of O&M staff and other social issues, it is proposed to phase-out the water supply system till confirmation of water sustainability during initial few years of O&M. In first phase, tube-wells, transmission lines and OHWT of 10,000 gallons may be installed along with public stand post for providing drinking and other essential domestic water requirement to population of village. In second phase, when reliability/sustainability of water source will

be established and O&M trainings and social norms are established to use equitable water, then piped water distribution system may be provided.

iii) Consequently, septic tanks with soakage pits will be provided as also decided in the above referred minutes of meeting. However, in this specific case since water distribution network is not being provided in first phase, the criteria of providing septic tanks for <150 HHs settlement will not be applicable and septic tanks/soakage pits will be provided even for >150 HHs. Upon laying of water distribution network in second phase, sewerage system will also be provided and these septic tanks will act as house chambers/manholes.

iv) This phasing is also required in view of investment portfolio available for each village as per approved umbrella PC-1 and to cover requisite number of villages according to TORs.

In view of above, we have proceeded with preparing revised Feasibility Study Report and PC-1/Rough Cost Estimate. As agreed, it is requested to send your approval/concurrence on the above phasing/modality/criteria by return email today please.

Thanks and best regards,

Regards;

Faisal Butt | Project Manager |

National Engineering Services Pakistan (pvt.) Limited

1-C Model town Extension, Lahore, Pakistan

Email: faisalbuttce_786@yahoo.com |

Meeting	Review of Rough Cost Estimate of Priority Villages
Dated	10.02.2023
Participants of Consultants	Quantity Surveyors (QS) of M/s. NESPAK Consultants M/s. Jers Consultants M/s Asian Consultants M/s Osmani Consultants M/s Techno Consultants
Participant of PRMSC	Chief Infrastructure Development Infrastructure Engineers Assistant Infrastructure Engineers

Following items are revised/deleted from Rough Cost Estimates:

1. Water Supply and Tube Wells

i. Provision of Temporary Pond items excluded in tube well installation.
ii. Provision of Clearance and grubbing costs are excluded from all villages.
iii. Change of Non schedule item Testing and Development of tube well on Schedule item.
iv. MS centralizer pipe is excluded.
v. Makeup pipe for shrouding is included.
vi. Lean concrete in pump room is reduced from 1:4:8 to 1:6:12.
vii. Change of Non schedule item of Chain pulley for pump room schedule item.
viii. Transportation cost of soil excluded from all components in water supply.
ix. OHR costing template provided to consultants to rationalize the cost.
x. OHR inlet and outlet pipe is MS pipe on schedule item.
xi. Deformed Grade 60 steel is proposed for OHR.
xii. Termite Proofing cost is excluded from all structures.
xiii. In distribution network Valve Chamber will be of brick work size 3' X 3' and 4' depth and all items of chamber will be schedule items.
xiv. There will be no steps in Valve Chamber.
xv. Fire hydrants are excluded in all villages.
xvi. Cost of NOC is excluded from all villages.
xvii. Electrical items costs are reduced i.e., size and length of cables.
xviii. LED lights are reduced.
xix. Flood lights are also excluded from Cost estimates.
xx. Provision of only one ceiling fan in tube well chamber
xxi. Provision of warning lights are removed from OHT.
xxii. Provision of uPVC Cable pipes Class D excluded from Cost,
xxiii. Provision of Cable trays Cost is also deleted.
xxiv. Switch Board Nos are reduced as per requirement.
xxv. Provision of Earthing is changed from non-schedule to schedule item.
xxvi. Power factor Improvement panel cost is reduced.
xxvii. Transformer cost, electric connection including 11 KVA transmission line, Poles, Conductors, security charges etc. are BOQ items. (WAPDA/DISCO Connection Complete with all aspects)

xxviii. Solar cost is PKR 300/- per Watt and Cost for Boundary wall is PKR 6500/- per Rft and it is only part of PC-I for cost provision.

xxix. No generator provision for backups.

2. Sewer Lines

i. Shuttering cost is excluded in excavation for sewer lines upto 7 feet depth.

ii. Crushed stone bedding is removed under sewer only sand bedding 6" thickness is provided.

iii. One connection chamber for two houses

iv. RCC pipes class 2 & 3 is recommended for sewer pipes.

v. New soling quantity is 1000 Cft.

vi. Restoration of carpeted road is removed

vii. Manholes are MRS items and rates for depth upto following are same
i) 0-5' ii) 5'-8' iii) 8'-10' iv) 10'-12'

3. Disposal Works

i. Provision of Jungle clearance item is deleted.

ii. Provision of Dry Sinking well item is excluded.

iii. Provision of plinth protection in well is deleted

iv. RCC in roof & beam etc.is 1:1.5:3

v. Provision of brick work in core wall is removed.

vi. C.I/M.S pipe is proposed from screening chamber to wet well instead of RCC pipe

vii. Provision of Tile Work item on roof of disposal station is removed.

viii. Only one submersible pump with one stand by is proposed.

ix. Provision of DI/ M.S Pipe from submersible pump to ABR.

x. Transportation cost of excavated earth is excluded in Disposal Works and ABR.

xi. Delete the provision of sump pumpl

xii. Provision of Epoxy coating on screens is deleted.

xiii. Chain pulley for submersible pump in Disposal Works on Schedule items.

4. ABR

i. Jungle clearance item is excluded in cost estimates.

ii. Removal of Sarkanda Item is excluded in cost estimate

iii. Cast iron Bend Pipe weight reduced from 1500 to 500 kg

iv. Steps in ABR is excluded (Iron steps)

v. Non-schedule item of Epoxy coating changed to schedule items and reduce the cost accordingly.

Annex-II

Lab Reports

Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +9242-35441444 Cell: 0303-4442334

EPA Certified

TEST REPORT

Ref#: PGG/LAB/2023-2351/DW **Date:** 02-May-23

Name of Client	**NESPAK**
Project Name	**Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster-Central**
Project Site	**Rojhan**

Sample Description:

Nature of sample	Drinking Water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	UmarKot Rajanpur82 N 28.881411° E 70.184824°
Sample source	Hand Pump
Sample Code	DW-807
Date of sampling	11-Apr-23

Summary of Test Result:

Physical Parameters	Partially Compliance
Biological Parameters	Non-Compliance
Chemical Parameters	Partially Compliance
Remarks: Parameters with * are exceeding with PEQS limits.	

- Analysis was conducted on the request of proponent for his own use.
- Report cannot be used regarding compliance of any complaint, EPO or any other court case.
- This report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of the results reported in this report lies with the client. Consequently, the laboratory is absolved of its responsibility for any claim that may result through the use by the client or others of the results appearing in this report.
- The left-over sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.

Sample Analyzed by	Reviewed by	Approved by
QURAT-UL-AIN	MUHAMMAD RAZAULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore. Lahore Pakistan

PNAC LAB 180 17025

Ref#: PGG/LAB/2023-2351/DW

Date: 02-May-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.825 at 23.5°C	APHA-4500-H^+ B
2.	Color	TCU	≤15	≤15	0.000	APHA-2120 B
3.	Taste	-	-	Non-Objectionable	Non-Objectionable	APHA-2160 C
4.	Odor	-	-	Non-Objectionable	Non-Objectionable	APHA-2150 B
5.	Turbidity	NTU	5	5	0.80	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	1077*	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	550*	APHA-2340 C
2.	Aluminum (Al)	mg/L	0.2	≤0.2	BDL	APHA-3111 D
3.	Antimony (Sb)	mg/L	0.02	≤0.005	BDL	APHA-3111 B
4.	Arsenic	µg/L	10	≤50	BDL	APHA-3114 B
5.	Barium (Ba)	mg/L	0.7	0.7	0.0010	APHA-3111 D
6.	Boron (B)	mg/L	0.3	0.3	BDL	APHA-3111 D
7.	Cadmium	mg/L	0.003	0.01	BDL	APHA-3111 B
8.	Chloride (Cl^{-1})	mg/L	250	<250	85	APHA-4500-Cl B
9.	Chromium (Cr)	mg/L	0.05	≤0.05	BDL	APHA-3500-Cr B
10.	Copper (Cu)	mg/L	2	2	BDL	APHA-3111 B
11.	Fluoride (F^{1-})	mg/L	1.5	≤1.5	0.7	APHA-4500-F-C
12.	Lead (Pb)	mg/L	0.01	≤0.005	BDL	APHA-3111 B
13.	Manganese (Mn^{2+})	mg/L	0.5	≤0.5	0.0143	APHA-3111 B
14.	Mercury (Hg)	mg/L	0.001	≤0.001	BDL	APHA-3112 B
15.	Nickle	mg/L	0.02	≤0.02	BDL	APHA-3111 B
16.	Nitrate	mg/L	50	≤50	1.240	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	BDL	APHA-4500-NO_2^{-1} E
18.	Selenium	mg/L	0.01	0.01	BDL	APHA-3111 B

Pak Green Enviro-Engineering (Pvt.) Ltd. 46-M, Gulberg-III, Lahore. Lahore Pakistan

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EPA Certified

Ref#: PGG/LAB/2023-2351/DW **Date:** 02-May-23

Chemical Parameters Analysis Results:

19.	Residual Chlorine	mg/L	-	0.2-0.5	0.06	APHA-4500 B
20.	Zinc (Zn^{+2})	mg/L	3.0	5.0	0.0989	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	81.6586	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	23.8625	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	0.0194	APHA-3111 B

Biological Parameters Analysis Results:

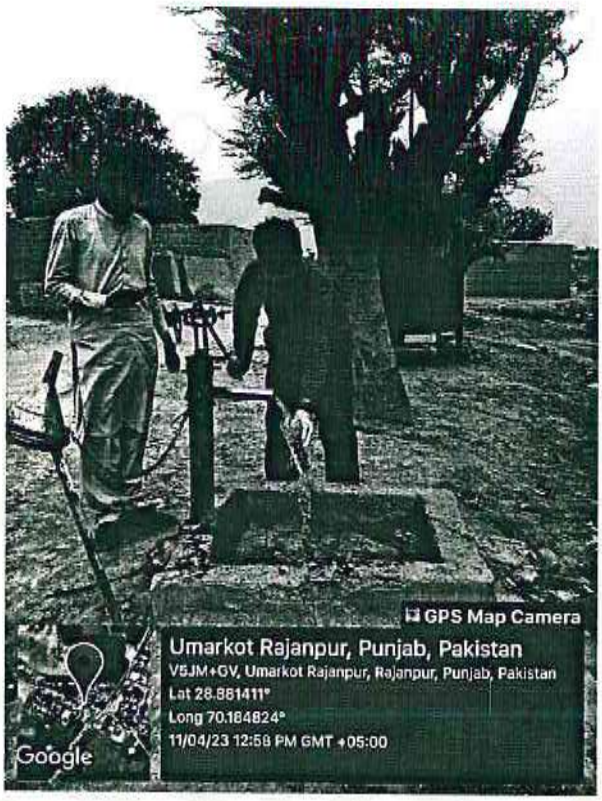
Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	484.6*	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	182.5*	APHA-9221 E
3.	Fecal Coliform	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	220.6*	APHA-9221 F

.....End of Report.....

PEQS: Punjab Environmental Quality Standards **^PNAC Accredited** **BDL: Below Detection Limit**
WHO: World Health Organization

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore Pakistan

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TEST REPORT

Ref#: PGG/LAB/2023-2352/DW **Date:** 02-May-23

Name of Client	**NESPAK**
Project Name	**Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster-Central**
Project Site	**Rojhan**

Sample Description:

Nature of sample	Drinking Water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Umerkot -Rahim kiryana Store N 28.824277° E 70.146365°
Sample source	Hand Pump
Sample Code	DW-808
Date of sampling	11-Apr-23

Summary of Test Result:

Physical Parameters	Non-Compliance
Biological Parameters	Non-Compliance
Chemical Parameters	Non-Compliance
Remarks: Parameters with * are exceeding with PEQS limits.	

- Analysis was conducted on the request of proponent for his own use.
- Report cannot be used regarding compliance of any complaint, EPO or any other court case.
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- The report is not valid for any negotiations.

Sample Analyzed by	Reviewed by	Approved by
QURAT-UL-AIN	MUHAMMAD RAZAULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore. Lahore Pakistan

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Ref#: PGG/LAB/2023-2352/DW

Date: 02-May-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.673 at 23.7°C	APHA-4500-H^+ B
2.	Color	TCU	≤15	≤15	98.7*	APHA-2120 B
3.	Taste	-	-	Non-Objectionable	Non-Objectionable	APHA-2160 C
4.	Odor	-	-	Non-Objectionable	Non-Objectionable	APHA-2150 B
5.	Turbidity	NTU	5	5	6.20*	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	2490*	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	820*	APHA-2340 C
2.	Aluminum (Al)	mg/L	0.2	≤0.2	BDL	APHA-3111 D
3.	Antimony (Sb)	mg/L	0.02	≤0.005	BDL	APHA-3111 B
4.	Arsenic	µg/L	10	≤50	BDL	APHA-3114 B
5.	Barium (Ba)	mg/L	0.7	0.7	BDL	APHA-3111 D
6.	Boron (B)	mg/L	0.3	0.3	BDL	APHA-3111 D
7.	Cadmium	mg/L	0.003	0.01	BDL	APHA-3111 B
8.	Chloride (Cl^{-1})	mg/L	250	<250	530*	APHA-4500-Cl B
9.	Chromium (Cr)	mg/L	0.05	≤0.05	BDL	APHA-3500-Cr B
10.	Copper (Cu)	mg/L	2	2	BDL	APHA-3111 B
11.	Fluoride (F^{1-})	mg/L	1.5	≤1.5	3.6*	APHA-4500-F-C
12.	Lead (Pb)	mg/L	0.01	≤0.005	BDL	APHA-3111 B
13.	Manganese (Mn^{2+})	mg/L	0.5	≤0.5	0.0138	APHA-3111 B
14.	Mercury (Hg)	mg/L	0.001	≤0.001	BDL	APHA-3112 B
15.	Nickle	mg/L	0.02	≤0.02	BDL	APHA-3111 B
16.	Nitrate	mg/L	50	≤50	1.249	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	2.112	APHA-4500-NO_2^{-1} E
18.	Selenium	mg/L	0.01	0.01	BDL	APHA-3111 B

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Ref#: PGG/LAB/2023-2352/DW

Date: 02-May-23

Chemical Parameters Analysis Results:

19.	Residual Chlorine	mg/L	-	0.2-0.5	BDL	APHA-4500 B
20.	Zinc (Zn^{+2})	mg/L	3.0	5.0	0.1015	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	134.0147	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	12.8642	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	1.8323	APHA-3111 B

Biological Parameters Analysis Results:

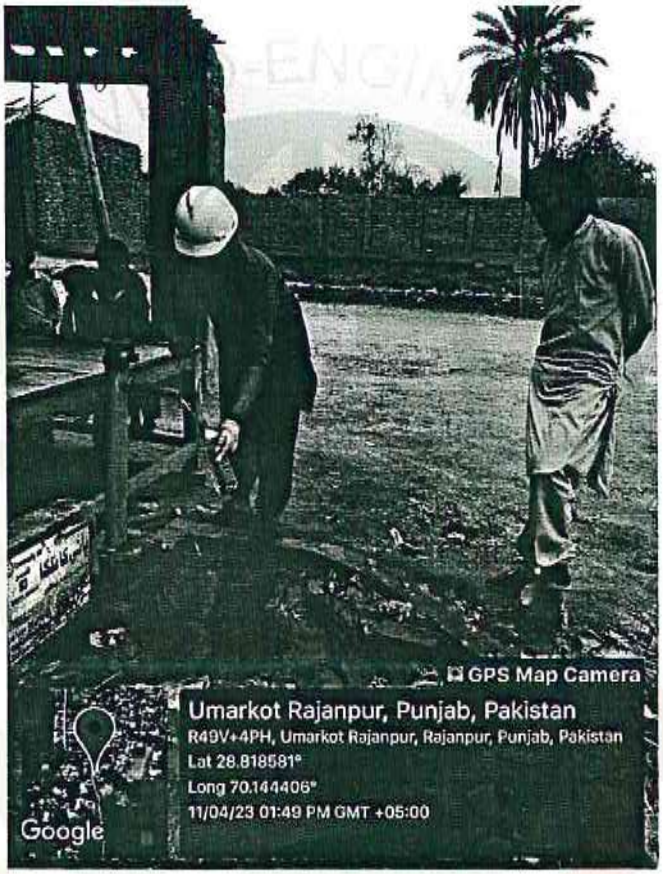
Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	559.7*	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	113.4*	APHA-9221 E
3.	Fecal Coliform	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	286.2*	APHA-9221 F

.....End of Report.....

PEQS: Punjab Environmental Quality Standards ^PNAC Accredited BDL: Below Detection Limit
WHO: World Health Organization

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TEST REPORT

Ref#: PGG/LAB/2023-2353/DW

Date: 02-May-23

Name of Client	**NESPAK**
Project Name	**Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster-Central**
Project Site	**Rojhan**

Sample Description:

Nature of sample	Drinking Water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Basti Haji Bashir Ahmed N 28.76527° E 70.063776°
Sample source	Hand Pump
Sample Code	DW-809
Date of sampling	11-Apr-23

Summary of Test Result:

Physical Parameters	Compliance
Biological Parameters	Non-Compliance
Chemical Parameters	Compliance
Remarks: Parameters with * are exceeding with PEQS limits.	

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- The report is not valid for any negotiations.

Sample Analyzed by	Reviewed by	Approved by
QURAT-UL-AIN	MUHAMMAD RAZAULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore. Lahore Pakistan

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Ref#: PGG/LAB/2023-2353/DW

Date: 02-May-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.708 at 23.6°C	APHA-4500-H^+ B
2.	Color	TCU	≤15	≤15	0.000	APHA-2120 B
3.	Taste	-	-	Non-Objectionable	Non-Objectionable	APHA-2160 C
4.	Odor	-	-	Non-Objectionable	Non-Objectionable	APHA-2150 B
5.	Turbidity	NTU	5	5	0.90	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	930	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	390	APHA-2340 C
2.	Aluminum (Al)	mg/L	0.2	≤0.2	BDL	APHA-3111 D
3.	Antimony (Sb)	mg/L	0.02	≤0.005	BDL	APHA-3111 B
4.	Arsenic	µg/L	10	≤50	BDL	APHA-3114 B
5.	Barium (Ba)	mg/L	0.7	0.7	BDL	APHA-3111 D
6.	Boron (B)	mg/L	0.3	0.3	BDL	APHA-3111 D
7.	Cadmium	mg/L	0.003	0.01	BDL	APHA-3111 B
8.	Chloride (Cl^{-1})	mg/L	250	<250	90	APHA-4500-Cl B
9.	Chromium (Cr)	mg/L	0.05	≤0.05	BDL	APHA-3500-Cr B
10.	Copper (Cu)	mg/L	2	2	BDL	APHA-3111 B
11.	Fluoride (F^{1-})	mg/L	1.5	≤1.5	0.7	APHA-4500-F-C
12.	Lead (Pb)	mg/L	0.01	≤0.005	BDL	APHA-3111 B
13.	Manganese (Mn^{2+})	mg/L	0.5	≤0.5	0.0046	APHA-3111 B
14.	Mercury (Hg)	mg/L	0.001	≤0.001	BDL	APHA-3112 B
15.	Nickle	mg/L	0.02	≤0.02	BDL	APHA-3111 B
16.	Nitrate	mg/L	50	≤50	BDL	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	BDL	APHA-4500-NO_2^{-1} E
18.	Selenium	mg/L	0.01	0.01	BDL	APHA-3111 B

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Ref#: PGG/LAB/2023-2353/DW

Date: 02-May-23

Chemical Parameters Analysis Results:

19.	Residual Chlorine	mg/L	-	0.2-0.5	0.0310	APHA-4500 B
20.	Zinc (Zn^{+2})	mg/L	3.0	5.0	BDL	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	90.4511	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	10.9700	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	BDL	APHA-3111 B

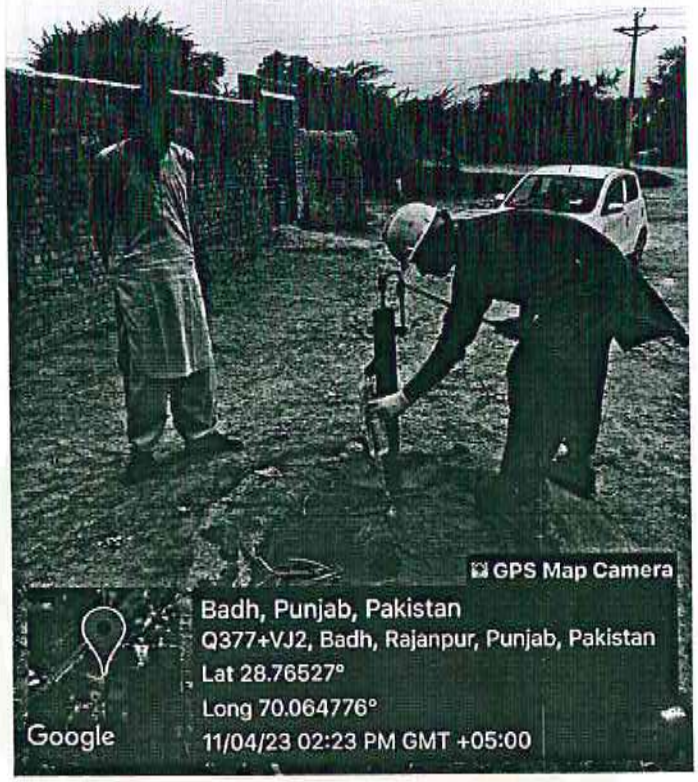
Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	286.2*	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	95*	APHA-9221 E
3.	Fecal Coliform	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	104.7*	APHA-9221 F

.....End of Report.....

PEQS: Punjab Environmental Quality Standards **^PNAC Accredited** **BDL: Below Detection Limit**
WHO: World Health Organization

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore. Lahore Pakistan


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TEST REPORT

Ref#: PGG/LAB/2023-2354/DW **Date:** 02-May-23

Name of Client	**NESPAK**
Project Name	**Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster-Central**
Project Site	**Rojhan**

Sample Description:

Nature of sample	Drinking Water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	House of Pir Bux Mazari Razi N 28.773607° E 70.053407°
Sample source	Hand Pump
Sample Code	DW-810
Date of sampling	11-Apr-23

Summary of Test Result:

Physical Parameters	Non-Compliance
Biological Parameters	Non-Compliance
Chemical Parameters	Non-Compliance
Remarks: Parameters with * are exceeding with PEQS limits.	

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Sample Analyzed by	Reviewed by	Approved by
QURAT-UL-AIN	MUHAMMAD RAZAULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore. Lahore Pakistan

PNAC LAB 180 17025

Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +9242-35441444 Cell: 0303-4442334

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Ref#: PGG/LAB/2023-2354/DW

Date: 02-May-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.267 at 23.9°C	APHA-4500-H^+ B
2.	Color	TCU	≤15	≤15	26.4*	APHA-2120 B
3.	Taste	-	-	Non-Objectionable	Non-Objectionable	APHA-2160 C
4.	Odor	-	-	Non-Objectionable	Non-Objectionable	APHA-2150 B
5.	Turbidity	NTU	5	5	7.04*	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	5740*	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	2010*	APHA-2340 C
2.	Aluminum (Al)	mg/L	0.2	≤0.2	BDL	APHA-3111 D
3.	Antimony (Sb)	mg/L	0.02	≤0.005	BDL	APHA-3111 B
4.	Arsenic	µg/L	10	≤50	BDL	APHA-3114 B
5.	Barium (Ba)	mg/L	0.7	0.7	BDL	APHA-3111 D
6.	Boron (B)	mg/L	0.3	0.3	BDL	APHA-3111 D
7.	Cadmium	mg/L	0.003	0.01	BDL	APHA-3111 B
8.	Chloride (Cl^{-1})	mg/L	250	<250	1475*	APHA-4500-Cl B
9.	Chromium (Cr)	mg/L	0.05	≤0.05	BDL	APHA-3500-Cr B
10.	Copper (Cu)	mg/L	2	2	BDL	APHA-3111 B
11.	Fluoride (F^{-1})	mg/L	1.5	≤1.5	4.9*	APHA-4500-F-C
12.	Lead (Pb)	mg/L	0.01	≤0.005	BDL	APHA-3111 B
13.	Manganese (Mn^{2+})	mg/L	0.5	≤0.5	0.1388	APHA-3111 B
14.	Mercury (Hg)	mg/L	0.001	≤0.001	BDL	APHA-3112 B
15.	Nickle	mg/L	0.02	≤0.02	BDL	APHA-3111 B
16.	Nitrate	mg/L	50	≤50	4.998	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	6.512*	APHA-4500-NO_2^{-1} E
18.	Selenium	mg/L	0.01	0.01	BDL	APHA-3111 B

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Ref#: PGG/LAB/2023-2354/DW

Date: 02-May-23

Chemical Parameters Analysis Results:

19.	Residual Chlorine	mg/L	-	0.2-0.5	BDL	APHA-4500 B
20.	Zinc (Zn^{+2})	mg/L	3.0	5.0	0.0714	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	156.7982	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	25.6644	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	0.7078	APHA-3111 B

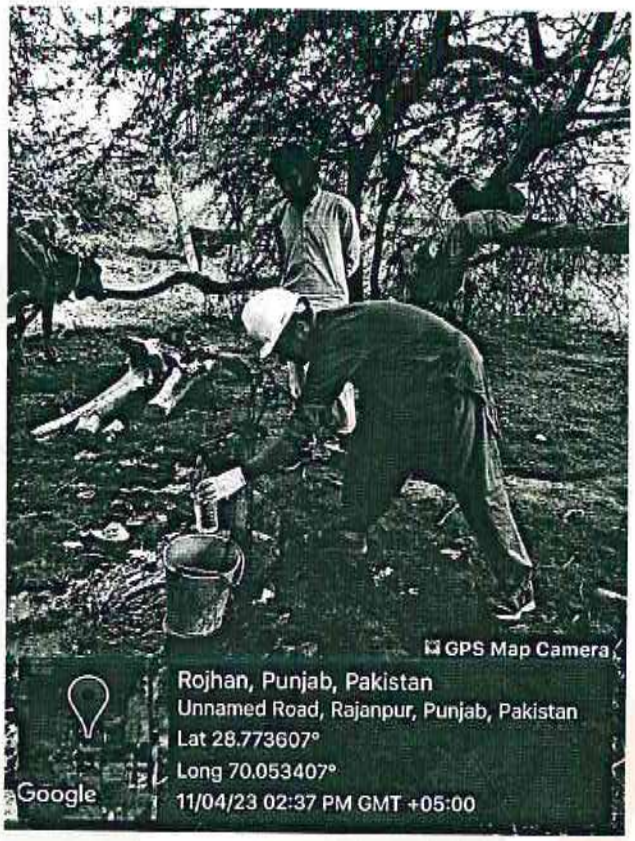
Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	486.4*	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	105.6	APHA-9221 E
3.	Fecal Coliform	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	286.2*	APHA-9221 F

.....End of Report.....

PEQS: Punjab Environmental Quality Standards **^PNAC Accredited** **BDL: Below Detection Limit**
WHO: World Health Organization

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore. Lahore Pakistan


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TEST REPORT

Ref#: PGG/LAB/2023-2355/DW

Date: 02-May-23

Name of Client	**NESPAK**
Project Name	**Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster-Central**
Project Site	**Rojhan**

Sample Description:

Nature of sample	Drinking Water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Dera Dildar- Basti Nassebabad N 28.715907° E 69.996178°
Sample source	Hand Pump
Sample Code	DW-811
Date of sampling	11-Apr-23

Summary of Test Result:

Physical Parameters	Compliance
Biological Parameters	Non-Compliance
Chemical Parameters	Compliance
Remarks: Parameters With * are exceeding with PEQS limits.	

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Sample Analyzed by	Reviewed by	Approved by
QURAT-UL-AIN	MUHAMMAD RAZAULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M. Gulberg-III. Lahore. Lahore Pakistan

PNAC Pakistan National Accreditation Council LAB 180 17025

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Ref#: PGG/LAB/2023-2355/DW

Date: 02-May-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.834 at 24.0°C	APHA-4500-H^+ B
2.	Color	TCU	≤15	≤15	0.000	APHA-2120 B
3.	Taste	-	-	Non-Objectionable	Non-Objectionable	APHA-2160 C
4.	Odor	-	-	Non-Objectionable	Non-Objectionable	APHA-2150 B
5.	Turbidity	NTU	5	5	0.25	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	527	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	210	APHA-2340 C
2.	Aluminum (Al)	mg/L	0.2	≤0.2	BDL	APHA-3111 D
3.	Antimony (Sb)	mg/L	0.02	≤0.005	BDL	APHA-3111 B
4.	Arsenic	µg/L	10	≤50	BDL	APHA-3114 B
5.	Barium (Ba)	mg/L	0.7	0.7	BDL	APHA-3111 D
6.	Boron (B)	mg/L	0.3	0.3	BDL	APHA-3111 D
7.	Cadmium	mg/L	0.003	0.01	BDL	APHA-3111 B
8.	Chloride (Cl^{-1})	mg/L	250	<250	50	APHA-4500-Cl B
9.	Chromium (Cr)	mg/L	0.05	≤0.05	BDL	APHA-3500-Cr B
10.	Copper (Cu)	mg/L	2	2	BDL	APHA-3111 B
11.	Fluoride (F^{1-})	mg/L	1.5	≤1.5	0.5	APHA-4500-F-C
12.	Lead (Pb)	mg/L	0.01	≤0.005	BDL	APHA-3111 B
13.	Manganese (Mn^{2+})	mg/L	0.5	≤0.5	BDL	APHA-3111 B
14.	Mercury (Hg)	mg/L	0.001	≤0.001	BDL	APHA-3112 B
15.	Nickle	mg/L	0.02	≤0.02	BDL	APHA-3111 B
16.	Nitrate	mg/L	50	≤50	BDL	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	BDL	APHA-4500-NO_2^{-1} E
18.	Selenium	mg/L	0.01	0.01	BDL	APHA-3111 B

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore. Lahore Pakistan

PNAC Pakistan National Accreditation Council LAB 180 17025

PAK-EPA

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Ref#: PGG/LAB/2023-2355/DW

Date: 02-May-23

Chemical Parameters Analysis Results:

19.	Residual Chlorine	mg/L	-	0.2-0.5	BDL	APHA-4500 B
20.	Zinc (Zn^{+2})	mg/L	3.0	5.0	0.0470	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	71.3856	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	8.5836	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	BDL	APHA-3111 B

Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	95.0*	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	Nil	APHA-9221 E
3.	Fecal Coliform	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	35.9*	APHA-9221 F

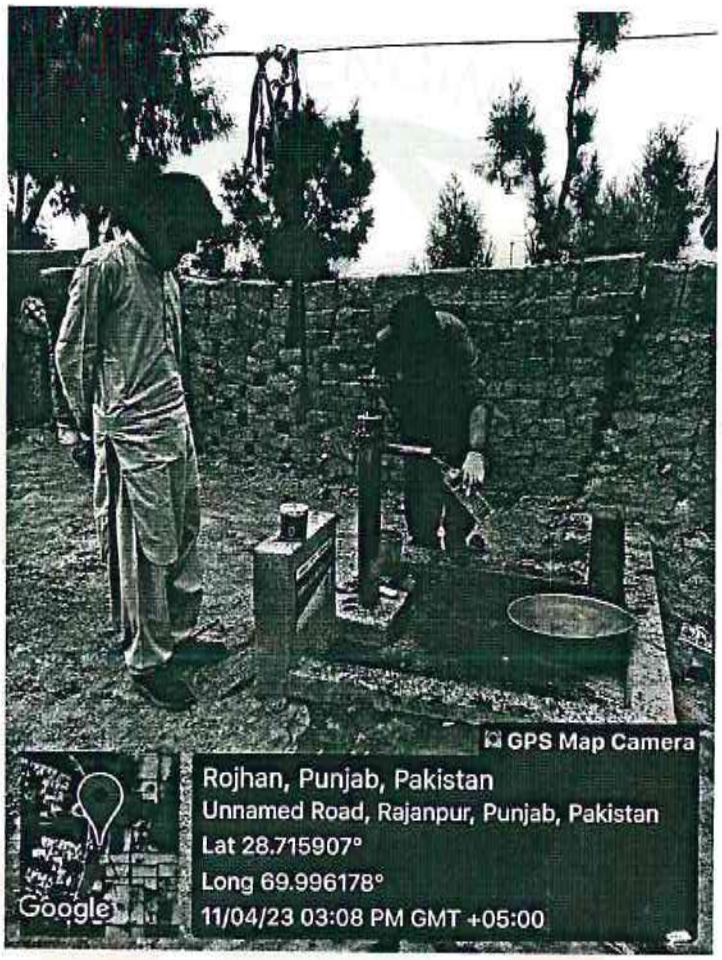
.....End of Report.....

PEQS: Punjab Environmental Quality Standards **^PNAC Accredited** **BDL: Below Detection Limit**
WHO: World Health Organization

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TEST REPORT

Ref#: PGG/LAB/2023-2356/DW

Date: 02-May-23

Name of Client	**NESPAK**
Project Name	**Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster-Central**
Project Site	**Rojhan**

Sample Description:

Nature of sample	Drinking Water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Dera Dilbar- Basti Shahid Hameed Khan Marzari N 28.711574° E 70° 70.004706°
Sample source	Hand Pump
Sample Code	DW-812
Date of sampling	11-Apr-23

Summary of Test Result:

Physical Parameters	Compliance
Biological Parameters	Non- Compliance
Chemical Parameters	Compliance
Remarks: Parameters with * are exceeding with PEQS limits.	

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- The report is not valid for any negotiations.

Sample Analyzed by	Reviewed by	Approved by
QURAT-UL-AIN	MUHAMMAD RAZAULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering 46-M, Gulberg-III, Lahore Lahore Pakistan

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Ref#: PGG/LAB/2023-2356/DW

Date: 02-May-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.824 at 23.0°C	APHA-4500-H^+ B
2.	Color	TCU	≤15	≤15	0.000	APHA-2120 B
3.	Taste	-	-	Non-Objectionable	Non-Objectionable	APHA-2160 C
4.	Odor	-	-	Non-Objectionable	Non-Objectionable	APHA-2150 B
5.	Turbidity	NTU	5	5	0.30	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	506	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	240	APHA-2340 C
2.	Aluminum (Al)	mg/L	0.2	≤0.2	BDL	APHA-3111 D
3.	Antimony (Sb)	mg/L	0.02	≤0.005	BDL	APHA-3111 B
4.	Arsenic	µg/L	10	≤50	BDL	APHA-3114 B
5.	Barium (Ba)	mg/L	0.7	0.7	BDL	APHA-3111 D
6.	Boron (B)	mg/L	0.3	0.3	BDL	APHA-3111 D
7.	Cadmium	mg/L	0.003	0.01	BDL	APHA-3111 B
8.	Chloride (Cl^{-1})	mg/L	250	<250	55	APHA-4500-Cl B
9.	Chromium (Cr)	mg/L	0.05	≤0.05	BDL	APHA-3500-Cr B
10.	Copper (Cu)	mg/L	2	2	BDL	APHA-3111 B
11.	Fluoride (F^{1-})	mg/L	1.5	≤1.5	0.6	APHA-4500-F-C
12.	Lead (Pb)	mg/L	0.01	≤0.005	BDL	APHA-3111 B
13.	Manganese (Mn^{2+})	mg/L	0.5	≤0.5	BDL	APHA-3111 B
14.	Mercury (Hg)	mg/L	0.001	≤0.001	BDL	APHA-3112 B
15.	Nickle	mg/L	0.02	≤0.02	BDL	APHA-3111 B
16.	Nitrate	mg/L	50	≤50	BDL	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	BDL	APHA-4500-NO_2^{-1} E
18.	Selenium	mg/L	0.01	0.01	BDL	APHA-3111 B

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Ref#: PGG/LAB/2023-2356/DW

Date: 02-May-23

Chemical Parameters Analysis Results:

19.	Residual Chlorine	mg/L	-	0.2-0.5	BDL	APHA-4500 B
20.	Zinc (Zn^{+2})	mg/L	3.0	5.0	0.0063	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	61.6304	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	8.5134	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	BDL	APHA-3111 B

Biological Parameters Analysis Results:

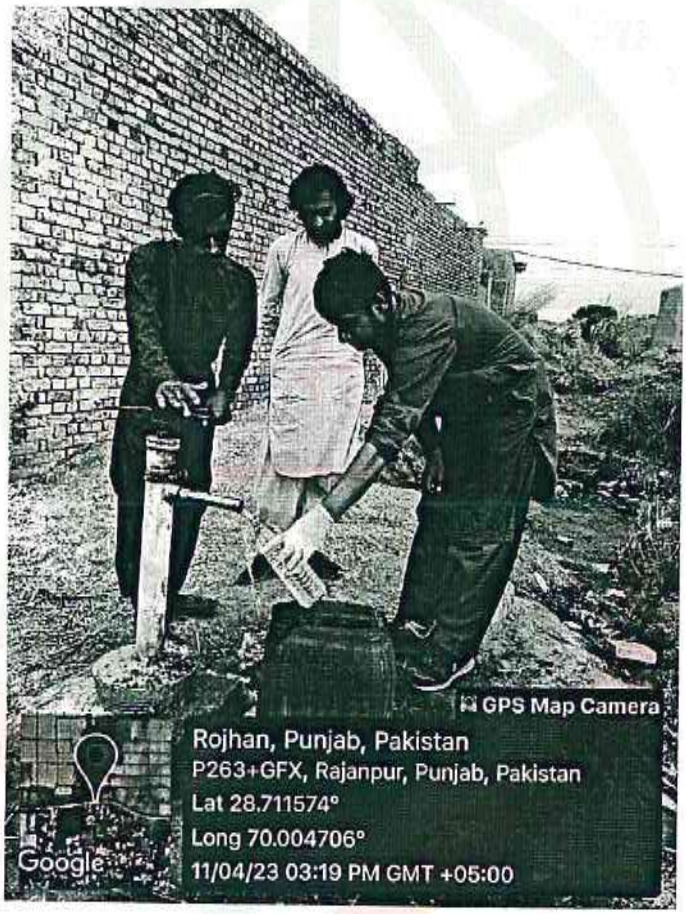
Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	116.5*	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	35.9	APHA-9221 E
3.	Fecal Coliform	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	95.0	APHA-9221 F

.....End of Report.....

PEQS: Punjab Environmental Quality Standards **^PNAC Accredited** **BDL: Below Detection Limit**
WHO: World Health Organization

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TEST REPORT

Ref#: PGG/LAB/2023-2357/DW **Date:** 02-May-23

Name of Client	**NESPAK**
Project Name	**Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster-Central**
Project Site	**Rojhan**

Sample Description:

Nature of sample	Drinking Water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	House of Jameel, Basti Gharlbabad N 28.793189° E 69.956878°
Sample source	Hand Pump
Sample Code	DW-813
Date of sampling	11-Apr-23

Summary of Test Result:

Physical Parameters	Non-Compliance
Biological Parameters	Non-Compliance
Chemical Parameters	Non-Compliance
Remarks: Parameters with * are exceeding with PEQS limits.	

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- The report is not valid for any negotiations.

Sample Analyzed by	Reviewed by	Approved by
QURAT-UL-AIN	MUHAMMAD RAZAULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore. Lahore Pakistan

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Ref#: PGG/LAB/2023-2357/DW **Date:** 02-May-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	6.995 at 23.9°C	APHA-4500-H^+ B
2.	Color	TCU	≤15	≤15	105.9*	APHA-2120 B
3.	Taste	-	-	Non-Objectionable	Objectionable*	APHA-2160 C
4.	Odor	-	-	Non-Objectionable	Objectionable*	APHA-2150 B
5.	Turbidity	NTU	5	5	21.0*	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	7810*	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	3950*	APHA-2340 C
2.	Aluminum (Al)	mg/L	0.2	≤0.2	BDL	APHA-3111 D
3.	Antimony (Sb)	mg/L	0.02	≤0.005	BDL	APHA-3111 B
4.	Arsenic	µg/L	10	≤50	BDL	APHA-3114 B
5.	Barium (Ba)	mg/L	0.7	0.7	BDL	APHA-3111 D
6.	Boron (B)	mg/L	0.3	0.3	BDL	APHA-3111 D
7.	Cadmium	mg/L	0.003	0.01	BDL	APHA-3111 B
8.	Chloride (Cl^{-1})	mg/L	250	<250	2609*	APHA-4500-Cl B
9.	Chromium (Cr)	mg/L	0.05	≤0.05	0.0372	APHA-3500-Cr B
10.	Copper (Cu)	mg/L	2	2	0.0299	APHA-3111 B
11.	Fluoride (F^{1-})	mg/L	1.5	≤1.5	6.4	APHA-4500-F-C
12.	Lead (Pb)	mg/L	0.01	≤0.005	BDL	APHA-3111 B
13.	Manganese (Mn^{2+})	mg/L	0.5	≤0.5	0.2153	APHA-3111 B
14.	Mercury (Hg)	mg/L	0.001	≤0.001	BDL	APHA-3112 B
15.	Nickle	mg/L	0.02	≤0.02	BDL	APHA-3111 B
16.	Nitrate	mg/L	50	≤50	7.004	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	11.946*	APHA-4500-NO_2^{-1} E
18.	Selenium	mg/L	0.01	0.01	BDL	APHA-3111 B

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Ref#: PGG/LAB/2023-2357/DW **Date:** 02-May-23

Chemical Parameters Analysis Results:

19.	Residual Chlorine	mg/L	-	0.2-0.5	BDL	APHA-4500 B
20.	Zinc (Zn^{+2})	mg/L	3.0	5.0	1.4286	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	158.0386	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	20.7500	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	3.1356	APHA-3111 B

Biological Parameters Analysis Results:

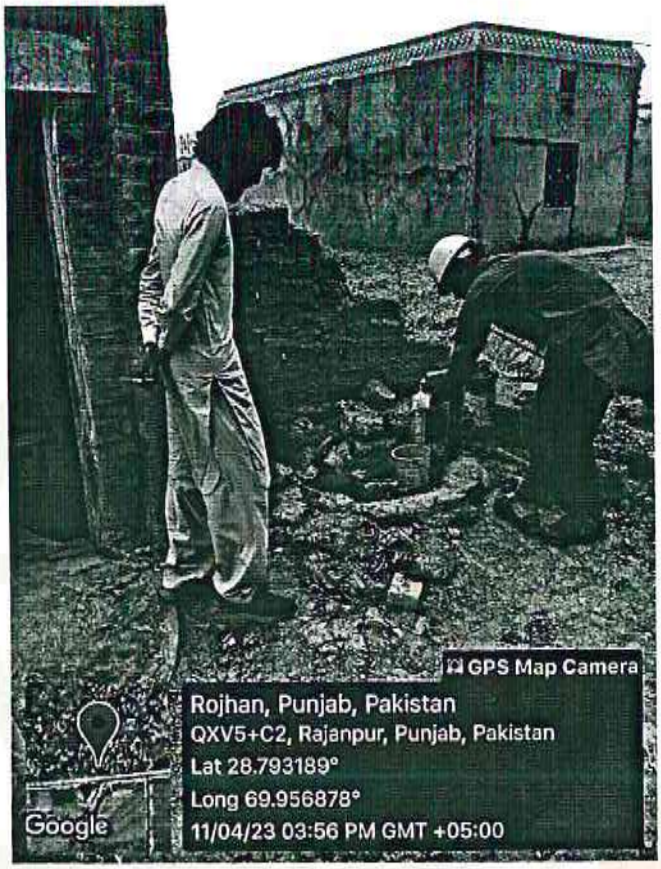
Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	486.4*	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	104.7*	APHA-9221 E
3.	Fecal Coliform	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	116.5	APHA-9221 F

.....End of Report.....

PEQS: Punjab Environmental Quality Standards **^PNAC Accredited** **BDL: Below Detection Limit**
WHO: World Health Organization

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TEST REPORT

Ref#: PGG/LAB/2023-2358/DW **Date:** 02-May-23

Name of Client	**NESPAK**
Project Name	**Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster-Central**
Project Site	**Rojhan**

Sample Description:

Nature of sample	Drinking Water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Safdarabad- Sheikh Zaid Colony N 28.823783° E 70.045595°
Sample source	Hand Pump
Sample Code	DW-814
Date of sampling	11-Apr-23

Summary of Test Result:

Physical Parameters	Non-Compliance
Biological Parameters	Non-Compliance
Chemical Parameters	Non-Compliance
Remarks: Parameters with * are exceeding with PEQS limits.	

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Sample Analyzed by	Reviewed by	Approved by
QURAT-UL-AIN	MUHAMMAD RAZAULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt.) Ltd. 46-M, Gulberg-III, Lahore Pakistan

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Ref#: PGG/LAB/2023-2358/DW

Date: 02-May-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.099 at 23.6°C	APHA-4500-H^+ B
2.	Color	TCU	≤15	≤15	284.2*	APHA-2120 B
3.	Taste	-	-	Non-Objectionable	Objectionable*	APHA-2160 C
4.	Odor	-	-	Non-Objectionable	Objectionable*	APHA-2150 B
5.	Turbidity	NTU	5	5	80.0*	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	7360*	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	3320*	APHA-2340 C
2.	Aluminum (Al)	mg/L	0.2	≤0.2	BDL	APHA-3111 D
3.	Antimony (Sb)	mg/L	0.02	≤0.005	BDL	APHA-3111 B
4.	Arsenic	µg/L	10	≤50	BDL	APHA-3114 B
5.	Barium (Ba)	mg/L	0.7	0.7	BDL	APHA-3111 D
6.	Boron (B)	mg/L	0.3	0.3	BDL	APHA-3111 D
7.	Cadmium	mg/L	0.003	0.01	BDL	APHA-3111 B
8.	Chloride (Cl^{-1})	mg/L	250	<250	2339*	APHA-4500-Cl B
9.	Chromium (Cr)	mg/L	0.05	≤0.05	0.0407	APHA-3500-Cr B
10.	Copper (Cu)	mg/L	2	2	0.0411*	APHA-3111 B
11.	Fluoride (F^{1-})	mg/L	1.5	≤1.5	5.6*	APHA-4500-F-C
12.	Lead (Pb)	mg/L	0.01	≤0.005	BDL	APHA-3111 B
13.	Manganese (Mn^{2+})	mg/L	0.5	≤0.5	0.4568	APHA-3111 B
14.	Mercury (Hg)	mg/L	0.001	≤0.001	BDL	APHA-3112 B
15.	Nickle	mg/L	0.02	≤0.02	BDL	APHA-3111 B
16.	Nitrate	mg/L	50	≤50	6.884	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	10.024*	APHA-4500-NO_2^{-1} E
18.	Selenium	mg/L	0.01	0.01	BDL	APHA-3111 B

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Ref#: PGG/LAB/2023-2358/DW

Date: 02-May-23

Chemical Parameters Analysis Results:

19.	Residual Chlorine	mg/L	-	0.2-0.5	BDL	APHA-4500 B
20.	Zinc (Zn^{+2})	mg/L	3.0	5.0	1.1933	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	157.3466	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	20.4483	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	8.7406	APHA-3111 B

Biological Parameters Analysis Results:

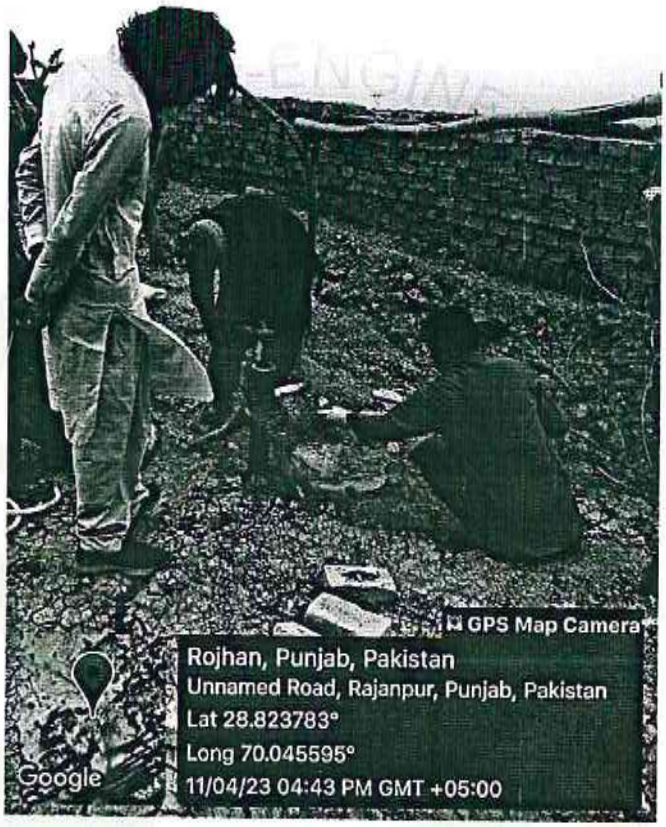
Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	1044.1*	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	486.4*	APHA-9221 E
3.	Fecal Coliform	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	507.8*	APHA-9221 F

.....End of Report.....

PEQS: Punjab Environmental Quality Standards **^PNAC Accredited** **BDL: Below Detection Limit**
WHO: World Health Organization

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TEST REPORT

Ref#: PGG/LAB/2023-2359/DW

Date: 02-May-23

Name of Client	**NESPAK**
Project Name	**Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster-Central**
Project Site	**Rojhan**

Sample Description:

Nature of sample	Drinking Water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Safdarabad- Basti Hafiz Sarwarwali N 28.809923° E 70.064581°
Sample source	Hand Pump
Sample Code	DW-815
Date of sampling	11-Apr-23

Summary of Test Result:

Physical Parameters	Non-Compliance
Biological Parameters	Non-Compliance
Chemical Parameters	Non-Compliance
Remarks: Parameters with * are exceeding with PEQS limits.	

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- The report is not valid for any negotiations.

Sample Analyzed by	Reviewed by	Approved by
QURAT-UL-AIN	MUHAMMAD RAZAULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt.) Ltd. 46-M, Gulberg-III, Lahore. Lahore Pakistan

PNAC LAB 180 17025

Ref#: PGG/LAB/2023-2359/DW

Date: 02-May-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.398 at 24.1°C	APHA-4500-H^+ B
2.	Color	TCU	≤15	≤15	29.8*	APHA-2120 B
3.	Taste	-	-	Non-Objectionable	Objectionable*	APHA-2160 C
4.	Odor	-	-	Non-Objectionable	Objectionable*	APHA-2150 B
5.	Turbidity	NTU	5	5	35.0*	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	1740*	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	930*	APHA-2340 C
2.	Aluminum (Al)	mg/L	0.2	≤0.2	BDL	APHA-3111 D
3.	Antimony (Sb)	mg/L	0.02	≤0.005	BDL	APHA-3111 B
4.	Arsenic	µg/L	10	≤50	BDL	APHA-3114 B
5.	Barium (Ba)	mg/L	0.7	0.7	BDL	APHA-3111 D
6.	Boron (B)	mg/L	0.3	0.3	BDL	APHA-3111 D
7.	Cadmium	mg/L	0.003	0.01	BDL	APHA-3111 B
8.	Chloride (Cl^{-1})	mg/L	250	<250	275*	APHA-4500-Cl B
9.	Chromium (Cr)	mg/L	0.05	≤0.05	BDL	APHA-3500-Cr B
10.	Copper (Cu)	mg/L	2	2	BDL	APHA-3111 B
11.	Fluoride (F^{1-})	mg/L	1.5	≤1.5	1.9*	APHA-4500-F-C
12.	Lead (Pb)	mg/L	0.01	≤0.005	BDL	APHA-3111 B
13.	Manganese (Mn^{2+})	mg/L	0.5	≤0.5	BDL	APHA-3111 B
14.	Mercury (Hg)	mg/L	0.001	≤0.001	BDL	APHA-3112 B
15.	Nickle	mg/L	0.02	≤0.02	BDL	APHA-3111 B
16.	Nitrate	mg/L	50	≤50	1.994	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	1.246	APHA-4500-NO_2^{-1} E
18.	Selenium	mg/L	0.01	0.01	BDL	APHA-3111 B

Pak Green Enviro-Engineering (Pvt.) Ltd. 46-M, Gulberg-III, Lahore Pakistan

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Ref#: PGG/LAB/2023-2359/DW

Date: 02-May-23

Chemical Parameters Analysis Results:

19.	Residual Chlorine	mg/L	-	0.2-0.5	BDL	APHA-4500 B
20.	Zinc (Zn^{+2})	mg/L	3.0	5.0	0.4284	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	99.4849	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	10.6545	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	1.9324	APHA-3111 B

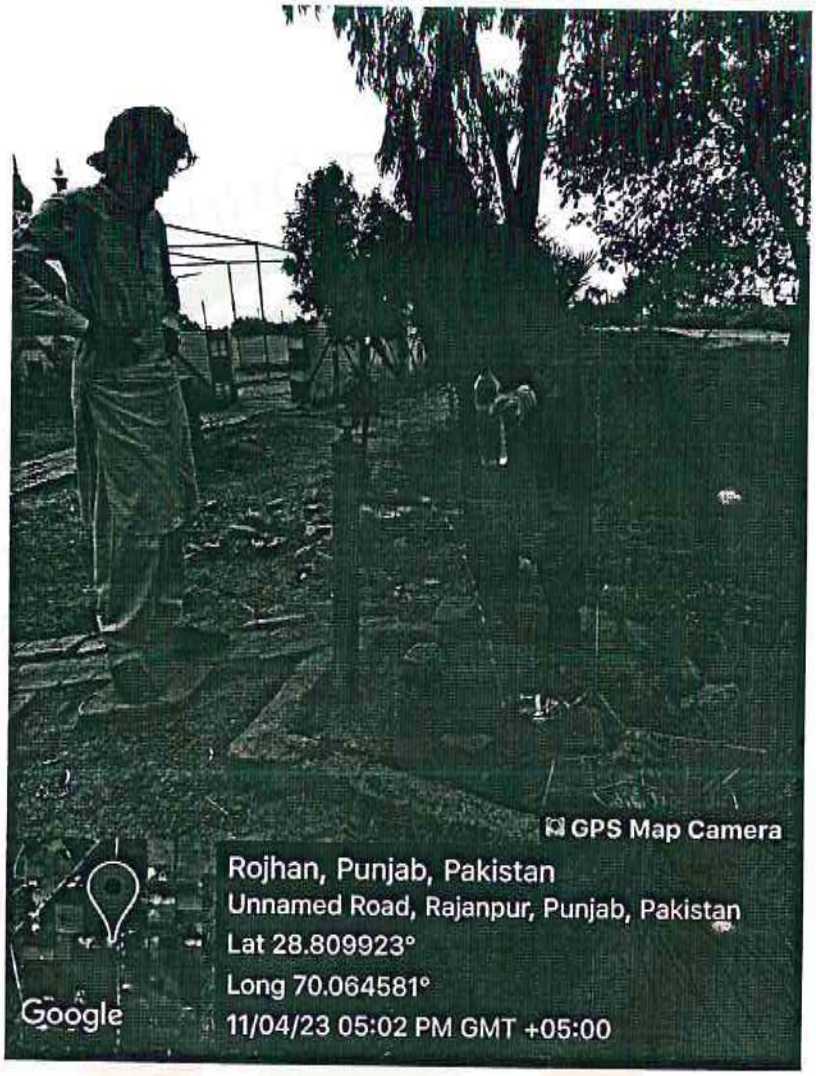
Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	1282.6*	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	495.8*	APHA-9221 E
3.	Fecal Coliform	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	532.0*	APHA-9221 F

.....End of Report.....

PEQS: Punjab Environmental Quality Standards **^PNAC Accredited** **BDL: Below Detection Limit**
WHO: World Health Organization

Pak Green Enviro-Engineering 46-M, Gulberg-III, Lahore (Pvt) Ltd. Lahore Pakistan


GPS Map Camera
Rojhan, Punjab, Pakistan
Unnamed Road, Rajanpur, Punjab, Pakistan
Lat 28.809923°
Long 70.064581°
11/04/23 05:02 PM GMT +05:00
Google

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TEST REPORT

Ref#: PGG/LAB/2023-2360/DW

Date: 02-May-23

Name of Client	**NESPAK**
Project Name	**Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster-Central**
Project Site	**Rojhan**

Sample Description:

Nature of sample	Drinking Water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Saleemabad- Govt. Boy Elemric N 28.807512° E 70.081812°
Sample source	Hand Pump
Sample Code	DW-816
Date of sampling	11-Apr-23

Summary of Test Result:

Physical Parameters	Compliance
Biological Parameters	Non-Compliance
Chemical Parameters	Non-Compliance
Remarks: Parameters with * are exceeding with PEQS limits.	

- Analysis was conducted on the request of proponent for his own use.
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- The report is not valid for any negotiations.

Sample Analyzed by	Reviewed by	Approved by
QURAT-UL-AIN	MUHAMMAD RAZAULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore. Lahore Pakistan

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Ref#: PGG/LAB/2023-2360/DW

Date: 02-May-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.590 at 23.4°C	APHA-4500-H+ B
2.	Color	TCU	≤15	≤15	0.000	APHA-2120 B
3.	Taste	-	-	Non-Objectionable	Non-Objectionable	APHA-2160 C
4.	Odor	-	-	Non-Objectionable	Non-Objectionable	APHA-2150 B
5.	Turbidity	NTU	5	5	1.20	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	955	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	510*	APHA-2340 C
2.	Aluminum (Al)	mg/L	0.2	≤0.2	BDL	APHA-3111 D
3.	Antimony (Sb)	mg/L	0.02	≤0.005	BDL	APHA-3111 B
4.	Arsenic	µg/L	10	≤50	BDL	APHA-3114 B
5.	Barium (Ba)	mg/L	0.7	0.7	BDL	APHA-3111 D
6.	Boron (B)	mg/L	0.3	0.3	BDL	APHA-3111 D
7.	Cadmium	mg/L	0.003	0.01	BDL	APHA-3111 B
8.	Chloride (Cl^{-1})	mg/L	250	<250	70	APHA-4500-Cl B
9.	Chromium (Cr)	mg/L	0.05	≤0.05	0.7559*	APHA-3500-Cr B
10.	Copper (Cu)	mg/L	2	2	BDL	APHA-3111 B
11.	Fluoride (F^{1-})	mg/L	1.5	≤1.5	0.9	APHA-4500-F-C
12.	Lead (Pb)	mg/L	0.01	≤0.005	BDL	APHA-3111 B
13.	Manganese (Mn^{2+})	mg/L	0.5	≤0.5	0.0025	APHA-3111 B
14.	Mercury (Hg)	mg/L	0.001	≤0.001	BDL	APHA-3112 B
15.	Nickle	mg/L	0.02	≤0.02	BDL	APHA-3111 B
16.	Nitrate	mg/L	50	≤50	1.256	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	1.091	APHA-4500-NO_2^{-1} E
18.	Selenium	mg/L	0.01	0.01	BDL	APHA-3111 B

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Ref#: PGG/LAB/2023-2360/DW

Date: 02-May-23

Chemical Parameters Analysis Results:

19.	Residual Chlorine	mg/L	-	0.2-0.5	BDL	APHA-4500 B
20.	Zinc (Zn^{+2})	mg/L	3.0	5.0	0.1389	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	77.9688	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	9.1167	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	BDL	APHA-3111 B

Biological Parameters Analysis Results:

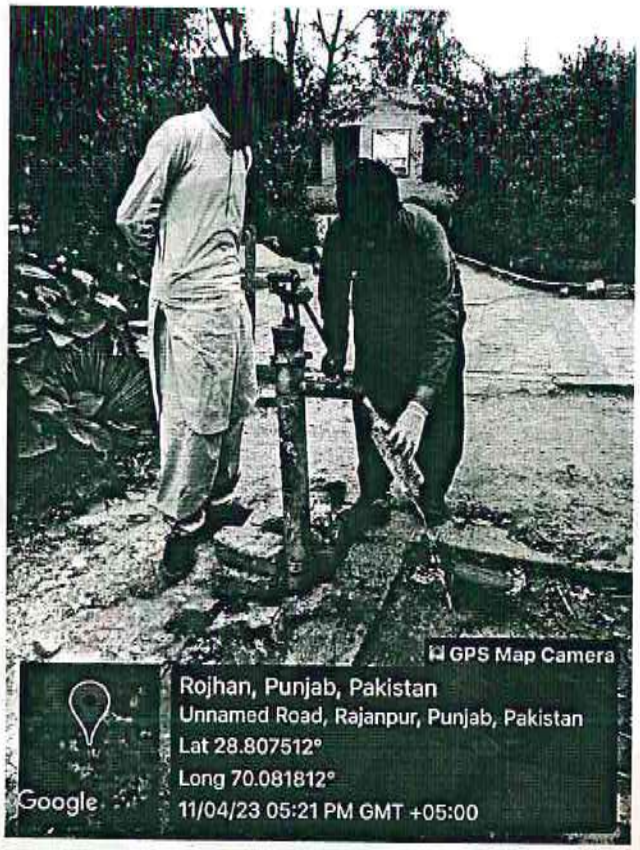
Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	286.2*	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	95.0*	APHA-9221 E
3.	Fecal Coliform	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	113.4*	APHA-9221 F

.....End of Report.....

PEQS: Punjab Environmental Quality Standards **^PNAC Accredited** **BDL: Below Detection Limit**
WHO: World Health Organization

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TEST REPORT

Ref#: PGG/LAB/2023-2361/DW **Date:** 02-May-23

Name of Client	**NESPAK**
Project Name	**Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster-Central**
Project Site	**Rojhan**

Sample Description:

Nature of sample	Drinking Water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Tariqabad Left Bank Basti Bajwa N 28.877325° E 70.153285°
Sample source	Hand Pump
Sample Code	DW-817
Date of sampling	11-Apr-23

Summary of Test Result:

Physical Parameters	Compliance
Biological Parameters	Non-Compliance
Chemical Parameters	Compliance
Remarks: All Parameters are in Compliance with PEQS limits.	

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- The report is not valid for any negotiations.

Sample Analyzed by	Reviewed by	Approved by
QURAT-UL-AIN	MUHAMMAD RAZAULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore. Lahore Pakistan

PNAC LAB 180 17025

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Ref#: PGG/LAB/2023-2361/DW

Date: 02-May-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.803 at 23.4°C	APHA-4500-H^+ B
2.	Color	TCU	≤15	≤15	0.000	APHA-2120 B
3.	Taste	-	-	Non-Objectionable	Non-Objectionable	APHA-2160 C
4.	Odor	-	-	Non-Objectionable	Non-Objectionable	APHA-2150 B
5.	Turbidity	NTU	5	5	0.15	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	563	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	280	APHA-2340 C
2.	Aluminum (Al)	mg/L	0.2	≤0.2	BDL	APHA-3111 D
3.	Antimony (Sb)	mg/L	0.02	≤0.005	BDL	APHA-3111 B
4.	Arsenic	µg/L	10	≤50	BDL	APHA-3114 B
5.	Barium (Ba)	mg/L	0.7	0.7	BDL	APHA-3111 D
6.	Boron (B)	mg/L	0.3	0.3	BDL	APHA-3111 D
7.	Cadmium	mg/L	0.003	0.01	BDL	APHA-3111 B
8.	Chloride (Cl^{-1})	mg/L	250	<250	30	APHA-4500-Cl B
9.	Chromium (Cr)	mg/L	0.05	≤0.05	0.3938	APHA-3500-Cr B
10.	Copper (Cu)	mg/L	2	2	BDL	APHA-3111 B
11.	Fluoride (F^{1-})	mg/L	1.5	≤1.5	0.9	APHA-4500-F-C
12.	Lead (Pb)	mg/L	0.01	≤0.005	BDL	APHA-3111 B
13.	Manganese (Mn^{2+})	mg/L	0.5	≤0.5	0.0010	APHA-3111 B
14.	Mercury (Hg)	mg/L	0.001	≤0.001	BDL	APHA-3112 B
15.	Nickle	mg/L	0.02	≤0.02	BDL	APHA-3111 B
16.	Nitrate	mg/L	50	≤50	BDL	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	BDL	APHA-4500-NO_2^{-1} E
18.	Selenium	mg/L	0.01	0.01	BDL	APHA-3111 B

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Ref#: PGG/LAB/2023-2361/DW

Date: 02-May-23

Chemical Parameters Analysis Results:

19.	Residual Chlorine	mg/L	-	0.2-0.5	BDL	APHA-4500 B
20.	Zinc (Zn^{+2})	mg/L	3.0	5.0	0.0047	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	62.0797	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	8.1525	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	0.0067	APHA-3111 B

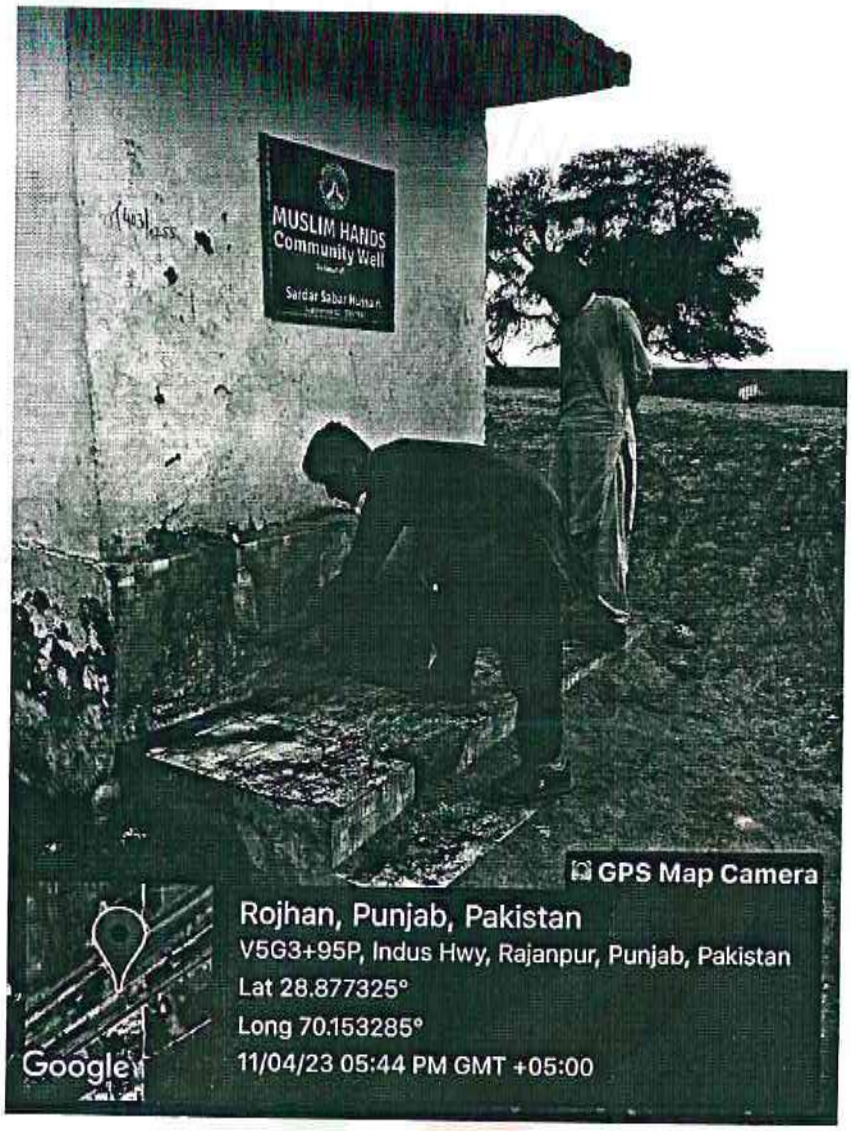
Biological Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	35.9*	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	95.0*	APHA-9221 E
3.	Fecal Coliform	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	36.8*	APHA-9221 F

.....End of Report.....

PEQS: Punjab Environmental Quality Standards **^PNAC Accredited** **BDL: Below Detection Limit**
WHO: World Health Organization

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore, Lahore Pakistan


MUSLIM HANDS
Community Well
GPS Map Camera
Rojhan, Punjab, Pakistan
V5G3+95P, Indus Hwy, Rajanpur, Punjab, Pakistan
Lat 28.877325°
Long 70.153285°
11/04/23 05:44 PM GMT +05:00
Google

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TEST REPORT

Ref#: PGG/LAB/2023-2362/DW **Date:** 02-May-23

Name of Client	**NESPAK**
Project Name	**Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster-Central**
Project Site	**Rojhan**

Sample Description:

Nature of sample	Drinking Water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Tariqabad Basti Bajwa House M. Iqbal N 28.874478° E 70.154193°
Sample source	Hand Pump
Sample Code	DW-818
Date of sampling	11-Apr-23

Summary of Test Result:

Physical Parameters	Non-Compliance
Biological Parameters	Non-Compliance
Chemical Parameters	Non-Compliance
Remarks: Parameters with * are exceeding with PEQS limits.	

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- The report is not valid for any negotiations.

Sample Analyzed by	Reviewed by	Approved by
QURAT-UL-AIN	MUHAMMAD RAZAULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt.) Ltd. 46-M, Gulberg-III, Lahore Pakistan

PNAC LAB 180 17025

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Ref#: PGG/LAB/2023-2362/DW

Date: 02-May-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.372 at 23.0°C	APHA-4500-H^+ B
2.	Color	TCU	≤15	≤15	25.3*	APHA-2120 B
3.	Taste	-	-	Non-Objectionable	Objectionable*	APHA-2160 C
4.	Odor	-	-	Non-Objectionable	Objectionable*	APHA-2150 B
5.	Turbidity	NTU	5	5	37.0*	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	4660*	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	1430*	APHA-2340 C
2.	Aluminum (Al)	mg/L	0.2	≤0.2	BDL	APHA-3111 D
3.	Antimony (Sb)	mg/L	0.02	≤0.005	BDL	APHA-3111 B
4.	Arsenic	µg/L	10	≤50	BDL	APHA-3114 B
5.	Barium (Ba)	mg/L	0.7	0.7	BDL	APHA-3111 D
6.	Boron (B)	mg/L	0.3	0.3	BDL	APHA-3111 D
7.	Cadmium	mg/L	0.003	0.01	BDL	APHA-3111 B
8.	Chloride (Cl^{-1})	mg/L	250	<250	1145*	APHA-4500-Cl B
9.	Chromium (Cr)	mg/L	0.05	≤0.05	0.2080	APHA-3500-Cr B
10.	Copper (Cu)	mg/L	2	2	0.0436*	APHA-3111 B
11.	Fluoride (F^{1-})	mg/L	1.5	≤1.5	4.6*	APHA-4500-F-C
12.	Lead (Pb)	mg/L	0.01	≤0.005	BDL	APHA-3111 B
13.	Manganese (Mn^{2+})	mg/L	0.5	≤0.5	0.0138	APHA-3111 B
14.	Mercury (Hg)	mg/L	0.001	≤0.001	BDL	APHA-3112 B
15.	Nickle	mg/L	0.02	≤0.02	BDL	APHA-3111 B
16.	Nitrate	mg/L	50	≤50	5.196	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	7.788	APHA-4500-NO_2^{-1} E
18.	Selenium	mg/L	0.01	0.01	BDL	APHA-3111 B

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PAK-EPA

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Ref#: PGG/LAB/2023-2362/DW

Date: 02-May-23

Chemical Parameters Analysis Results:

19.	Residual Chlorine	mg/L	-	0.2-0.5	BDL	APHA-4500 B
20.	Zinc (Zn^{+2})	mg/L	3.0	5.0	0.1986	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	154.0307	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	15.9516	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	0.0401	APHA-3111 B

Biological Parameters Analysis Results:

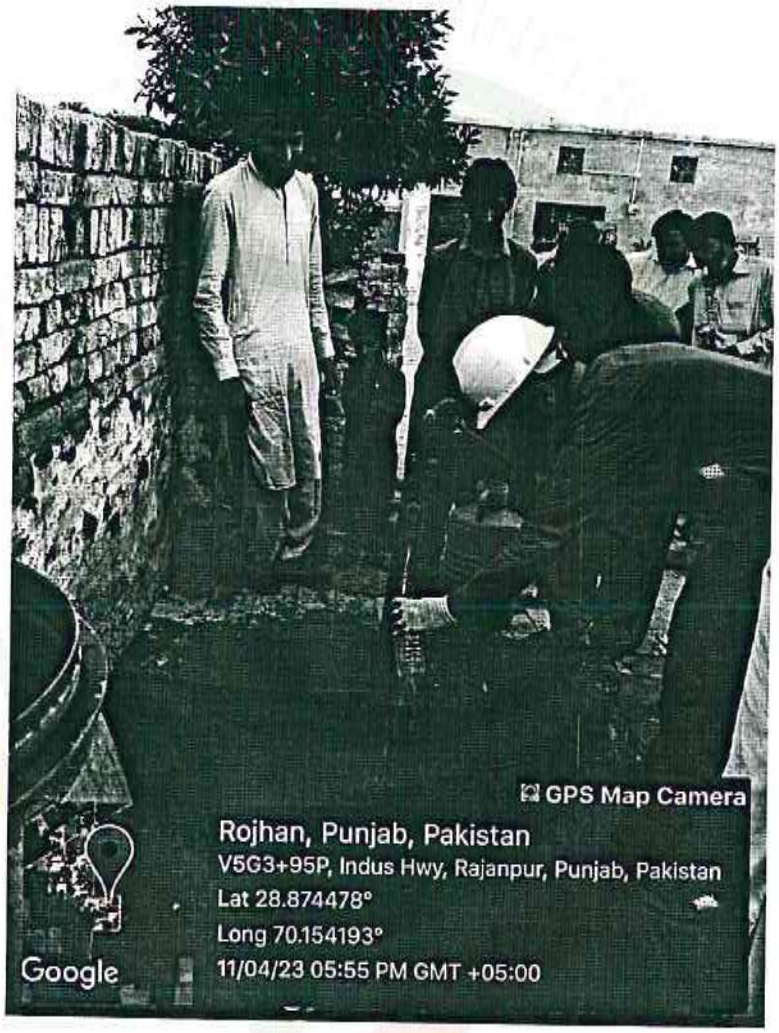
Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	1044.1*	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	354.2*	APHA-9221 E
3.	Fecal Coliform	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	532.0*	APHA-9221 F

.....End of Report.....

PEQS: Punjab Environmental Quality Standards **^PNAC Accredited** **BDL: Below Detection Limit**
WHO: World Health Organization

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore. Lahore Pakistan

PNAC LAB 180 17025


GPS Map Camera
Rojhan, Punjab, Pakistan
V5G3+95P, Indus Hwy, Rajanpur, Punjab, Pakistan
Lat 28.874478°
Long 70.154193°
11/04/23 05:55 PM GMT +05:00
Google

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EPA Certified

TEST REPORT

Ref #: PGG/LAB/2023-2363/WW

Date: 2-May-23

Name of Client	**NESPAK**
Project Name	**Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster -South**
Project Site	**Rojhan**

Sample Description:

Nature of sample	Waste water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Umar Kot Rahim Kariyana Store N 28.819077" E 70.144388"
Sample source	Pond
Sample Code	WW-819
Date of sampling	11-Ap-23

Summary of Test Result:

Physical Parameters	Compliance
Chemical Parameters	Non Compliance
Remarks: Parameters with * are not in compliance with PEQS Limits.	

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- The report is not valid for any negotiations.

Sample Analyzed by	Reviewed by	Approved by
QURAT-UL-AIN	MUHAMMAD RAZAULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

Pak Green Enviro-Engineering (Pvt.) Ltd. 46-M, Gulberg-III, Lahore Pakistan

PNAC LAB 180 17025

Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +9242-35441444 Cell: 0303-4442334

Ref #: PGG/LAB/2023-2363/WW

Date: 2-May-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	PEQS	Results	Method / Technique
1.	Temperature	°C	-	24.2	APHA-2550 B
2.	pH	-	6.5-8.5	7.617 at 24.2°C	APHA-4500-H^+ B

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	PEQS	Results	Method / Technique
1.	Biological Oxygen Demand (BOD_5 at 20 °C) ^	mg/L	80	98*	APHA-5210 D
2.	Chemical Oxygen Demand (COD) ^	mg/L	150	160*	APHA-5220 B
3.	Total dissolved Solids (TDS)	mg/L	1000	8320*	4660*
4.	Total Suspended Solids (TSS) ^	mg/L	200	200	APHA-2540 D
5.	Greases & Oil	mg/L	10	BDL	APHA-5520 B
6.	Phenolic Compound (As Phenol)	mg/L	-	BDL	APHA-5530 D
7.	Chloride (Cl^{-1})	mg/L	<250	2269*	APHA-4500-Cl B
8.	Fluoride (F^{1-})	mg/L	≤1.5	3.6*	APHA-4500-F-C
9.	An Ionic detergent as MBAs	mg/L	20	1.946	APHA 5540 C
10.	Sulphate (SO_4^{2-}) ^	mg/L	600	645*	APHA-4500-SO_4 C
11.	Sulphide (S^{2-})	mg/L	1.0	BDL	APHA-4500-S^{2-} F
12.	Ammonia (NH_3) ^	mg/L	40	16.4	APHA-4500NH_3 C
13.	Cadmium	mg/L	0.01	BDL	APHA-3111 B
14.	Chromium (Cr)	mg/L	≤0.05	0.1905	APHA-3500-Cr B
15.	Copper (Cu)	mg/L	2	BDL	APHA-3111 B
16.	Lead (Pb)	mg/L	≤0.005	BDL	APHA-3111 B

Pak Green Enviro-Engineering (Pvt) Ltd. 46-M, Gulberg-III, Lahore Pakistan

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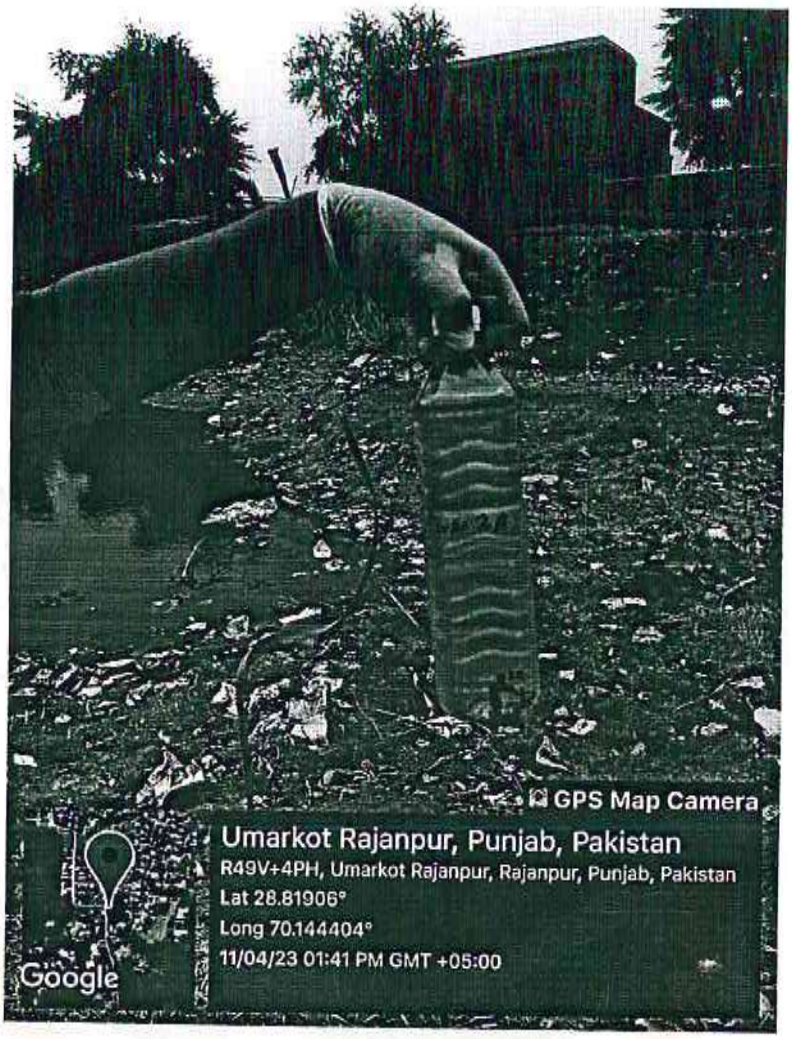
17.	Mercury (Hg)	mg/L	≤0.001	BDL	APHA-3112 B
18.	Selenium	mg/L	0.01	BDL	APHA-3111 B
19.	Nickle	mg/L	≤0.02	BDL	APHA-3111 B
20.	Silver (Ag)	mg/L	1.0	BDL	APHA-3111 B
21.	Zinc (Zn^{+2})	mg/L	5.0	0.03559	APHA-3111 B
22.	Arsenic	µg/L	≤50	BDL	APHA-3114 B
23.	Barium (Ba)	mg/L	0.7	BDL	APHA-3111 D
24.	Total Iron (Fe)^	mg/L	8.0	0.3559	APHA-3111 B
25.	Manganese (Mn^{2+})	mg/L	≤0.5	BDL	APHA-3111 B
26.	Boron (B)	mg/L	6.0	BDL	APHA-3111 D
27.	Chlorine (Cl_2)	mg/L	1.0	BDL	APHA-4500 Cl B
28.	Total Toxic Metals (Cd, Cr, Cu, Pb, Hg, Se, Ni, Ag, As, Ba, B)	mg/L	2.0	0.1905	-
29.	Sodium	mg/L	-	163.1364	APHA-3111 B
30.	Cyanide (as CN^{1-}) Total	mg/L	1.0	BDL	APHA-4500-CN F

.....End of Report.....

PEQS: Punjab Environmental Quality Standards **^PNAC Accredited** **BDL: Below Detection Limits**

PAK GREEN Enviro-Engineering (Pvt.) Ltd. 46-M, Gulberg-III, Lahore Pakistan

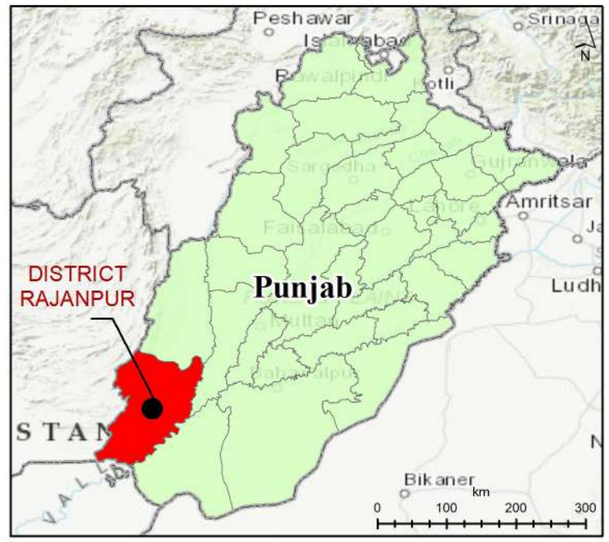
Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +9242-35441444 Cell: 0303-4442334

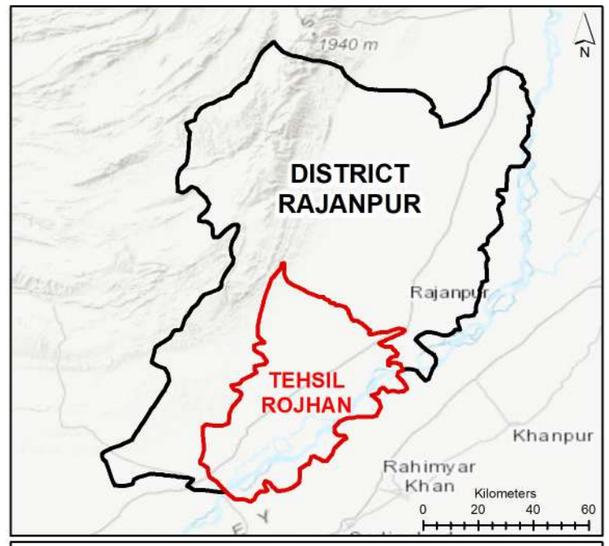


Annex-III

Environmental Sensitive Receptors







LEGEND:

- Environmental Sensitive Receptors
- Canal / Minor / Distributary

CLIENT:	CONSULTANT:	PROJECT:	MAP TITLE:	SCALE:
PUNJAB RURAL MUNICIPAL SERVICES COMPANY (PRMSC)	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE:- NESPAK HOUSE 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CONSULTANCY SERVICES FOR ENGINEERING DESIGN & CONSTRUCTION SUPERVISION PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT, PILOT PHASE, CLUSTER SOUTH-III	**ENVIRONMENTAL SENSITIVE RECEPTORS MAP KOTLA HUSSAIN SHAH, TEHSIL ROJHAN, CLUSTER SOUTH-III**	Meters 0 250 500 1,000 — 1:15,000



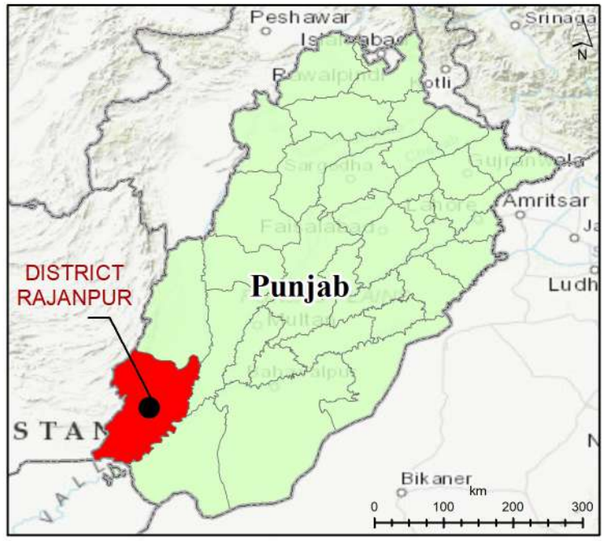
Govt. Primary School

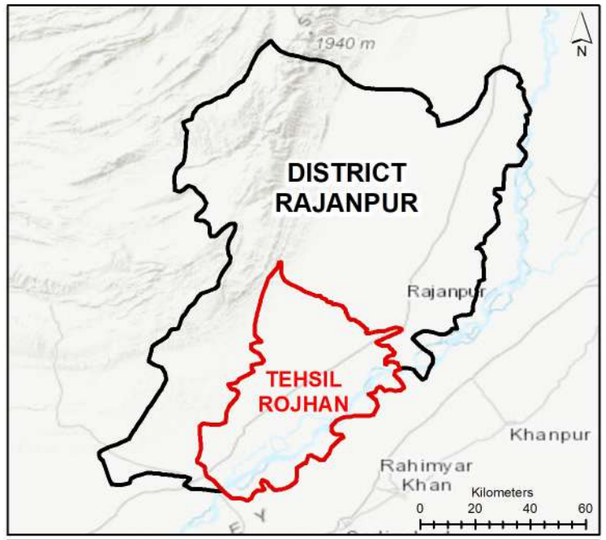


Masjid



Graveyard





LEGEND:

Environmental Sensitive Receptors

Canal / Minor / Distributary

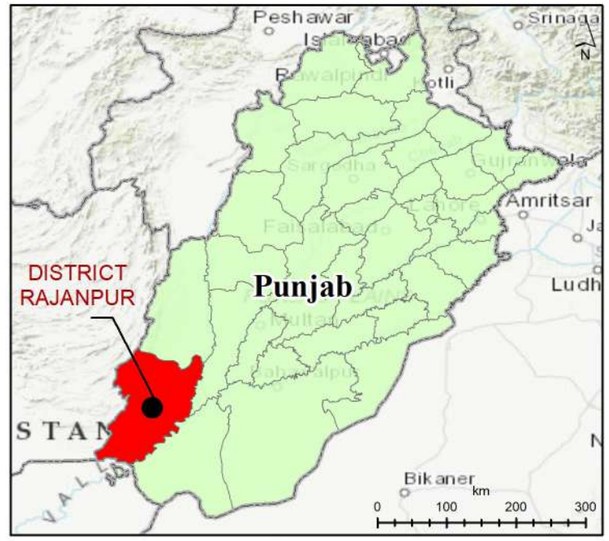
CLIENT:	CONSULTANT:	PROJECT:	MAP TITLE:	SCALE:
PUNJAB RURAL MUNICIPAL SERVICES COMPANY (PRMSC)	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE:- NESPAK HOUSE 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CONSULTANCY SERVICES FOR ENGINEERING DESIGN & CONSTRUCTION SUPERVISION PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT, PILOT PHASE, CLUSTER SOUTH-III	**ENVIRONMENTAL SENSITIVE RECEPTORS MAP CHAK DILBAR (GAREEBABAD), TEHSIL ROJHAN, CLUSTER SOUTH-III**	Meters 0 75 150 300 — 1:4,500

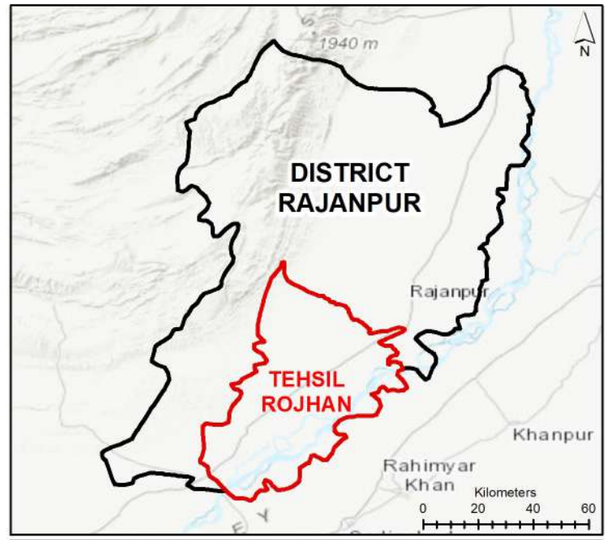


Jamia Masjid
Gulzar-e-Madina



Water Pond (Diggi)

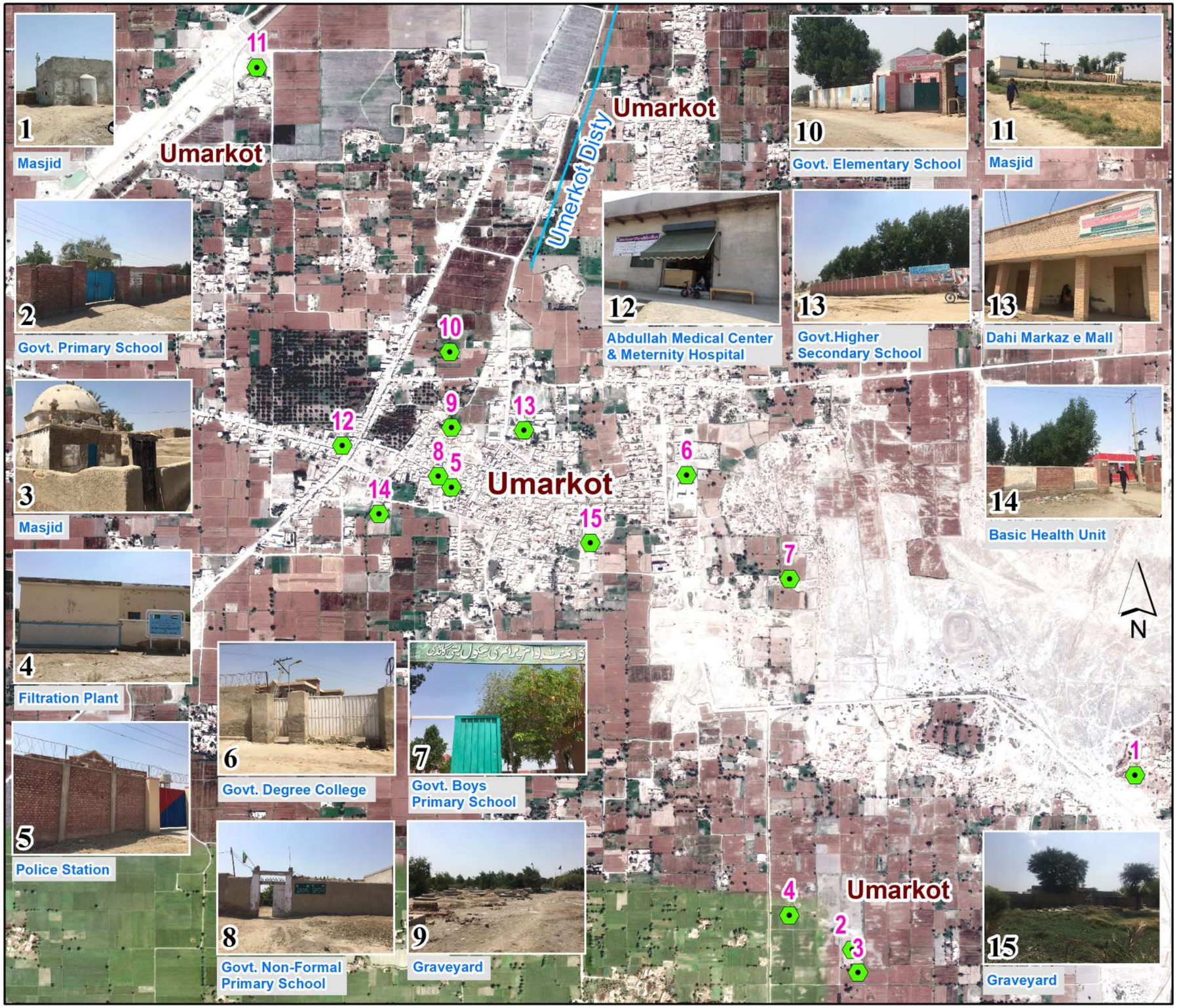


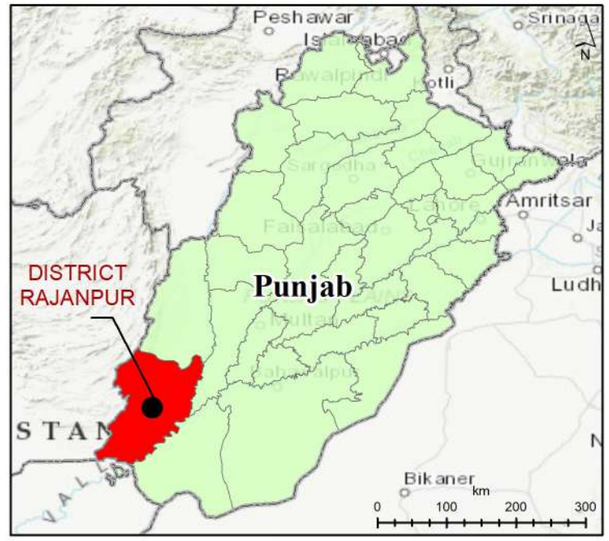


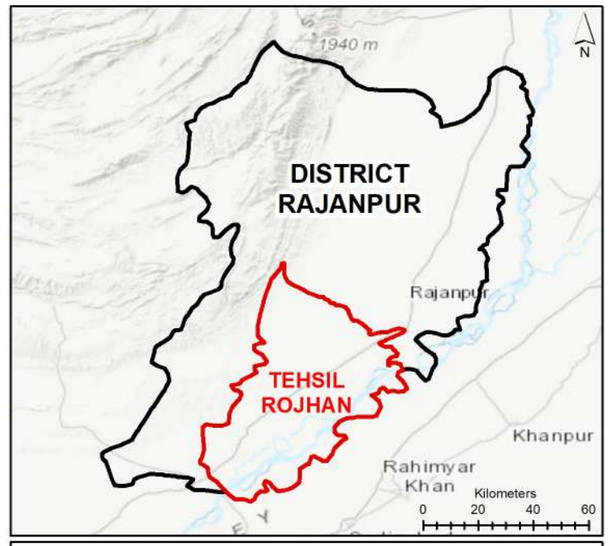
LEGEND:

- Environmental Sensitive Receptors
- Canal / Minor / Distributary

CLIENT:	CONSULTANT:	PROJECT:	MAP TITLE:	SCALE:
PUNJAB RURAL MUNICIPAL SERVICES COMPANY (PRMSC)	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE:- NESPAK HOUSE 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CONSULTANCY SERVICES FOR ENGINEERING DESIGN & CONSTRUCTION SUPERVISION PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT, PILOT PHASE, CLUSTER SOUTH-III	**ENVIRONMENTAL SENSITIVE RECEPTORS MAP CHAK DILBAR (BALA CHANI), TEHSIL ROJHAN, CLUSTER SOUTH-III**	Meters 0 50 100 200 — 1:3,000







LEGEND:

- Environmental Sensitive Receptors
- Canal / Minor / Distributary

CLIENT:	CONSULTANT:	PROJECT:	MAP TITLE:	SCALE:
PUNJAB RURAL MUNICIPAL SERVICES COMPANY (PRMSC)	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE:- NESPAK HOUSE 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CONSULTANCY SERVICES FOR ENGINEERING DESIGN & CONSTRUCTION SUPERVISION PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT, PILOT PHASE, CLUSTER SOUTH-III	**ENVIRONMENTAL SENSITIVE RECEPTORS MAP UMAR KOT, TEHSIL ROJHAN, CLUSTER SOUTH-III**	Meters 0 215 430 860 — 1:13,000



1 Daman School System



2 Govt. Girls Primary School



3 Graveyard

Kadra Canal

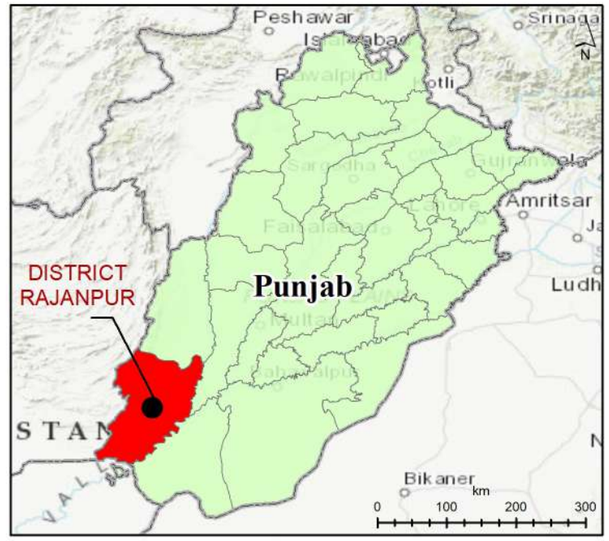
Saleemabad Disty

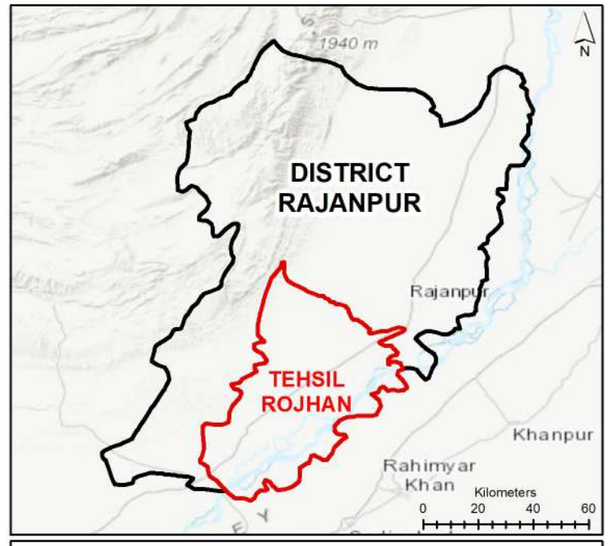
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2

3

Bangla Hidayat
(Tariqabad)

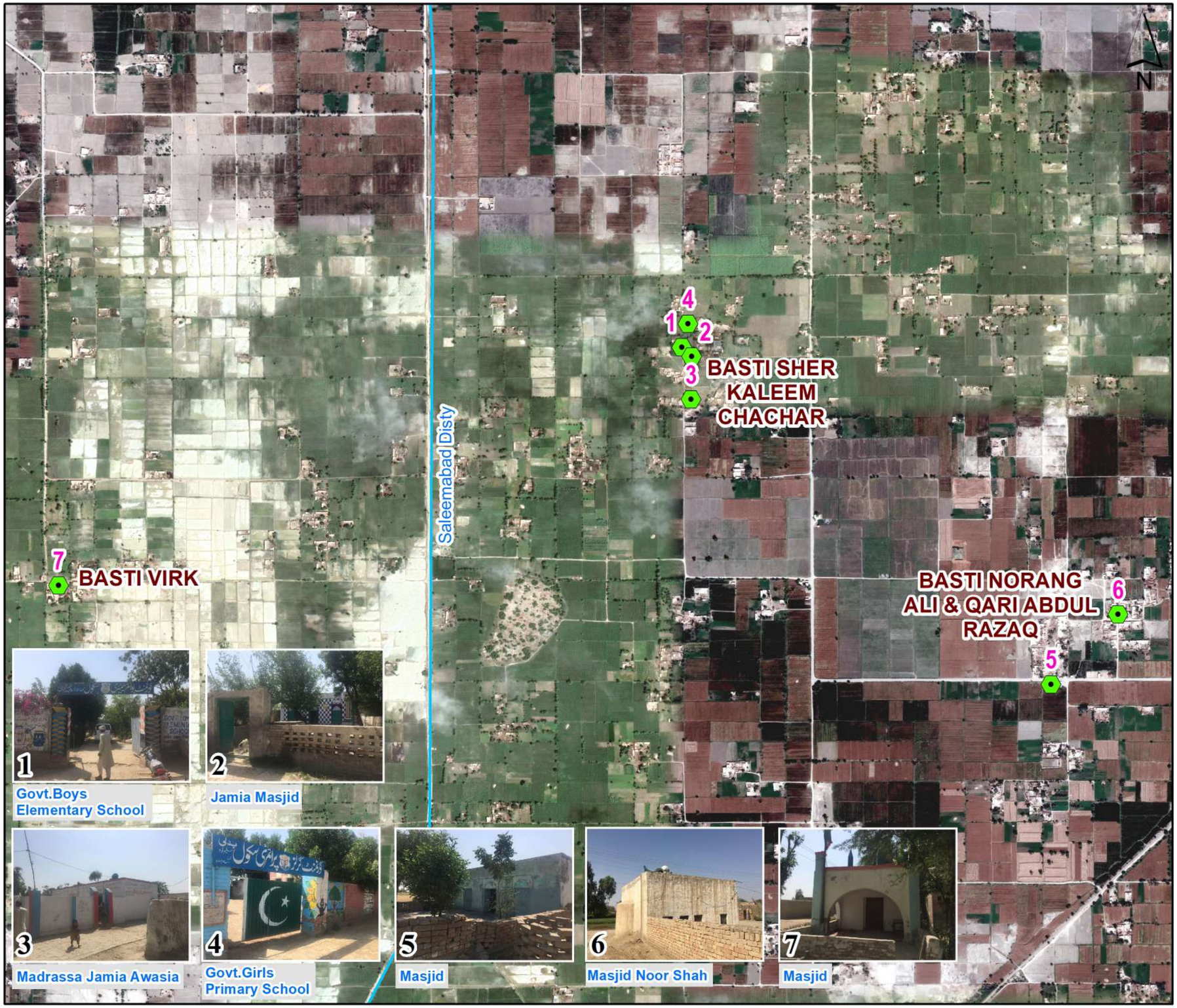


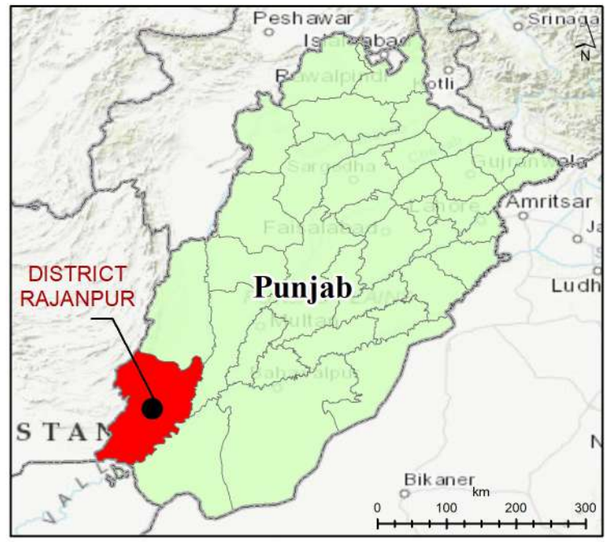


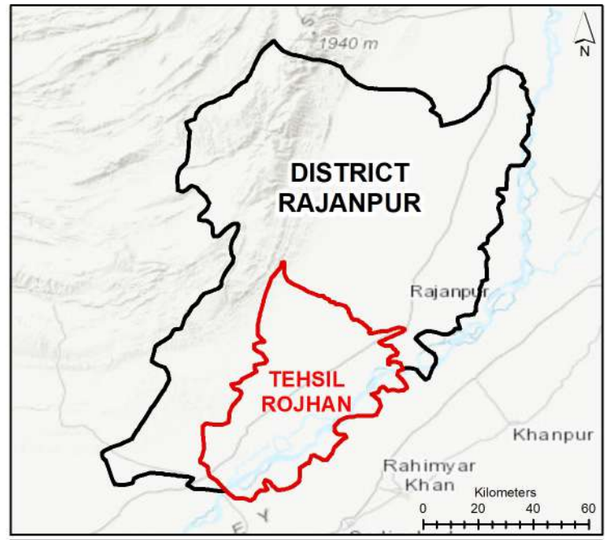
LEGEND:

- Environmental Sensitive Receptors
- Canal / Minor / Distributary

CLIENT:	CONSULTANT:	PROJECT:	MAP TITLE:	SCALE:
PUNJAB RURAL MUNICIPAL SERVICES COMPANY (PRMSC)	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE:- NESPAK HOUSE 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CONSULTANCY SERVICES FOR ENGINEERING DESIGN & CONSTRUCTION SUPERVISION PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT, PILOT PHASE, CLUSTER SOUTH-III	**ENVIRONMENTAL SENSITIVE RECEPTORS MAP TARIQ ABAD, TEHSIL ROJHAN, CLUSTER SOUTH-III**	Meters 0 90 180 360 — 1:5,000







LEGEND:

- Environmental Sensitive Receptors
- Canal / Minor / Distributary

CLIENT:	CONSULTANT:	PROJECT:	MAP TITLE:	SCALE:
PUNJAB RURAL MUNICIPAL SERVICES COMPANY (PRMSC)	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE:- NESPAK HOUSE 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CONSULTANCY SERVICES FOR ENGINEERING DESIGN & CONSTRUCTION SUPERVISION PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT, PILOT PHASE, CLUSTER SOUTH-III	**ENVIRONMENTAL SENSITIVE RECEPTORS MAP SALEEMABAD, TEHSIL ROJHAN, CLUSTER SOUTH-III**	Meters 0 200 400 800 — 1:12,000



Masjid



Jamia Masjid



Govt.Model Primary School

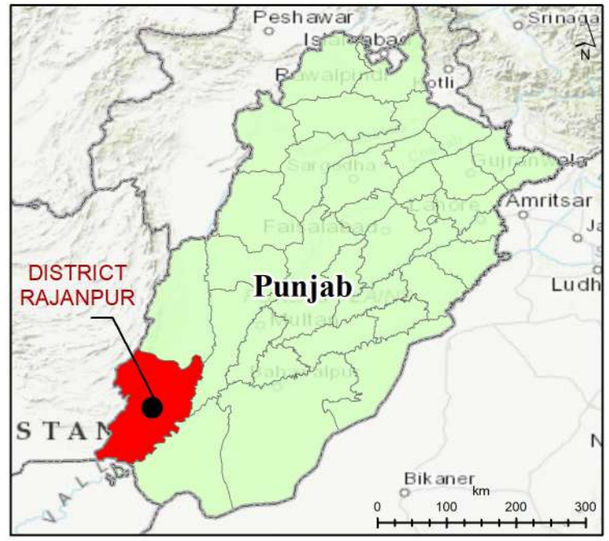


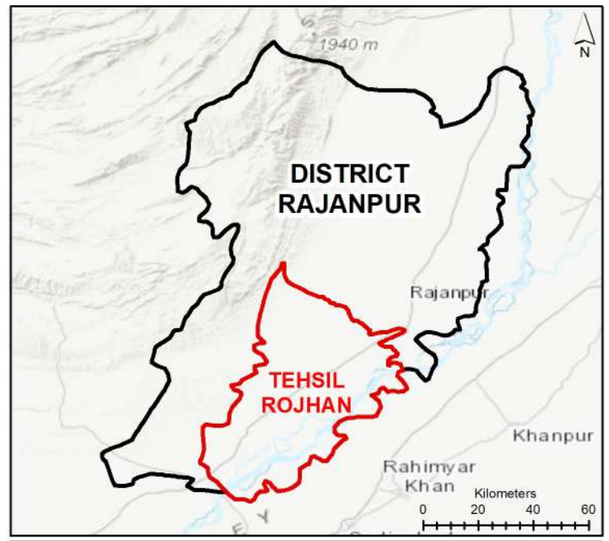
Masjid

Masjid

Masjid

Govt. Girls Primary School





LEGEND:

- Environmental Sensitive Receptors
- Canal / Minor / Distributary

CLIENT: PUNJAB RURAL MUNICIPAL SERVICES COMPANY (PRMSC)	**CONSULTANT:** NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	**PROJECT:** CONSULTANCY SERVICES FOR ENGINEERING DESIGN & CONSTRUCTION SUPERVISION PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT, PILOT PHASE, CLUSTER SOUTH-III	**MAP TITLE:** ENVIRONMENTAL SENSITIVE RECEPTORS MAP SAFDARABAD TEHSIL ROJHAN, CLUSTER SOUTH-III	**SCALE:** Meters 0 350 700 1,400 — 1:20,000

70°0'0"E

BASTI NASEEBABAD

BASTI SHAHID HAMEED KHAN

BASTI HAJI SHANAWAZ

N

1 Govt. Girls Primary School

2 Masjid

3 Govt.Boys High School

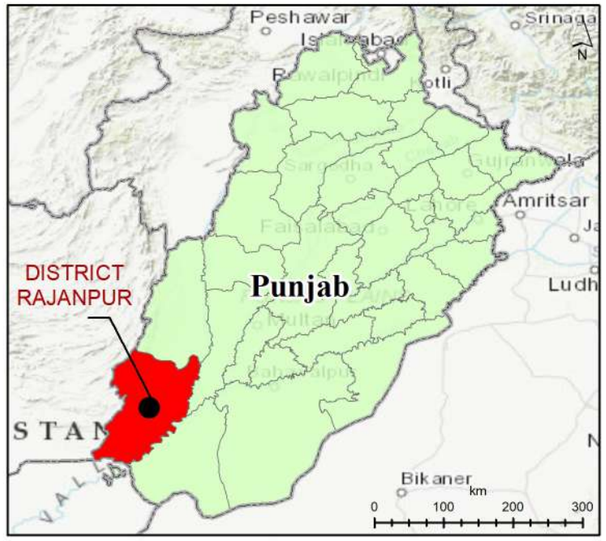
4 Graveyard

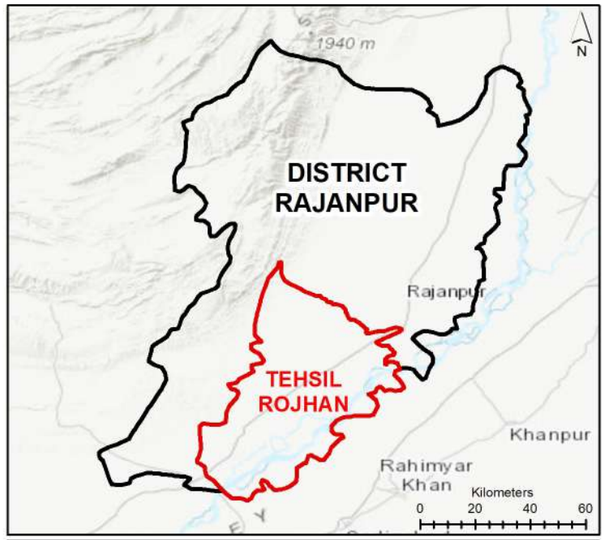
5 Govt.Boys Elementary School

6 Masjid

7 Govt. Boys Primary School

70°0'0"E





LEGEND:

Environmental Sensitive Receptors

Canal / Minor / Distributary

CLIENT:

PUNJAB RURAL MUNICIPAL SERVICES COMPANY (PRMSC)

CONSULTANT:

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD

HEAD OFFICE:- NESPAK HOUSE 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

PROJECT:

CONSULTANCY SERVICES FOR ENGINEERING DESIGN & CONSTRUCTION SUPERVISION PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT, PILOT PHASE, CLUSTER SOUTH-III

MAP TITLE:

ENVIRONMENTAL SENSITIVE RECEPTORS MAP DERA DILDAR, TEHSIL ROJHAN, CLUSTER SOUTH-III

SCALE:

Meters 0 150 300 600

1:8,000



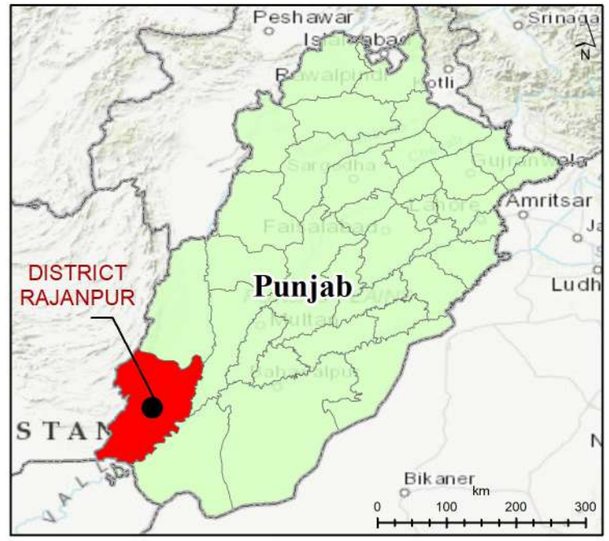
Masjid

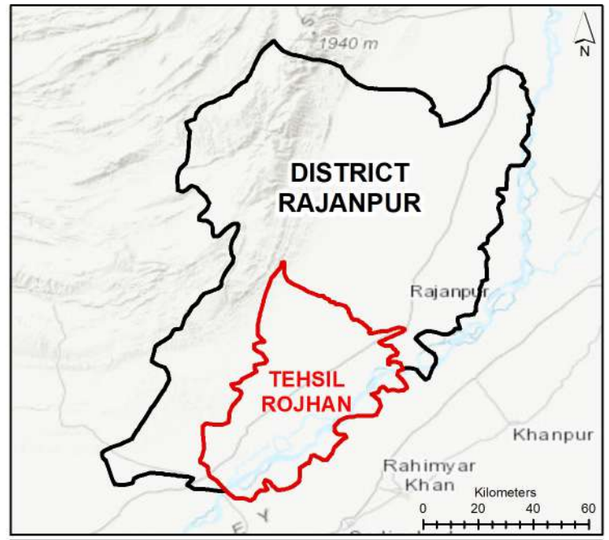


Graveyard



Govt.Boys Elementary School





LEGEND:

- Environmental Sensitive Receptors
- Canal / Minor / Distributary

CLIENT:	CONSULTANT:	PROJECT:	MAP TITLE:	SCALE:
PUNJAB RURAL MUNICIPAL SERVICES COMPANY (PRMSC)	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE:- NESPAK HOUSE 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CONSULTANCY SERVICES FOR ENGINEERING DESIGN & CONSTRUCTION SUPERVISION PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT, PILOT PHASE, CLUSTER SOUTH-III	**ENVIRONMENTAL SENSITIVE RECEPTORS MAP MUTFARQ MAZARI, TEHSIL ROJHAN, CLUSTER SOUTH-III**	Meters 0 50 100 200 — 1:3,000

Annex-IV

Socio-Economic Survey Tool

Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS)

Name	M. Anns Ali	Date	7-04-2023
Settlement	Dera Dildar	UC	Dera Dildar.
Tehsil	Rojhan	District	Rajhanpur.

Name of Respondant: Humayou Badshah Contact: 0333-6739000 Age: 23

Gender: Male ✓ Female

Marital Status: Married ✓ Unmarried

Caste: Mazari Mother Language: Balochi Relegion: Islam

Qualification

Illetrate | Primary | Middle | Matric

Intermediate | Graduation | Above ✓

Profession: Farmer (Agriculture).

Source of income? Farming

Average monthly income (PKR)?

<15,000 | 15,001-25,000 ✓ | 25,0001-35,000

35,0001-50,000 | >50,000

Average monthly savings (PKR)? Nothing

Type of family system? Joint ✓ Nuclear

No. of family members? 7.

Ownership status of house? Owned ✓ Rented | Squatters

Type of construction of house? Katcha | Pacca ✓ Semi-pacca

Available facilities?

Electricity	✓	Sui Gas	X	Sewerage	X	Water Supply	X
Telephone		Solid Waste	X	Roads	X.	Public Transport	X
Rescue	✓	Health	X	School	✓	College	X
Madrassa	✓	Graveyard	✓	Mosque	✓		

Source of water in locality?

Piped Netwrok | Hand pump | Borehole ✓ | Tube well | Others

Source of drinking water?

Filtration plant | Hand pumps | Boreholes ✓ | Commercial vendors

Water supply | Others

Scanned with CamScanner

Satisfaction with water quality? Yes [✓] No [ ]

If no, reasons. _____

Type of sewerage system?

Piped network [ ] Open drains [ ] In fields/ plots [ ] Others [✓] Soakage pit

Satisfaction with sewerage system? _____

If no, reasons. _____

Type of solid waste management system?

Door-to-door collection [ ] Community bin system [ ] Open dumping [✓]

Current expenditures on water/sewerage/solid waste? Zero expenditures.

Potable Water [ ] Sewerage [ ] Solid waste [ ] Drinking Water [ ]

Major diseases?

Hepatitis [ ] Malaria [ ] Kidney [ ] Diabetes [ ]

Hypertension [ ] Gastrointestinal [✓] cancer Others [✓]

Health facility visited? Rahim Yar Khan Distance 120km

Health expenditure? 20000

Landholding _____ House [ ] Agriculture [✓] Commercial [ ]

Major crops

Wheat [✓] Cotton [ ] Sugarcane [ ] Fodder [ ] Vegetable [ ]

Maize [ ] Fruits [ ] Others [ ]

Soruce of water for irrigation?

Rainfall [ ] Canal [ ] Tube well [✓] Wastewater [ ]

Any NGO/CBO working in the area? Yes [ ] No [✓]

If yes, Name _____ Scope _____

Willingness for project implementation? Yes [✓] No [ ]

Willingness to pay tariff / month for improved services? Yes [✓] No [ ]

How much tariff can you pay? 300 - 400

Pressing needs? Soiling and provision of Hospital

Signature of Interviewer

Scanned with CamScanner

Annex-V

Gender Survey Tool

Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS)

Name	Mst. Javeria	Date	07-04-2023
Settlement	Mutafaraq Mazari	UC	Meerpur
Tehsil	Rojhan	District	Rajhapur

Name of Respondant: Amna Contact: 0335-2600299 Age: 24

Gender: Male [ ] Female [✓]

Marital Status: Married [✓] Unmarried [ ]

Caste: Mazari Mother Language: Balochi Religion: Islam

Qualification:

Illetrate [ ] Primary [ ] Middle [ ] Matric [ ]

Intermediate [✓] Graduation [ ] Above [ ]

Profession: House wife (Live stock)

Source of income: Live stock

Average monthly income (PKR)?

<15,000 [✓] 15,001-25,000 [ ] 25,0001-35,000 [ ]

35,0001-50,000 [ ] >50,000 [ ]

Average monthly savings (PKR)?: Nothing

Type of family system? Joint [✓] Nuclear [ ]

No. of family members? 12.

Ownership status of house? Owned [✓] Rented [ ] Squatters [ ]

Type of construction of house? Katcha [✓] Pacca [ ] Semi-pacca [ ]

Available facilities? & roads + animal freeses

Electricity	✓	Sui Gas	X	Sewerage	X	Water Supply	X
Telephone	X	Solid Waste	X	Roads	X	Public Transport	X
Rescue	X	Health	X	School	✓	College	X
Madrassa	✓	Graveyard	✓	Mosque	✓		

Source of water in locality?

Piped Netwrok [ ] Hand pump [✓] Borehole [ ] Tube well [ ] Others [ ]

Source of drinking water?

Filtration plant [ ] Hand pumps [✓] Boreholes [ ] Commercial vendors [ ]

Water supply [ ] Others [ ]

Satisfaction with water quality? Yes [✓] No [ ]

If no, reasons. _____

Type of sewerage system?

Piped network [ ] Open drains [ ] In fields/ plots [ ] Others [✓] Soakage pits

Satisfaction with sewerage system?

If no, reasons. _____

Type of solid waste management system?

Door-to-door collection [ ] Community bin system [ ] Open dumping [✓]

Current expenditures on water/sewerage/solid waste? Zero expenditures

Potable Water [ ] Sewerage [ ] Solid waste [ ] Drinking Water [ ]

Major diseases?

Hepatitis [ ] Malaria [ ] Kidney [ ] Diabetes [ ]

Hypertension [ ] Gastrointestinal [ ] Others [✓]

Health facility visited? Diarrhea Distance 1Km Nearley clinic

Health expenditure? 1000

Landholding ____ House [ ] Agriculture [✓] Commercial [ ]

Major crops

Wheat [✓] Cotton [✓] Sugarcane [ ] Fodder [ ] Vegetable [ ]

Maize [ ] Fruits [ ] Others [ ]

Soruce of water for irrigation?

Rainfall [ ] Canal [ ] Tube well [✓] Wastewater [ ]

Any NGO/CBO working in the area? Yes [ ] No [✓]

If yes, Name Scope

Willingness for project implementation? Yes [✓] No [ ]

Willingness to pay tariff / month for improved services? Yes [✓] No [ ]

How much tariff can you pay? 100-200

Pressing needs? water Supply, Sewerage System, School and Health care facility

- people have to move outside of house to fetch water. It will be great if water supply will be at on house door facility.

Signature of Interviewer

Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSSP)

Gender Specific Questions

If married what was your age at the time of marriage? 18

How many children do you have? 04

In case of house wife, what are the reasons for not working? _____

In case of working women, what is the nature of work?

Office work		Agriculture		Pvt. Job	
Maid		Teacher		Other	✓ (livestock)

Do women of the area work in local markets or streets? Yes [ ] No [✓]

Do you feel sexual harassment at your workplace? Yes [ ] No [✓]

Do you have full power to spend you own money the way you like? Yes [✓] No [ ]

How many hours per day do you work? average 4 hours (vary from to day to day activities)

Do you save money from your monthly income? Yes [ ] No [✓]

Do you play role in decision in your house regarding agriculture or business affairs? Yes [ ] No [✓]

If Yes What types of decisions? _____

House hold tasks?

Sewing	✓	Laundry	✓	Dishes	✓
Cleaning house	✓	Any other	✓	Cooking	✓

→ animals takecare

What is the knowledge level of the adolescent girls on menstrual hygiene? What type of sanitary material do they use during menstruation cycle? well awaire Sanitary pad from main city.

Do you want to learn some skills for earning your livelihood? Yes [✓] No [ ]

If yes, what type of skills? Vocational Training Centre.

Should women get educated? Yes [✓] No [ ]

Do women of the area face gender violence or domestic violence? Yes [ ] No [✓]

Are the women allowed to go out their houses freely or have limited access? Yes [✓] No [ ] freely move

What are pressing needs of women in the projected area? Market area or facility to buy Sanitory product from local Shops, provision of school & high educated teacher, awareness compaign for females to maintainance of hygines, and for paying Tariff.

Annex-VI

Public Consultation Form

PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Jaweria Date: 6-4-23 1:34 – 3:00

B. Site Location:

Sub-village _____ Village/Town Saleemabad.

Union Council _____ Tehsil & District _____

Venue: Jam Talib House.

==========

A) POINTS TO BE DISCUSSED

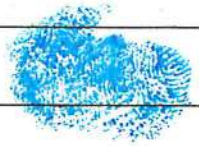
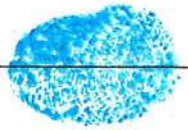
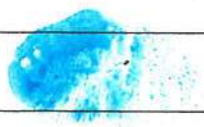
1. Introduction of the project
2. Description of various components of the project, its activities and impacts
3. Needs, priorities and reactions of the affected people
4. Inquiring existing problems
5. Assessment of pressing needs of people

B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

No culture of female education.
Water get yellow after being explode in air undrinkable.
handpumps and borehole in all houses.
Domestic water & Launclary from Diggi
No Hospital have to go to Umerkot/Rajhanpur.
Allergy + throat issues + cough + kidney stones
Soakage pits systems.
maternity issues resolved by Dai because ~~Gan~~ are poor.
Vocational ~~or~~ Training Centres.

C) SUGGESTIONS DURING CONSULTATION SESSIONS

D) PARTICIPANTS

Sr.#	Name	Mobile No.	Signature
1	Zainab زینب	زینب	
2			
3	Mumtaz. ممتاز		
4			
5	Lal Khatoon لال خاتون		
6			
7	Fatima. فاطمہ	فاطمہ	
8			
9	Saima صائمہ	صائمہ	
10			
11	Aziz Mai عزیز مائی		
12			

Sr.#	Name	Mobile No.	Signature
13	Noor نور	نور	
14			
15	Mehwish مہوش	مہوش	
16			
17	Gul Khatoon گل خاتون		
18			
19	Kausar Bibi کوثر		
20			
21	Parveen پروین	پروین	
22			
23	Sajda ساجدہ	ساجدہ	
24			
25	Saniq سانیہ	ثانیہ	
26	Sehrish سہرش	سہرش	
27	عذرا	عذرا	
28	نسیم	نسیم	
29	کلثوم	کلثوم	
30	تسلیم	تسلیم	
31	سعدیہ	سعدیہ	
32			

Asma Asma

Hiyata Mai

Rubab Rubab

PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Asif Ali Date: 06/04/2023

B. Site Location:

Sub-village Saleemabad Village/Town _____

Union Council Safdarabad (57) Tehsil & District Rajanpur.

Venue: ~~Govt. Middle School~~ Govt Elementary School

==========

A) POINTS TO BE DISCUSSED

1. Introduction of the project
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B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

Kidney related disease diagnosed in majority of population.
Use canal water & Tube well for irrigation.
Majority of population do not have washrooms.
10% of population have bore.
Farmer and labour by profession.
land hold by the villagers.
No sewerage system have Soakage pits.
Open dumping for Solid waste.

C) **SUGGESTIONS DURING CONSULTATION SESSIONS**

D) **PARTICIPANTS**

Sr.#	Name	Mobile No.	Signature
1	مختیار احمد	03338826384	
2	محمد شریف	03337435219	محمد شریف
3	آصف علی	0337-7287327	
4	غلام اکبر	03357239944	
5	حافظ مہر علی	0333-7294348	حافظ مہر علی
6	عبداللہ	03357387644	
7	حاجی شاہد حسین	0332-7232323	
8	فلنسر نخش	03337287875	
9	محمد اجمل	03345225176	
10	مجاہد حسین	03426436820	
11	نازک حسین	03322132490	
12	حاجی ارشاد احمد	03346654993	ارشاد احمد

Sr.#	Name	Mobile No.	Signature
13	فاروق جاجہ	03318878604	
14	ابرار احمد	0335-7761435	
15	شبیر محمد	03319623938	
16	رئیس فاروق جاجہ	03356934168	
17	ناصر جاجہ		
18	ہاشم علی		
19	خورشید احمد شاہ		
20	اللہ ڈیوایا		
21	حاکم علی	03317628745	
22	منور حسن	03348008388	منور حسن
23	رئیس شبیر قلیم جاجہ	03336675786	
24	غلام اکبر	0335-7539944	
25			
26			
27			
28			
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30			
31			
32			

PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Riaz Ahmad Date: 05/04/2023

B. Site Location:

Sub-village Umer kot Village/Town _____

Union Council _____ Tehsil & District Rajanpur.

Venue: Dera Riaz Ahmad.

==========

A) **POINTS TO BE DISCUSSED**

1. Introduction of the project
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B) **MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS**

(1) Get water from RO plant [1 km]
(2) Use Handpump for domestic use.
(3) Hepatitis, gastrointestinal, kidney, water borne disease.
(4) Cotton, wheat are common cultivation
(5) Primary School → boys & girls.
(6) Majority donot have washroom facility (S-1)
(7) For sewerage → septic tank & soakage pit are present.
(8) Willing to pay tariff.
(9) Water is hard / Brakish.
(10) Solangi caste.
(11) Pressing need → soiling & access road.
(12) Last flood in 2010.

C) SUGGESTIONS DURING CONSULTATION SESSIONS

(13) Govt. land is available. & people are also willing for VLD.
(14) People own agriculture land.
(15) Majority people are Labor.
(16) Majority have washroom facility in Mouza.

D) PARTICIPANTS

Sr.#	Name	Mobile No.	Signature
1	Mehboob Ahmad	0302-3015676	محمود احمد
2	Riaz Ahmad	0333-6164975	ریاض احمد
3	Rasool Baksh		
4	Kareem Baksh	0334-7005771	کریم بخش
5	Ishaq		اسحٰق
6	Niaz Ahmad	0332-3632048	
7	Sajad Kareem	0334-7757742	سجاد کریم
8	Fiaz	0332-1325878	فیاض
9			
10			
11			
12			

PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Javeria Date: 5-4-23

B. Site Location: 12:49-2:15

Sub-village _____ Village/Town Umer Kot

Union Council _____ Tehsil & District _____

Venue: Rafique House.

==========

A) POINTS TO BE DISCUSSED

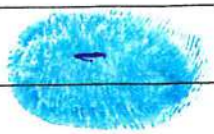
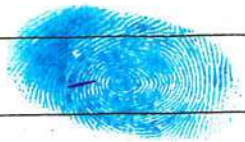
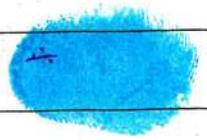
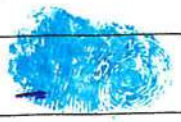
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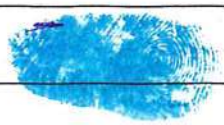
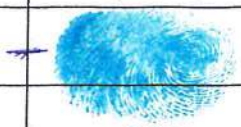
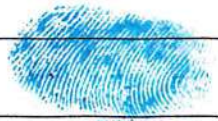
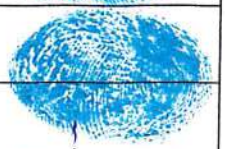
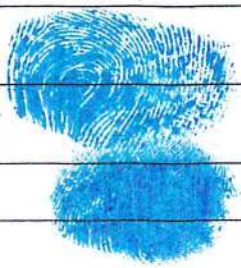
B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

Bitter water Supply system. (home + hand pumps).
flood effected area.
Sludges cause after rain due to poor sewerage System.
Open Dumping.
Build Soakage pits outside of houses.
No NGO available for any kind.
fetch water from hand pump far from locality
Have travel expenditures

C) SUGGESTIONS DURING CONSULTATION SESSIONS

D) PARTICIPANTS

Sr.#	Name	Mobile No.	Signature
1	Samina		
2			
3			
4	Maqsood		
5			
6			
7	Safiya Mai		
8			
9	Amna.		
10			
11	Nasem Bibi		
12			نسیم بی بی

Sr.#	Name	Mobile No.	Signature
13	Hajra Bibi		
14			
15	mamal Bibi	03360384486	
16			
17	Bakhta Mai		
18			
19	Shamim Mai		
20			
21	Khousar		
22			
23	Asia		
24			
25			
26	Nasreen Bibi		
27			
28	Anwar Bibi		
29			
30	Allah Wasai		
31	Jindo Mai		
32			

PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

4:15 – 5:20

A. Name of Facilitator: Saweria Date: 6-3-23

B. Site Location:

Sub-village _____ Village/Town @ Safdarabad

Union Council _____ Tehsil & District _____

Venue: Haq Nawaz House.

==========

A) POINTS TO BE DISCUSSED

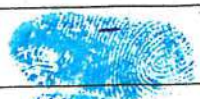
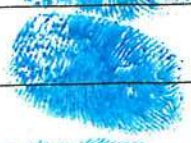
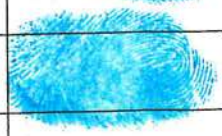
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B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

flood effected area (covers by 6 months in year).
Malaria, Typhoid, BP, Diabetes, Allergy.
50% ratio of sweet water.
Absence of mosque.
graveyard drowned in flood.
women difficulty to work in agriculture due to flood inversion in crops.
Early menopause.
complete absence of any kind of sewerage system.
~~Get~~ fetch water from nead handpump available for whole community.

C) SUGGESTIONS DURING CONSULTATION SESSIONS

D) PARTICIPANTS

Sr.#	Name	Mobile No.	Signature
1	Samina		
2			
3	Ruleina		
4			
5	Wasai		
6			
7	Sameela		
8			
9	Shamim		
10			
11	muqadus		
12			

Zarina Mai — 

Dhano Mai 

Harshi

Sr.#	Name	Mobile No.	Signature
13	Taslima		
14			
15	Salma.		
16			
17	Zahino Mai		~~03321 4884~~ 2
18			
19	Rahima Mai		
20			
21	Morti Mai		
22			
23	Hanifa Mai		
24			
25	Aqus Khatoon		
26			
27	Janul Mai		
28			
29	Mimi Mai		
30			
31	Sharmo Mai		
32			

Nasreen
Mosa Mai

03316730557

Sharmi Mai  0333-1311617

Naseema Mai 

Shabina Mai 

Basi Mai  03347326687

Gulzara Mai 

Shehnaz Mai 

Hamida Mai 

Amna Mai 

Kalsoom Mai 

Taima Mai

Bashi Mai  ~~0333 1311617~~ ~~03321 118842~~ ✓

Sugrah Mai 

PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Abdul Latif Date: _____

B. Site Location:

Sub-village Basti - Jawana Village/Town safdar abad.

Union Council _____ Tehsil & District _____

Venue: _____

==========

A) POINTS TO BE DISCUSSED

1. Introduction of the project
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B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

(1) Hand pump → for drinking purpose
(2) Malaria, hepatitis, skin diseases, Gestro intentinal disease.
(3) Majority do not have washroom facility
(4) NRSP → washrooms.
(5) Majority of NRSP washroom were damaged by flood
(6) Flood prone area.
(7) 35 - 40 ft depth → water
(8) Caste → Language → Saraiki
(9) Rojhan → THQ
(10) 1000 — 1200 PKR For medical.

C) **SUGGESTIONS DURING CONSULTATION SESSIONS**

(11) Boys & girls primary school.

D) **PARTICIPANTS**

Sr.#	Name	Mobile No.	Signature
1	Haq Nawaz	0335-3164745	حق نواز
2	Abdul Latif	0333-7128254	
3	Abdul Majid	0335-0844576	عبدالماجد
4	Qadara	0333-7482544	قادرہ
5	Ali Baksh	0304-7557914	علی بخش
6	Raab Nawaz	0331-2435089	
7	Safdar	0331-9730527	سفدر
8	Aslem	0333-1785556	اسلم
9	Mujahid Husain	0306-2131835	
10	Jawad	0308-7917749	جواد
11	Allah-bachaya	0306-3594834	
12	Jonak	03	جونق

Sr.#	Name	Mobile No.	Signature
13	Hayat	0335-9586870	حیات
14			
15			
16			
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PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Ali Baksh Date: 07/04/2023.

B. Site Location:

Sub-village Mutafaiq Mazari Village/Town _____

Union Council Meerapur Tehsil & District Rojhan

Venue: Ali Baksh house.

==========

A) POINTS TO BE DISCUSSED

1. Introduction of the project
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B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

Only 30% of population have washrooms.
majority of the community have hand pumps → domestic & drinking water.
20% population have bore
Hepatitis and kidney stones common disease
Quality of water is bad → undrinkable.
Laboure & Farmer ley profession.
No Sewereage → have soakage pits.
Open dumping.

C) **SUGGESTIONS DURING CONSULTATION SESSIONS**

D) **PARTICIPANTS**

Sr.#	Name	Mobile No.	Signature
1	Noor Khan	0334 7859359	نورخان
2	Munir Ahmed	0333 6422740	
3	Wazeer Ahmed	0336 6154887	وزیر احمد
4	Ameer Ahmed		آمیر احمد
5	Raza Muhammad	0332 6128405	
6	Allah Yar	0333 6434044	اللہ یار
7	Hassan Mehmood	0333 7449396	حسن محمود
8	Habib ullah		
9	Bashir Ahmed	0333 6435887	بشیر احمد
10	Dilshad Ahmed		
11	Sikandar Hussain		سکندر حسین
12	Khalil Ahmed	0334 7865696	خلیل احمد

Sr.#	Name	Mobile No.	Signature
13	M. Iqbal		محمود اقبال
14	Abdul Rehman	0334 6650434	عبدالرحمٰن
15	Dr. Qamar Hussain	0336 3233438	قمر حسین
16	Ali Bakhsh	0332 7314024	علی بخش
17			
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PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Javeria Date: 7-3-23

3:15 – 4:15

B. Site Location:

Sub-village _____ Village/Town Mutafiq Mizari

Union Council _____ Tehsil & District _____

Venue: Ali Bakhsh House

==========

A) POINTS TO BE DISCUSSED

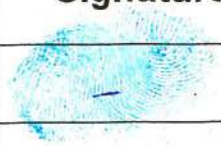
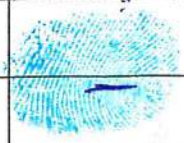
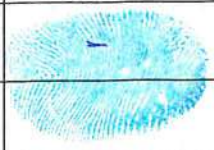
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4. Inquiring existing problems
5. Assessment of pressing needs of people

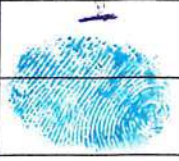
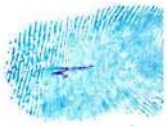
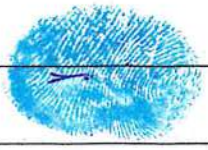
B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

40% of houses have washrooms
Diarrhea + Kidney + Hepatites majority of people get diagnosed with.
All use hand pump water for drinking and domestic use.
No Sui gas use animals feeses & woods.
Women work as agriculture or take care of animals for livestock business.
No hospital had to go to nearby pot clinic.

C) SUGGESTIONS DURING CONSULTATION SESSIONS

D) PARTICIPANTS

Sr.#	Name	Mobile No.	Signature
1	Aziz Bibi		
2			
3	Allah Bachai bibi		
4			
5	Haiyata Bibi		
6			
7	Amna Bibi		
8			
9	Mariyam Bibi		
10			
11	Rosheen Bibi		
12			

Sr.#	Name	Mobile No.	Signature
13	Allah jawai		
14			
15	Noor Khatoon		
16			
17	Rahima		
18			
19	Amna	0335-2602209 Husband	
20			Amna
21	Naseem		Naseem
22			
23	Jameela		
24			
25	Irshad.		
26			
27	Khaton mai		
28			
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PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Naseer-u-Deen Mazari Date: 07/04/2023.

B. Site Location:

Sub-village Dera Dildar Village/Town Basti-shahid hameed Khan

Union Council _____ Tehsil & District Rojhan.

Venue: Dera Naseer-u-Din Mazari

==========

A) POINTS TO BE DISCUSSED

1. Introduction of the project
2. Description of various components of the project, its activities and impacts
3. Needs, priorities and reactions of the affected people
4. Inquiring existing problems
5. Assessment of pressing needs of people

B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

(1) Water supply scheme already exist (in 4 Major settlements)
(2) people donot pay the bill → [in 2009]
(3) - Supply is only functional for 10-15 days.
(4) So the supply line is closed.
(5) People use hand pump [2-3 hand pumps]
(6) Girls primary + Boys high school
(7) Mosque + Madrassa
(8) 35-40 ft depth
(9) Rojhan Hospital
(10) All people have (90.95 %) have washroom.
(11) Cancer, hepatitus, kidney disease
(12) Flood prone area (3-4 ft) in 2022.

C) SUGGESTIONS DURING CONSULTATION SESSIONS

(13) Water is sweet due to near by water body / River
(14) River Indus (10 – 12 km).
(15) Flood water use for Irrigation otherwise ~~tong~~ underground water is brackish
(16) Mazari, Balachani caste.

D) PARTICIPANTS

Sr.#	Name	Mobile No.	Signature
1	Nasir ul Deen Khan	0333-6437056	
2	Rashid Hameed	0334-6655460	
3	Mohsin Hameed	0334-7335343	
4	Jahanbaz Mazari	0333-6431522	
5	Humayoun Khan	0333-6739000	
6	Hamzah Khan	0	
7	Ghulam Shabbir	0333-7236447	
8	Tanveer Ahmad		Tanveer Ahmad.
9	Ghulam Muhammad		
10	M. Afzal		M. Afzal.
11	Sadiq Hussain		
12	Sabir Hussain		

Sr.#	Name	Mobile No.	Signature
13	Imtiyaz Hussain		امتیاز حسین
14	Altaf Hussain		
15	M. Aslam	0335-1846365	محمد اسلم
16			
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PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Jaweria Date: 6-7-4-23 11:30-1:00

B. Site Location:

Sub-village _____ Village/Town Dera Dildar

Union Council _____ Tehsil & District _____

Venue: & Jahanzaib Mazari House.

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A) POINTS TO BE DISCUSSED

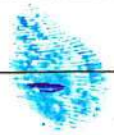
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4. Inquiring existing problems
5. Assessment of pressing needs of people

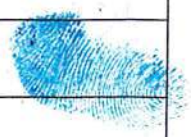
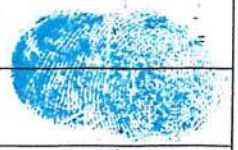
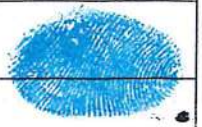
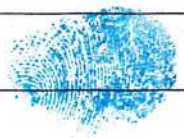
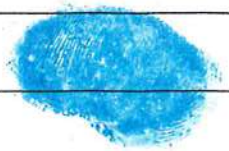
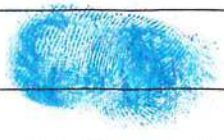
B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

Early age marriages are common.
Bitter water supply.
washrooms in 50% of population, poor ones did have washrooms, go in fields & jungle. (or a hole in ground).
Open Dumping System.
Mostly of women have Irregular Hormones can't conceive.
Appendex, in 90% of people Diarrhea + Malaria + Hepatitis + Typhoid.
Crops get effected by flood.

C) SUGGESTIONS DURING CONSULTATION SESSIONS

D) PARTICIPANTS

Sr.#	Name	Mobile No.	Signature
1	Hamida Bibi		
2			
3	Qaisra Jahzaib	03352972524	قیصرہ جہانزیب
4			
5	Nayab	"	Nayab
6			
7	Khanzadi		
8			
9	Zahra	:	Zahra
10			
11	Mahzaib		Mahzaib
12			

Sr.#	Name	Mobile No.	Signature
13	Sima Bibi		
14			
15	Shazia Bibi		
16			
17	Shahzina Bibi		
18			
19	Maksooda Bibi		
20			
21	Sharifa Bibi		
22			
23	Sania Bibi		Sania
24			
25	Zobaida Bibi		
26			
27	Zeba Bibi		
28			
29	Farah Bibi		فرح فرازی
30			
31	Uzma Bibi		
32			

Bashira Bibi

Pari Bibi

Taslima Bibi

Shafia Bibi

Lal khatoon

Nagina Bibi

Norjahan Bibi

Sohni Bibi

Shahzina Bibi

Hanifa Bibi

Yasmin Bano

Safiya Bibi

Noreen Bibi

Murada Bibi

Suhagi

Amna Bibi

Ajaib Bibi

Monira Bibi

Gulnaz Bibi

Shehla Bibi

Kabil Khatoon

Shamshad

Shaheena

Naseem

Anwar

PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT
(PRSWSS)
Public Consultation

19:15-12:43

A. Name of Facilitator: Saweria Date: 4-4/23

B. Site Location:

Sub-village _____ Village/Town Rot la Hussan Shah

Union Council _____ Tehsil & District _____

Venue: Jamal Shah Dera

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A) POINTS TO BE DISCUSSED

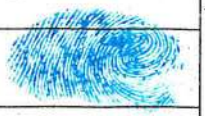
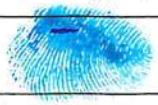
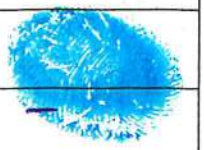
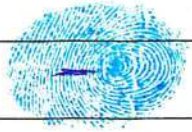
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5. Assessment of pressing needs of people

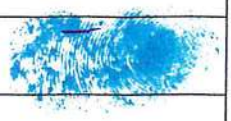
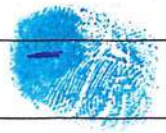
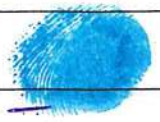
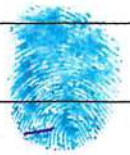
B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

Literacy rate is zero.
Many houses don't have electricity because can't pay the bill.
No schooling system.
Majority of population don't have washrooms and dug a hole use as washroom.
Common fetching system for water is handpump.
Ratchy house effected by rain
Living at other dwelling in → Jamal shah Land.
Zero Sewerage System.
No health System have to go Umerkot.

C) SUGGESTIONS DURING CONSULTATION SESSIONS

D) PARTICIPANTS

Sr.#	Name	Mobile No.	Signature
1	Samina	Agriculture	
2			
3	Miraaj	House wife	
4			
5	Wazir Mai	"	
6			
7	Nazira Mai	"	
8			
9			
10	Manzra	Agriculture (coppy)	
11			
12			

Sr.#	Name	Mobile No.	Signature
13	Iqbal mai	Dhol Bajati	
14			
15			
16	Zainab Bibi	Aged.	
17			
18	Ruksana Bibi	House wife.	
19			
20			
21	Mirhaaj mai	11	
22			—
23	Zulbait mai		
24		11	
25			
26	Shamshad mai	Silai	
27			
28			
29			
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31			
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PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Syed Jamal Hussain Shah. Date: 4/4/2023

B. Site Location:

Sub-village Kotla Husain Shah Village/Town _____

Union Council _____ Tehsil & District Rajanpur.

Venue: _____

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A) POINTS TO BE DISCUSSED

1. Introduction of the project
2. Description of various components of the project, its activities and impacts
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5. Assessment of pressing needs of people

B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

- Brackish water → contaiminated.
- Majorty of population ~~have~~ are labour in agriculture field.
- Use handpumps for water resources.
- No washrooms and have (020) people living on land lord area.
- Clean septic tanks / Gutter after one year.
- No NGO.

C) **SUGGESTIONS DURING CONSULTATION SESSIONS**

D) **PARTICIPANTS**

Sr.#	Name	Mobile No.	Signature
1	اقبال حسین	0313-7515459	اقبال حسین
2	محمد ایوب	0315-6949388	
3	شمیم عباس	0313-6449597	
4	اظہر عباس	0312-8912782	
5	ظفر عباس	0333-3834142	
6	نذیر احمد	0311-8838507	
7	ممتاز حسین	0335-6619257	ممتاز حسین
8	اشرف عباس	0312-6442931	
9	غلام رضا	0335-3022428	
10	محمد یاسر	0311-6529019	
11	ریحان عباس	0306-1839597	
12	اقرار حسین	0313-6693978	

Sr.#	Name	Mobile No.	Signature
13	محمد طارق حسن	0312-6445276	
14	حضور بخش	0312-5138210	
15	کاشف عباس	0335-7890730	
16	اویس رضا	0313-6046067	
17	وسیم عباس	0313-6447657	
18	کاشف علی	0315-0971378	
19	محمد اسماعیل	0316-3716712	
20	اشفاق احمد	0315-6442191	
21	ارشد حسین	0317-6954647	
22			
23			
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PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: _____ Date: 4/4/2023

B. Site Location:

Sub-village Chak Dillbar Village/Town _____

Union Council _____ Tehsil & District Rojanpur.

Venue: Near Mosque (04:00)

==========

A) POINTS TO BE DISCUSSED

1. Introduction of the project
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B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

Commercial vendor sales water for 40-50 RKS per can of 20 liters.
No drinking water.
3-4 houses have washrooms.
No female teacher available.
50% → paccay & 50% → Katchy houses.
No boundary of houses.
No education education facility.
No washrooms → have to go to fields.
No electricity → Solar panal should be ~~provided~~. preferred
Soiling required.

C) **SUGGESTIONS DURING CONSULTATION SESSIONS**

D) **PARTICIPANTS**

Sr.#	Name	Mobile No.	Signature
1	M. Jameel	0330-0601796	جمیل احمد
2	Jameel Ahmed	0330-4541680	
3	Dost Ali	0333-8684771	دوست علی
4	Payala	0343-6271576	
5	Mustafa	0336-4735354	
6	M. Gull	03338183477	محمد گل
7	Allah yar	0	
8	Ijaz		اعجاز
9	Fazu	0331-6049877	
10	Ismial	0335-2499777	
11	Meer Raz	03326177318	
12	Wali_Muhamed		ولی محمد

Sr.#	Name	Mobile No.	Signature
13		0331-8[illegible]43	
14	Khalid Ahmad	03366[illegible]4729	Khalid Ahmad.
15	Allah dass	0333586[illegible]000	
16	Allah dad		
17	Husan		Hussain Ahmad.
18	Haqjim Ali		
19	Ali		محمد علی
20	Haqji		
21	Fazal M.		فضل محمد
22	Ali.		علی حسین
23			
24	Laal Baksh	0336-8642942	لال بخش
25	Allah Baksh	0335-7999086	اللہ بخش
26	Muraad Baksh		مراد بخش
27	Mahammade.		
28	Arbi		عربی
29	Ghum Rasool	0336-3687927	غلام رسول
30	Nazoor baksh.		
31	M. Baksh.		محمد بخش
32	Gulam Hussain		غلام حسین

→ M. Baksh _____ محمد بخش

→ Ahmad Deen _____ محمد دین

→ Murreed Hussain _____ Murad Hussain

→ Gheeto _____

→ Kato _____

→ Sakawat Deen _____

→ Mauj Deen _____

→ Imam Baksh _____ امام بخش

→ Shah Baksh _____ شاہ بخش

→ Mauj Deen _____

→ Ghulam Akbar _____ غلام اکبر

PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Saweria Date: 4-4-23 2:44 –

B. Site Location:

Sub-village _____ Village/Town Chak Dilbar.

Union Council _____ Tehsil & District _____

Venue: Saleema house.

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A) POINTS TO BE DISCUSSED

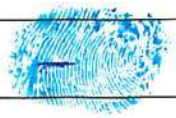
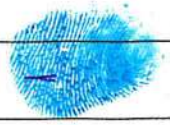
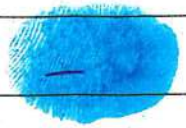
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B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

Drinking water Issues.
Electricity available only at financial Stable Houses.
Use flood water for laundry. and buy drinking from -ojhan.
No Sui gas use woods + animal feeces
No teachers in schools.
Diggi water is bitter in taste undrinkable.
Open dumping.
poor Sewerage System.
→ Should provide ~~healt~~ housing facility for population.

C) **SUGGESTIONS DURING CONSULTATION SESSIONS**

D) **PARTICIPANTS**

Sr.#	Name	Mobile No.	Signature
1	Salima Mai	House wife	
2			
3	Lateefa Mai	〃	
4			
5	Sahib Khatoon	〃	
6			
7	Shahèna Mai		
8		〃	
9			
10	Hasina Mai		
11			
12	Mukhi Mai		

Sr.#	Name	Mobile No.	Signature
13	Nasreen Mai		نسرین مائی
14			
15	Masooma Mai		
16			
17	Zahra		ظاہرہ
18			
19	Begam		بیگم جان
20			
21	Gulzara Mai		گلزارہ
22			
23	Gradan Mai		
24			
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PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT
(PRSWSS)
Public Consultation

A. Name of Facilitator: Sadia Date: 5-4-2023

B. Site Location:

Sub-village Tariqabad. Village/Town _____

Union Council _____ Tehsil & District _____

Venue: Sadia House.

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A) POINTS TO BE DISCUSSED

1. Introduction of the project
2. Description of various components of the project, its activities and impacts
3. Needs, priorities and reactions of the affected people
4. Inquiring existing problems
5. Assessment of pressing needs of people

B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

No hospitals
No washrooms have (1 to 5)
Majority of people have disease regarding kidney.
Women didn't allow to visit Dr before marriage.
Zero Sewerage System.
Still birth cases & Irregular hormones.
No Sui gas.
No Proper School System.
Mal nurishment in children when born.

C) SUGGESTIONS DURING CONSULTATION SESSIONS

D) PARTICIPANTS

Sr.#	Name	Occupation	Signature
1			
2			
3			
4			
5			

Tariqabad.

✱ Women didn't allow to see Dr before marriage even if she die.

They put more age in Nikkah form because child marriage is ban.

adia House.

3:40-4:35

Sadia ✱ 0332-6191572

Sana

Zahida

Humaira

Uzma Bibi

Perveen.

Parveen

Shabana

Nagina

Kalsoom

Zarina

PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Ghulam Qadir Date: 5/04/2023

B. Site Location:

Sub-village Tariqabad Village/Town _____

Union Council _____ Tehsil & District _____

Venue: In front of Ghulam Qadir House.

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A) POINTS TO BE DISCUSSED

1. Introduction of the project
2. Description of various components of the project, its activities and impacts
3. Needs, priorities and reactions of the affected people
4. Inquiring existing problems
5. Assessment of pressing needs of people

B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

Use handpump for water near Saleemabad.
50% → don't have washrooms.
Clean Soakage pits after one year
↳ Self supporting.
affected by 2022 flood.
Majority of population is labour by profession.
No Sewerage System
Open dumping System for Solid Waste Management.

C) **SUGGESTIONS DURING CONSULTATION SESSIONS**

D) **PARTICIPANTS**

Sr.#	Name	Mobile No.	Signature
1	عبدالجلیل	033/6033891	
2	غلام قادر	0333 740 2018	
3	ابراہیم	0334-0743236	
4	امان اللہ	03326191572	
5	سجاد احمد	03356871928	Sajid Ahmed
6	جنید احمد	0375-060508	Junaid Ahmad
7	صفدر احمد	0337-620323	
8	ظفر احمد	0372-179-9076	توقیر احمد
9	عطاء اللہ	0335-6979547	
10	شہباز نواز		شاہ نواز
11	جمیل احمد	0332-6055824	
12	عابد حسین	0336-6407771	عابد حسین

Sr.#	Name	Mobile No.	Signature
13	ساجد حسین		Sajid Hussain
14	شہباز		شہباز
15	رسول حسین	03316033821	رسول حسین
16	صادق نذیر	03336486	صادق نذیر
17	عمران حسین		Imran Hussain
18	محمد ظفر احمد		
19	ظہیر احمد		ظہیر احمد
20	خلیل احمد	0355134422	Khalil Ahmad
21	محمد شفیع		
22	صفدر حسین		
23	دلاور حسین		دلاور حسین
24	اشفاق احمد		اشتیاق احمد
25	اعجاز احمد		اعجاز احمد
26	نادر حسین		
27	اصغر حسین		اصغر حسین
28	محمد اسلم		M. Islam.
29	عمار	03326058506	
30	مختار احمد	0334-3736041	Mukhtar Ahmad.
31			
32			

Annex-VII

Photolog

Public Consultation Photolog	
	
	
Public Consultation at Chak Dilbar	
	









Public Consultation at Dera Dildar













Public Consultation at Kotla Hussan Shah













Public Consultation at Mutafariq Mazari









Public Consultation at Safdar Abad













Public Consultation at Saleemabad









Public Consultation at Tariqabad









Public Consultation at Umer Kot

Gender Consultation Photolog









Gender Consultation at Dera Dildar









Gender Consultation at Kotla Hussan Shah









Gender Consultation at Safdarabad









Gender Consultation at Saleemabad









Gender Consultation at Tariqabad









Gender Consultation at Umer Kot

Departmental Meetings at Rojhan









Meeting at PRMSC Office Rojhan









Meeting with NRSP and Unicef at PRMSC Office









Meeting wth Livestock Department

	
Meeting with Health Department	

Annex- VIII

Sanitation Plan

Sanitation Plan

1. Introduction

This plan outlines the measures that can improve conditions of sanitation at construction sites during construction and operation phase.

2. Purpose of the plan

The plan intends to ensure sanitation including the control of water supplies, excrete and wastewater disposal, refuse disposal, vectors of diseases, housing conditions, food supplies and handling, atmospheric conditions, and the safety of the working environment.

3. Management of Sanitation During Construction Phase:

i) Responsibility:

The Health and safety Inspector designated by construction contractor shall inspect sanitation conditions and ensure safe working environment for workers.

ii) Location of Camp Sites

The construction camps shall be located away from residential community. The accommodation and ancillary facilities for labor shall be constructed and maintained to standards and scales approved by the Resident Engineer.

The camps must be located such that the drainage from and through the camps shall not endanger any domestic or public water supply.

All sites must be managed to avoid ditches/depressions to minimize nuisance due to stagnant water.

iii) Water Supply

An adequate and convenient water supply, approved by the appropriate health authority, must be provided in each camp for drinking, cooking, bathing and laundry purposes.

Potable water supply systems for labor camps occupants shall meet the drinking water quality standards of Pakistan. In addition, the design of water system facilities shall be based on the suppliers Engineer’s estimates of water demands. The drinking water must be monitored regularly for drinking water quality parameters.

At all construction camps and other workplaces, good and sufficient water supply shall be maintained to eliminate chances of waterborne/water-related/water-based diseases to ensure the health and hygiene of the workers.

iv) Toilet Facilities and Hygiene

According to health and safety guidelines OR-OSHA number of toilets required at construction site is as 1 toilet for 20 workers. **Table 1** shows the number of toilets required in accordance with the number of employees at construction site. The total numbers of employees at construction site are estimated to be 110 persons.

Table-1: No. of Toilets Required for Employees at Construction Site:

No. of Employees	No. of Toilets and Urinals by OSHA	Total No. Toilets and Urinals Required at Construction Site
Up to 20	1 toilet	6 toilets
Up to 40 employees	1 urinal	3 urinals

Within the premises of every workplace, toilets and urinals shall be provided in an accessible place. A toilet must be located within 200 feet of the camp. No toilet may be closer than 100 feet to kitchen and sleeping area. These toilets must be distinctly marked by signs printed in native language of the persons occupying the camp, or marked with easily understood pictures or symbols.

Proper facility for hand washing and other cleaning activities to be provided, e.g;

- Providing hand soap and industrial hand cleaner for removing paints and other contaminants;
- Prohibited use of gasoline or solvent for hand washing; and
- Keep the floor of facilities dry to prevent spills and falls.

v) Waste Disposal

The sewage system for the camp must be designed, built and operated in compliance with the relevant legislation so that no health hazard occurs and no pollution to the air, ground or adjacent watercourse takes place.

Garbage bins must be provided in the camps and regularly emptied and garbage disposed of in a hygienic manner. Unless otherwise arranged for by the local sanitary authority, arrangement for disposal of excreta should be done in the already existing sewerage system in the area.

On completion of the works, all such temporary structures shall be cleared away, all rubbish burnt, excreta tank and other disposal pits or trenches filled in and effectively sealed off and the outline site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the engineer.

vi) Maintenance of Sanitary Facility

Proper maintenance of toilets and other sanitary facilities should be assured at construction camp site by the construction contractor. Toilets and other sanitary facilities shall be cleaned at least four times daily and at least twice during working hours and kept in a strict sanitary condition.

All buildings, rooms and equipment and the grounds surrounding them shall be maintained in a clean and operable condition and be protected from rubbish accumulation. All necessary means shall be employed to eliminate and control any infestations of insects and rodents within all parts of any labor camp.

vii) Site Clearance:

The construction contractor shall assure the clearance of construction machinery, vehicle and other equipment used during the construction period after the completion of the project.

viii) Storm Water/Sewage Clearance:

One of the main issue that may arise during construction and operational phase is the clogging of drainage/sewer pipelines as a result of construction material, oil spillage from vehicles, throwing of solid waste by the road users due to lack of bins into the nearby drainage/sewer pipes, etc. the blockage of these drainage pipes will cause over flow of water on road, which will have negative impacts on the road in form of deterioration of road surface as well as standing water acts as a source of water-through disease in the area.

Responsible Authorities:

In case of storm water drains/sewer pipes clogging the concerned department is responsible for un-clogging of these sewer and drainage pipelines.

ix) Awareness and Training:

A training and awareness sessions shall be conducted by the construction contractor for workers before commencement of the project. The implementation of sanitation plan would be more effective if the importance of hygiene; sanitation and safety are known to the workers.

Annex-IX

Chance Finds Procedure

CHANCE FIND PROCEDURES

Project may involve deep excavation. Therefore, the possibility of chance find is not ignorable. In case of any chance find, the contractor will immediately report through Supervision Consultant to Directorate General (DG) of Antiquities & Archaeology, Government of Punjab to take further suitable action to preserve those antique or sensitive remains. Representative of the “Director Archaeology and Museum (DAM)” will visit the site and observed the significance of the antique, artifact and Cultural (religious) properties and significance of the project. The documentation will be completed and if required suitable action will be taken to preserve those antiques and sensitive remains.

In case any artifact, antiques and sensitive remains are discovered, chance find procedures should be adopted by contractor workers as follows:

- Stop the construction activities in the areas of chance find;
- Delineate the discovered site or area;
- Consult with the local community and provincial Archeological Department
- The suggestion of the local communities and the concerned authorities will be suitably incorporated during taking the preventive measures to conserve the antique, artifact and cultural (religious) properties
- Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remain, a night guard shall be arranged until the responsible local authorities take over;
- After stopping work, the contractor must immediately report the discovery to the Supervision Engineer.

The contact Address of Directorate General of Antiquities & Archaeology is given below:

1st Floor Aiwan-e-Auqaf Building Near
Lahore High Court, Lahore, Pakistan

Tel: 042-99210870

Annex-X

Resource Conservation Plan

Resource Conservation Plan

1. Introduction:

The resources in this world are not infinite. We are completely dependent on the resources of the earth to fulfill all our day-to-day requirements. Sustainable development calls for the need to conserve resources, especially the non-renewable resources.

2. Objective of the plan:

The Resource Conservation Plan is intended to make an effort towards achieving sustainable development. The objective of the resource conservation plan is to:

- Minimize the use of natural resources; and
- Mitigate/ prevent pollution contaminating the natural resources.

3. Planning:

Careful estimations of quantities of material, fuel, water and energy required directly or indirectly shall be done to avoid excessive or unnecessary wastage of these materials. In addition to this, pollution prevention strategies shall also be devised to prevent contamination of resources.

The estimations include the following:

1. Estimation of construction material required for the project
2. Estimation of fuel consumption for construction machinery, construction vehicles and generators etc.
3. Estimations of the energy requirements during all the stages of the project
4. Estimations of water consumption for construction activities and construction camp sites.

The pollution prevention strategies include the following

1. Strategies shall be planned to reduce loads on the identified resources to be consumed;
2. Best management practices shall be devised to control or reduce pollution resulting from the activities during different stages of the project; and
3. An inspector shall be assigned responsibility to oversee the ongoing activities to check the compliance of the planned strategies.

4. Execution of the plan:

The planned strategies shall be implemented to conserve the natural resources including but not limited to the following:

Material

- Material supplied shall be in conformance with the estimated quantities and excess material shall be returned to the supplier;
- Material wastage shall be avoided by using best management practices;
- Waste produced during the project execution shall be disposed of safely to the designated disposal sites through approved contractors; and
- Reuse of the materials shall be appreciated.

Fuel/Energy

- Reduce trips and optimize routes to and from the construction site for all kinds of activities;
- Regular maintenance of equipment and vehicles to avoid leaks and sustain efficient fuel consumption;
- Switch off/plug off idle equipment and vehicles to avoid wastage of fuel;
- Minimize warm up time, unnecessary acceleration and deceleration of the construction equipment and vehicles;
- Avoid unnecessary burning of fuel for cooking in construction camps;
- Avoid unnecessary heating/cooling systems during extreme weathers;
- Construction shall start in early hours of the day to avoid heat in summers and utilization of day light; and
- Alternate energy sources shall be considered for electricity generations during construction to conserve fossil fuel as it is nonrenewable resource.

Water

- Avoid using potable water for sprinkling, curing and washing of equipment/ vehicles. Surface water or treated effluent can be used instead;
- Wastage of water should be controlled through providing proper valves and through controlling pressure of the water;
- Unnecessary equipment washings should be avoided;
- Awareness amongst workers shall be raised to conserve water and immediately report for any leaks detected; and

Pollution:

- Emissions shall be reduced/controlled as far as possible and direct discharges to air shall be avoided by strictly adhering to the mitigation measures outlined in ESMP report;
- Waste water shall not be discharged directly into the water body and must be managed as per the recommendations presented in ESMP; and

- Construction & demolition waste and municipal solid waste shall not be dumped/ burnt openly and shall be handled according to the preventative measure given in ESMP study.

5. Checking and Corrective Actions

The proponent shall bind the construction contractor through contract agreement to comply the strategies outlined in Resources Conservation Plan. The proponent shall also appoint an Inspector who shall monitor the daily onsite activities and shall report any issues/ concerns raised in relation to Resource Conservation Plan. The inspector shall recommend adequate corrective actions to mitigate the issues raised.

Annex-XI

Health & Safety plan

Health & Safety Management Plan (HSMP)

1.0 Introduction

This health and safety management plan has been prepared to identify and outline the manner in which construction site health and safety aspects will be managed to ensure the safe and efficient performance of the construction phase activities and to minimize adverse effects on the existing community and workers arising from construction activities. HSMP plan is prepared under the guidelines given in Health and Safety Framework for South Asia Region by the World Bank.

This plan is designed to identify, evaluate, and control health and safety hazards for the purpose of protecting employees. The plan provides for emergency response activities at the job site as well as covering site hazard analysis, training requirements, engineering controls, materials handling, and safe construction operations. This plan is intended to provide guidance and information in dealing with the hazards that may be faced on the construction site by the contractor and its workers.

The consultant as a third-party validator will monitor the compliance of the plan by the contractor and its workers on each construction site.

The purpose of this plan is to illustrate safety issues specific to the PRMSC. This plan is intended to maintain a safe work environment and effectively reduce the number of accidents resulting in personal injury, property damage, and damage to construction equipment.

2.0 Scope of Project

2.1 Scope of Work

Punjab is the most populous province of Pakistan with 110 million inhabitants out of which 70 million population resides in rural areas. Despite being the largest province with reference to population, the people living in rural areas of Punjab have been deprived of improved water and sanitation facilities. Reports show that 3 in 5 households in Punjab use E-Coli contaminated water and every 25th household in Punjab lacks access to improved sources of drinking water[1]. Access to improved sanitation is also quite low across rural Punjab

The Government of Punjab has launched a project for service improvement in rural areas of Punjab namely Punjab Rural Sustainable Water Supply and Sanitation Project (PRSWSSP). To implement this project Punjab Rural Municipal Services Company (PRMSC) has been established under Section 42 of Companies Act 2017. PRMSC has hired the services of National Engineering Services Pakistan (Pvt.) Ltd. (NESPAK) for the subproject titled “Consultancy Services for Engineering Design and Construction Supervision of Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS) Cluster: South – III”.

[1] https://pwd.punjab.gov.pk/population_profile

The goal of PRSWSSP is to improve sanitation conditions, provide clean drinking water, improve living conditions through solid waste management, behavior change and capacity building for the sustainability of the project in rural settlements of Punjab.

2.2 Site Location

The proposed project sites are located in Tehsil Rojhan, District Rajanpur.

3.0 Health and Safety Responsibilities

The effectiveness and success of the safety plan implementation depend upon the active participation and cooperation of all employees. The duties and responsibilities of all employees under this policy are the following:

3.1 Project Engineer

- Prepare the Site-Specific Safety Plan.
- Direct and coordinate health and safety regulations related to the construction site.
- Participate in post-accident investigations.
- Assist in formulating policy matters.
- Implement contractor Safety Program and Policy

3.2 Foremen/Supervisors

- Be familiar with, explain, and enforce health and safety plan under his jurisdiction.
- Direct and coordinate health and safety activities within the area or responsibility
- Ensure safety devices and proper PPE are used by employees under supervision.
- Instruct and train all employees within the area of responsibility in job health and safety requirements, including (but, not limited to) hazard recognition and avoidance. Also, foreman/front-line supervisors must require compliance by employees with the established safety rules.
- Direct the correction of unsafe conditions.
- Ensure safety equipment is available, maintained, used, and stored correctly.
- Ensure injuries are treated promptly and reported properly.
- Participate in post-accident investigations.
- Coordinate daily job site inspection.
- Implement health and safety plan at each site as per required.

3.3 Construction Workers

The main responsibility of every worker at the construction site will be to follow the health and safety instructions and procedures.

- Be familiar with and comply with proper health and safety practices.
- Use the required safety devices and proper PPE.
- Notify the supervisor immediately of unsafe conditions/- acts, accidents, and injuries.

- Implement the health and safety plan

3.4 Subcontractors

By the contract, the subcontractors will have to comply with and ensure the compliance of their employees with the provisions of health and safety policy as well as their own safety program. Failure to fulfill this requirement is a failure to meet the conditions of the subcontract.

3.5 Supervision Consultant (SC)

SC will validate the effective implementation of the health and safety plan at the site. PRMSC will be overall responsible for the safe construction work at each site.

4.0 General Health and Safety Procedures

4.1 Personal Protective Equipment (PPE)

The contractor provides Personal Protective Equipment (PPE) to all employees. Hard hats, safety glasses, and safety work boots are required to be worn at all times when on the job site. Reflective vests are required when working outside around equipment or traffic. Exceptions may be made to this PPE requirement only under an approved contractor work plan. Employees learn where to get PPE during their new-hire orientation and are responsible for wearing and maintaining the required PPE. Additional PPE may be required depending on the task and if there is a potential for exposure to hazardous conditions. PPE requirements are reviewed by the foreman. Employees are expected to use reasonable judgment regarding whether additional PPE (beyond the required) is necessary for certain tasks. If employees are unsure of the type of PPE required for a specific task or job, they should ask the supervisor.

4.2 Equipment Use and Operation

Equipment is used only for its intended use and as recommended by the manufacturer. Using equipment for purposes other than what it is designed for is prohibited. Employees are prohibited from operating a vehicle in a reckless manner or at a speed greater than is reasonable and proper, with due regard for weather, traffic, the character of roadway, load, type of vehicle, and any other conditions which may affect the safe operation of the vehicle. The vehicle must be kept under control at all times and special care is exercised when transporting personnel.

Employees may only ride equipment if there are seats or equal protection available for each person. Seatbelts are worn at all times while operating equipment with seats. No cell phone or earbud is used while operating equipment.

4.3 Repair

Employees are prohibited from making repairs, alterations, or attachments to equipment in the field except with the permission of the superintendent, foreman, or equipment mechanic. Only qualified personnel will perform repairs on equipment. Such repairs, alterations, or attachments are documented on the appropriate shop forms.

Employees are prohibited from removing a guard, safety device, or appliance from equipment or machinery except to make repairs. While making repairs, employees use appropriate lockout/tag-out procedures. When repairs are complete, the guard, safety device, or appliance is replaced immediately.

4.4 Conduct

The following conduct is prohibited and may result in discipline up to and including termination:

- Horseplay and scuffling on the job.
- Making a false report or misrepresentation.
- Fighting.
- Use of alcohol or any other drugs
- Dishonesty and theft of the property.
- Deliberate misuse of the equipment.
- Unnecessary risk-taking.
- Violating or disobeying any instruction given by a supervisor

5.0 General Jobsite Procedures

5.1 New Hire Orientation

New-hire orientation may consist of, but is not limited to, the following:

- Have the employee read the health and safety plan and other safety requirements, guidelines etc. Answer any questions the new hire may have about these policies and request a signature on the Statement of Understanding.
- Orient the employee to the job site indicating the location of the emergency facilities, portable fire extinguishers, first-aid station, emergency phone numbers, public notices, and any job site-specific information.
- Explain the injury and accident policy.
- Review the written hazard communication program. Discuss hazards, container labeling, and the use of protective equipment.
- Explain the emergency response plan for catastrophic events such as fire, explosion, etc.
- Issue PPE as required for the job

5.2 Training

Training and education are necessary for the success of this policy. Employees are trained to recognize job site hazards and the procedures to follow to minimize these hazards. Training may consist of (but is not limited to) the following:

- Weekly job site safety meetings.
- Orientation training for new hires.
- Individual job/task training, including the applicable regulations/standards for the specific job/task.

Supervisors and management receive ongoing safety training throughout the year.

5.3 Safety Meetings

Weekly safety meetings are held on the job site. All employees and subcontractors are required to attend. The meetings may cover a range of safety-related topics. The format and content of the meetings are up to the discretion of the superintendent. Monthly safety meetings are held for all foremen, superintendents, project managers, project engineers, contractors, and other management personnel. These meetings are for the purpose of discussing companywide safety issues and providing continued safety training and education.

5.4 Safety Inspections

The superintendent and foreman conduct an initial safety inspection at the beginning of each project. In addition, a daily safety inspection of the job site is conducted by the contractor employees, employees of a subcontractor, or some combination thereof. The inspection is rotated between all workers on the job site. Any safety concern found during the inspection is reported. If a worker is unclear about any safety aspect, the foreman or project Engineer helps. If the area being inspected requires a *competent person*, the employee conducts the inspection with the competent person. Also, if time allows, the foreman for the worker conducting the inspection is encouraged to walk through it with them.

5.5 Hazard Communication

The contractor needs to develop a written hazard communication plan. It will be explained to each employee during the new-hire orientation. The purpose of the hazard communication plan is to provide employees with information on the chemical and physical hazards that may be present at the job site. Safety Data Sheets for all chemicals will be kept on site.

5.6 Job Hazard Analysis

A job hazard analysis may be developed covering the major activities of construction, the hazards associated with these activities, and ways to mitigate these hazards.

5.7 Housekeeping

Housekeeping is one of the most important factors for a safe job site. Form material should be scraped and all protruding nails pounded down. All other debris is cleared from work areas, passageways, and stairs. Excess materials are stacked neatly out of the way. Tools should be stored in the toolbox so these are available for all employees to use.

Combustible scrap and debris are removed at regular intervals during the course of construction. Containers with covers are provided for the collection and separation of waste, trash, oily and used rags, and other such refuse, which is removed safely and on a regular basis.

Foreign object and debris (FOD) is a significant concern in nearby occupied spaces and construction areas. It is extremely important to keep all trash and debris contained at this site. Housekeeping will be strictly enforced

5.8 Fall Protection

The contractor provides fall protection when employees are exposed to fall hazards.

Fall protection may consist of, but is not limited to, the following:

- A stairway or ladder is provided at any point of access where there is a break in elevation of 19 inches or more.
- Guardrails are installed for all leading-edge work. For loading bay locations fall-arrest systems or fall-restraint systems are used.
- Safety harnesses with approved lanyards and tie-off points are used for all other fall protection unless an appropriate procedure or device was approved in advance by a competent person.
- Stilts may be used on job sites but work area floors must be clean/clear of all debris, materials, and equipment.

5.9 Electrical Safety

Electrical safety may consist of, but is not limited to, the following:

- Live electrical parts are guarded against accidental contact by cabinets, enclosure, location, or guarding.
- Extension cords are kept in safe, working condition.
- All lamps for general illumination have the bulbs protected against breakage. All light sockets are filled with a working bulb.
- Employees will not work in such close (able to contact) proximity to any part of an electric power circuit unless the circuit is de-energized, grounded, or guarded by insulation.

- De-energized equipment or circuits are locked out and tagged out. The tags identify the equipment or circuits being worked on.
- All generators used for temporary power shall be grounded according to manufacturers' specifications.
- Equipment shall not be operated closer than 10 feet from power lines less than 50kV. Safe distance will increase near higher voltage power lines, (over 50kV)

5.10 Tools

The contractor provides tools for employees to use. Only trained employees are allowed to use such tools. The safe use of tools may consist of, but is not limited to the following:

- Unsafe or defective tools are removed from service and tagged out.
- Power tools are turned off and motion stopped before setting down.
- Tools are disconnected from the power source before changing drills, blades, or bits and before any repair or adjustment is made. Running tools are not left unattended.
- Portable abrasive grinders have guards installed covering the upper and back portions of the abrasive wheel.

5.11 Scaffolds

Scaffolds are erected, moved, dismantled, or altered under the supervision of a competent person for scaffolding. Scaffold use consists of, but is not limited to, the following procedures:

- Standard guardrails are installed on all open sides and ends of scaffold platforms and/or work levels more than ten feet below the ground.
- Scaffolds four to ten feet in height with a minimum horizontal dimension in any direction less than 45 inches have standard railings installed on all open sides/ends.
- Platforms at all working levels are fully planked. Planking is laid tight with no more than one inch space between them, overlap at least 12 inches, and extends over end supports 6-12 inches unless cleats are used.
- The front edge of all platforms is no more than 14 inches from the face of the work, except plastering/lathing may be 18 inches.
- Mobile scaffolds are erected no more than a maximum height of four times their minimum base dimension.
- Scaffold casters/wheels are locked whenever the platform is occupied.
- Scaffolds are not overloaded beyond their design loadings.
- Scaffold components are not used as tie-off/anchor points for fall-protection devices.
- Portable ladders, hook-on ladders, attachable ladders, integral prefabricated scaffold frames, walkways, or direct access from another scaffold or structure are used for access when platforms are more than two feet above or below a point of access.
- Cross braces are not used as a means of access to scaffolds.

- Scaffolds are not erected, used, dismantled, altered, or moved such that they or any conductive material handled on them might come close to exposed and energized power lines than the following:
    - Three feet from insulated lines of less than 300 volts;
    - Ten feet plus for any other insulated or uninsulated Lines

5.12 Excavation and Trenches

Excavation and trenching are done in the presence of a competent person and in compliance with, but not limited to, the following procedures:

- Any excavation or trench five feet or more in-depth is provided cave-in protection through shoring, sloping, benching, or the use of hydraulic shoring, trench shields, or trench boxes. Trenches less than five feet in depth and showing potential of cave-in are also provided cave-in protection. Specific requirements of each system are dependent upon the soil classification as determined by a competent person.
- A competent person inspects each excavation/trench daily prior to the start of work, after every rainstorm or other hazard-increasing occurrence, and as needed throughout the shift.
- Any material and equipment are kept at least two feet from the edge of the trench or excavation.

5.13 Ladders

Ladders are inspected during the weekly inspections to identify any unsafe conditions. Any ladders found to be unsafe are taken out of service. Extension ladders extend three feet above the work surface and are 100 percent tied off. Step ladders are only used in the open position. Ladders are stored lying down. No standing on the top step or first rung below the top of a step ladder.

5.14 Illumination

Construction areas and storage areas where work is in progress are lighted with either natural or artificial illumination.

5.15 Motor Vehicles and Mechanized Equipment

Vehicles and equipment are only operated by qualified persons (training or experience). All equipment operators are responsible for checking, on a daily basis, all fluid levels, drive components, and hydraulics. In addition, operators visually inspect the engine and look for structural breaks and cracks on the machine. Any and all deficiencies must be reported to a supervisor immediately.

When equipment is stopped or parked, parking brakes are set and other safety precautions are taken as required for the type of equipment such as placing the forks flat on the ground. Keys shall be removed from equipment at the end of each shift.

5.16 Severe Weather

Outside construction operations including, but not limited to site work, and concrete work are suspended if severe wind or rain conditions present safety hazards at the worksite. Rain and wind storm hazards are evaluated and appropriate measures are taken to abate potential hazards.

5.17 Accident

All accidents and near misses must be reported immediately to the foreman or superintendent. An accident report is then filled out by the employee and the supervisor. Filling out an accident report does not require the delay of medical attention. Any injury is treated first. Employees file such reports without fear of reprisal by management. The accident or incident may be discussed at weekly safety meetings to avoid that sort of accident in the future.

5.18 First Aid

First-aid kits are available in the project office, at the appropriate and accessible locations as indicated during orientation. In addition, foremen and superintendents maintain current first aid boxes at the site.

5.19 Fire Protection

The contractor maintains appropriate fire extinguishers at the fire-prone areas of the construction site. All equipment is fitted with portable fire extinguishers. Employees are instructed on the location and usage of these fire extinguishers. Emergency telephone numbers for fire protection and emergency medical services are posted on the field office bulletin board.

5.20 Emergency Action Plan

Each job site develops an emergency action plan that is reviewed with each employee during orientation. The emergency action plan covers emergency escape procedures, procedures followed by employees remaining to operate critical operations before they evacuate, procedures to account for all employees, rescue and medical duties, and how to report emergencies.

5.21 Environmental Protection Plan

This health and safety plan also contains an Environmental Protection Plan for the control, prevention, management, containment, cleanup, and disposal of petroleum products or other

hazardous substances which may be generated on each project site. The Project Engineer directs measures to control and prevent accidental discharge of petroleum products or other hazardous substances during storage and transfer on all job sites. Any onsite storage is in approved containers. Absorbent pads and other recovery equipment shall available to contain and recover any fuel accidentally spilled. Any spills and contaminated soils are cleaned and disposed of in accordance with applicable requirements.

5.22 Traffic and Pedestrian Control

A traffic control plan will be developed and put in place prior to beginning work on the project for the protection of workers and the general public. Barricades and signage must place around job site areas to reroute vehicle traffic and keep pedestrians out of the job site.

Project Engineers and Superintendents will evaluate the site before work starts to plan site control. Fencing, signage, and barricades shall be erected and secured as to keep pedestrians out.

Any time while performing work near or on a roadway and a worker has a sense of traffic patterns not being controlled properly or speeds too extreme for conditions, the worker should remove himself from the area and notify Supervisor. The Project Engineer shall stress and discuss, at weekly meetings, for all workers to be aware of traffic hazards and pedestrians.

5.24 Concrete Work

The project involves concrete work. There are many hazards associated with this work including but not limited to; Slips Trips, Falls, Strains and Sprains, Eye Injuries, Chemical Burns, and Silica Exposure. The risk assessment shall be performed for all concrete work to minimize the associated hazards

6.0 Monitoring and Reporting

Monitoring the implementation of the health and safety plan and progress reporting will be very important for the effective enforcement of the plan. PRMSC project team along with the supervision consultant will validate effective reinforcement of HSMP. The supervision consultant will frequently visit the construction sites and monitor the effectiveness of the plan implementation. The status of implementation will be reported to the PRMSC fortnightly.

Annex-XII

Emergency Response Plan

Emergency Response Plan

1. Introduction

Emergency management can be defined as the organization, coordination and implementation of a range of measures to prevent, mitigate, respond to, overcome and recover from the consequences of emergency events affecting the community, its assets and the environment.

2. Purpose of Plan

This plan intends to provide a framework for safety and security to infrastructure, people and vehicles. It assigns responsibility to organizations and individuals for carrying out specific actions at projected times and places in an emergency situation that exceeds the capability or routine responsibility of any one agency.

The emergency response plan provides guidance to;

- Prevent any potential sources causing hazard to the resources during all stages of the project;
- Coordinate between various organizations to take actions in case of emergencies;
- Protect people and property in emergencies and disasters;
- Develop procedures to respond to the emergencies efficiently;
- Identify and ensure availability of personnel, equipment, facilities, supplies, and other resources for use in order to provide timely and efficient response and recovery operations; and
- Confirm that measures taken in an incident are adequate to recover the affected resources or further improvements are needed.

3. Planning

i. Emergency Response Team

A group/ team shall be dedicated to identify and control potential emergencies during the construction and operation of the project. The roles and responsibilities of the group members shall be clearly defined.

The primary responsibilities of the group are described below:

- Identify the potential hazard or risk sources that can lead to emergency situations; Ensure availability of adequate resources, procedures and communication system to deal with the identified emergency situations;
- Ensure awareness and training of the staff to facilitate implementation of the emergency response plan;
- Maintaining the records of any previous incidents; and
- Post-event analysis to bridge the gaps of the existing risk prevention procedures.

The emergency response team shall include but not limited to the following;



A. Site Incharge

- Approve/ modify devised measures to prevent or mitigate the risks associated with the identified risk sources;
- Arrange resources for dealing with potential emergencies including, financial, equipment and personnel required to deal with emergencies;
- Assure that the Emergency Response Plan is adequate, effective and implementable.

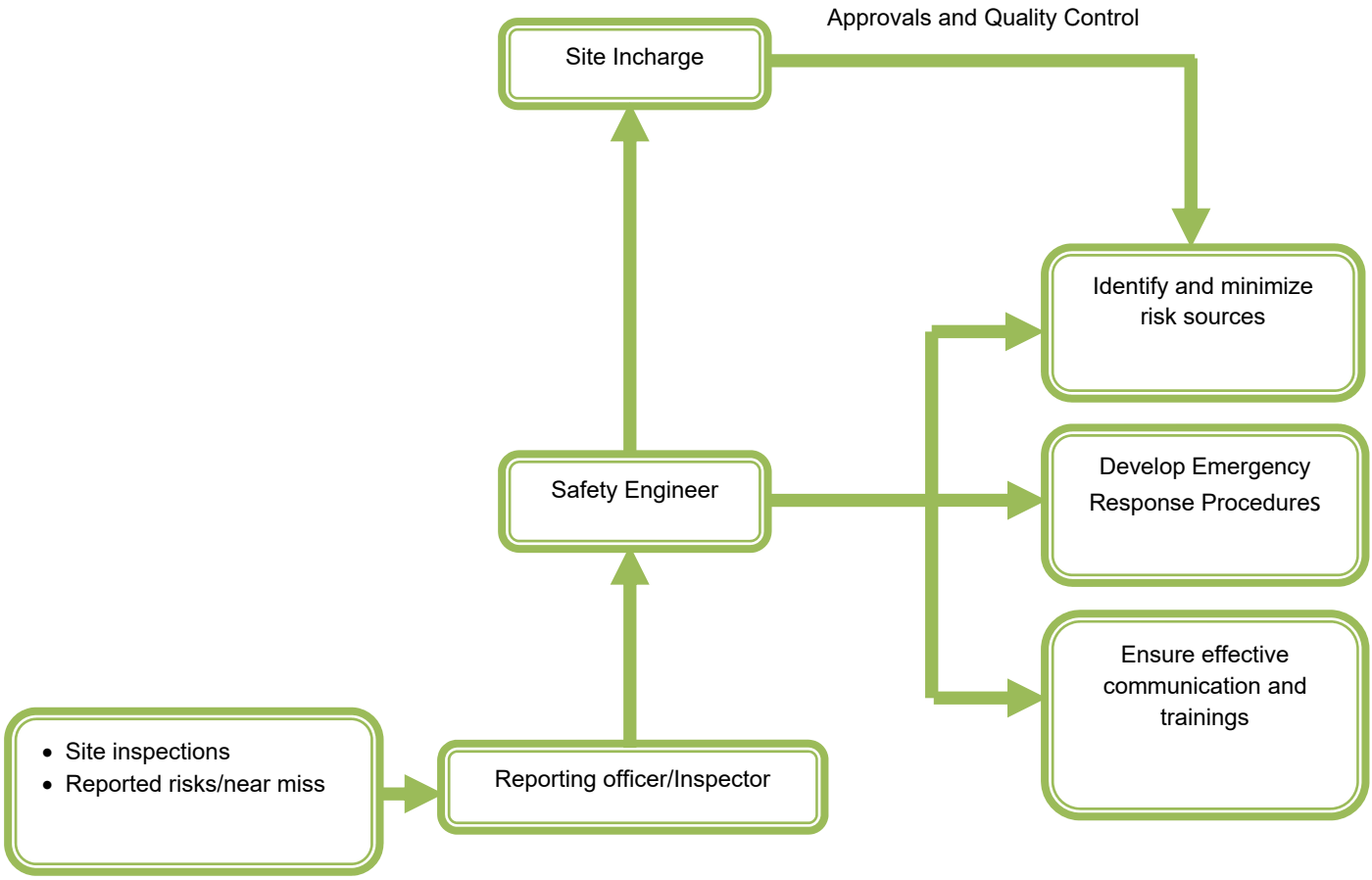
B. Safety Engineer

- Analyze the Identified risk sources and devise measures to prevent or mitigate the risks in close consultation with the Team Leader;
- Develop and implement the Emergency Response Procedures, in case of the possible emergencies arise;
- Ensure effective internal and external communication; and
- Provide regular trainings and arrange drills to make people aware of dealing with emergencies.

C. Reporting officer/Inspector

- Regular inspections of the site, to identify potential risks associated with equipment, materials and work practices;
- Anybody from the site can notify the reporting officer about potential risk and/ or near-misses on the site;
- Record any identified risks and mitigation measures to control the identified risk; and
- Notify the issue and control measures taken thereby to the safety engineer.

The designation, roles and responsibilities of each member shall be clearly defined and communicated to the employees. An outline of the framework of responsibilities is presented in the following organizational chart:



ii. Hazard Identification

A comprehensive identification and evaluation of the hazards/ risks likely to cause an emergency shall be done by Emergency Response Team (ERT). Major potential emergencies identified in projects are as follows:

- Fire
- Earthquake
- Terrorism (including bombing)
- Disease Outbreak
- Structural failure
- Disruption of Utilities (Power, Water, Telecommunications, Gas, etc.)
- Accidents (falls, slips, electric shocks etc.)
- Vehicular accident
- Failure of trenches
- Power/ equipment failure
- Vandalism

iii. Prevention and Mitigation

The ERT shall work to eliminate or reduce the impact of identified emergencies and increasing the resilience of an affected community to recover from the consequences of such events. These activities include:

- Design considerations to control flooding, earthquakes and adequate lightening for fog etc.;
- Regular inspection and maintenance of construction machinery and the structural integrity;
- Review of work schedules based on weather updates; and
- Security controls based on political situations.

4. Emergency Preparedness

The ERT shall be prepared with all necessary resources and the personnel shall be trained regularly.

i. Resources

Finance and administration

The financial resources shall be reserved for dealing with any emergencies arising on site during construction. Responsibilities of the person managing the resources in case of emergencies shall be clearly defined and the required resources shall be adequate and updated regularly.

Equipment

All the necessary equipment needed in an event of emergencies shall be made available, as a minimum, the equipment needed include;

- Personal Protective Equipment
- Alarms/ Warnings
- Fire extinguishers
- Crowd control, flashlights, signs, barricades
- First Aid Facility
- Detection instruments, e.g., personal alarm kits; smoke detection instruments
- Tools to fix minor vandalism

Communication

All external and internal communication systems shall be made available. Local emergency numbers shall be clearly posted and communicated to the personnel involved in construction.

The local emergency numbers are given below, which shall be regularly updated.

Emergency Numbers

	Service	Rojhan (0604)
1	Edhi Ambulance	115
2	Emergency Police	15
3	Rojhan Police Station	0604-610181
4	Rescue Service	1122
5	Rescue Fire Brigade Station	0604-690190
6	THQ Hospital Rojhan	0604-610152 0321-7388883

Trainings

Personnel shall be made aware of the importance of safety, potential emergencies and how to respond in case of emergencies. One day training and mock exercise shall be done to prepare, the personnel to deal with emergencies.

5. Emergency Response

Response includes actions taken to reduce the impacts of an emergency event, and to limit the threat to life, property and the environment.

The emergencies can be dealt with:

- On-site Management of the situation
- Off-site coordination to arrange necessary resources to support the on-site management
- Providing advice and reports of the situation to stakeholders

i. Emergency Response Procedure:

Any person can report about an emergency, an on-site worker, an outside agency, or the public. Circumstances change during the course of an emergency in different events; thus, the procedure will vary as per the specific situation on ground. However, a basic action plan to be followed in an emergency is discussed below. This order of response is applicable to almost any emergency and should be followed in sequence.

Assess the situation:

The most important thing to do in case of emergency is to stay calm and avoid panic. Assess the situation, the cause and most immediate requirement to control, limit and/ or manage the immediate, ongoing, or further damage.

Immediate control:

The most senior person on the scene should take control and contact, or delegate someone to contact emergency services as posted and communicated by ERT and inform the reporting officer of ERT and explain the situation. The area of emergency shall be restricted by barricades, tapes and adequate signage, if and as required.

Protection from further losses:

- Once the site is restricted, to provide protection and reduce further losses, the source causing the emergency shall be controlled including equipment, materials, environment and accident scene from continuing damage or further hazards to the area and people. e.g.: suppress fire, prevent objects from falling, shut down equipment or utilities, and take other necessary measures as required depending upon the type of emergency
- Provide first aid if required or in doing so.
- Designate people to emergency duties. e.g.: assign personnel to guide emergency services on arrival.
- Headcount People/ personnel to identify any missing persons.
- People/ personnel shall be directed to safe location.
- Arrange diversions for the traffic to reduce disturbance to the flow of traffic, if and as far as possible.
- Preserve the accident scene until experts mark it safe; only disturb what is essential to maintain life or relieve human suffering and prevent immediate or further losses.

ii. Communication:

Emergency service providers:

The emergency service providers' needs to be kept informed of the situation. On site, personnel from the emergency services shall be guided towards the emergency scene, brief about the event, ongoing and potential hazards and cause(s), if known.

Emergency Response Team and Management:

Members of ERT shall be immediately informed and the management shall also be kept informed.

Public:

Timely notifications to public shall be disseminated through electronic and print media depending upon the requirement and urgency of the emergency so that they can adopt alternate routes and avoid the hazards associated with the emergency encountered.

Utilities:

In case of disruption of utilities, the utility control authorities shall be immediately contacted to control the situation.

6. Recovery:

Emergency affected individuals, communities and infrastructure shall be restored in terms of emotional, economic, and physical wellbeing including the following as a minimum:

- A detailed analysis and assessment of causes of emergency, extent of damage and gaps if any, in managing the emergency;
- Recovery/ replacement of the assets and infrastructure;
- Reinstatement of disrupted services;
- Updating of safety arrangements and Emergency response procedures to ensure better safety and security in any other arising emergencies.

Annex- XIII

Site Rehabilitate Plan

SITE REHABILITATION PLAN

The project site should be rehabilitated after the completion of construction work. The rehabilitation will include following:

- Rehabilitation of construction camp site
- Removal of construction waste and debris
- Rehabilitation of road after laying of water/ sewer pipes

1. Rehabilitation of construction camp site

The construction camps will damage the camp site/area by following:

- Generation of solid waste;
- Generation of wastewater;
- Damage to soil due to compaction by the camps/containers;
- Damage to air quality by the operation of generators or burning of fuels;
- Hunting and poaching of animals; and
- Damage to resources.

Following measures should be adopted to rehabilitate the campsite:

- The removed/damaged flora should be replanted;
- The solid waste should be removed from the site and disposed of to the dumping area;
- Wastewater generated from the site should be either directed to the sewerage system or removed through the suction trucks;
- Soil should be reclaimed and rehabilitated; and
- Buildings may be used for any other purpose

2. Removal of construction waste and debris from site

The construction waste and debris generated at the site should be segregated and removed from the site by a licensed contractor.

Annex-XIV

Environmental Code of Practice (ECOPs)

Environmental Codes of Practice

1. Rationale of this ECOPs

This Environmental Codes of Practice (ECOPs) sets out standards and procedures for managing the potential environmental impacts associating with the minor construction activities for watersupply and sewerage network for PRMSC. The environmental impacts associated with this small civil work are considered to be minor, temporary and reversible, and readily managed with good practices during implementation. The ECOPs lay out outline simple rules and procedures regarding identification, monitoring and mitigation of those environmental impacts. The ECOPs shall be included in all relevant contracts.

2. Environmental Screening and Assessment

During construction, the potential impacts include dust and solid waste generation associated with minor civil work activities. These impacts are small, localized and can be mitigated by incorporating good civil work practices, including proper housekeeping measures, proper material storage and disposal of solid waste and pollution control.

In addition, to ensure the environmental sanitation and safety during operation, it is requested that design for chlorination stations shall be in line with the quality standards including appropriate ventilation, trash bin, lighting, fire extinguisher, eye-wash facilities and toilet facilities etc.

3. Project ECOP Implementation Arrangements

a. PRMSC

The PRMSC will be responsible for over-sighting the implementation of project. During implementation, the PRMSC is responsible for ensuring that the ECOPs will be incorporated in the bidding document and complied by contractors. The PRMSC has ultimate responsibility in the event of non-compliance with the ECOP during construction.

b. The Contractor

The Contractor, has the responsibility of establishing and maintaining contact with the PRMSC or delegated agencies and local residents and keeping them informed of construction matters likely to affect them. The Contractor and any agents or Sub-Contractors will be contractually required to comply with the requirements as specified in the ECOPs. The Contractor will responsible for implementation of the ECOPs, including workplace safety, and will ensure adequate resources are available for the implementation of the ECOPs throughout the construction period.
The Contractor has a duty to inform local residents likely to be affected by such activities at least 14 days prior to undertaking the works, as well as applying for the appropriate permits and licenses.

4. Construction Activities and Environmental Rules for Contractors

a. Management of Construction Site

This part describes basic requirements for all Contractors carrying out minor construction activities. It will be included in all construction contracts of the civil works. The Contractor is required to minimize, as far as reasonably practicable, any adverse environmental impact of their construction activities.

Prohibitions

The following activities are prohibited on or near the project site:

(a) Cutting of trees for any reason outside the approved construction area;
(b) Illegal dumping of demolition material and debris.
(c) Use of unapproved toxic materials, including lead-based paints, asbestos, etc.;
(d) Disturbance to anything with architectural or historical value;
(e) No burning of waste
(f) Use of alcohol by workers.

Working hours: Core working hours will be from 0800 to 1800 on weekdays and 0800 to 1300 on weekend. Individual site requirements which differ from the above will be considered on a site-by-site basis. Noisy operations shall not take place outside these hours without prior approval from the PRMSC and/or delegated agencies and local authorities.

Good housekeeping: The Contractor will follow a 'good housekeeping' policy at all times. This will include, but not necessarily be limited to the following: Ensure considerate site behavior of the Contractor's staff; Prohibit open fires; Ensure that appropriate provisions for dust control and road cleanliness are implemented; Remove rubbish at frequent intervals, leaving the site clean and tidy; Remove food waste; Frequently inspect, repair and re-paint as necessary all site hoardings to comply with the local conditions and local regulations, all flying post/ board is to be removed as soon as reasonably practicable and within 24 hours of notice**;** Maintain toilet facilities and other welfare facilities for its staff;

Public information and site access: As a minimum, the Contractor will provide public information on the site program (start and finish dates), plus the telephone for public contacts and/or requests especially during the school year. Any un-authorized entry to or exit from the sites should be control as much as possible.

Site layout and facilities: Location of site huts, office accommodation, toilets and welfare facilities should be accommodated within the boundaries of the site.

Emergency Procedures: The Contractor will ensure that emergency procedures are developed to facilitate effective actions in case of medical/fire emergency as well as environmental pollution (major spillage of gasoline, used oil, and/or toxic chemicals, etc.). The emergency procedure will contain emergency phone numbers and the method of notifying the statutory authorities. Contact numbers for the key staff of the contractor will also be included.

Fire prevention and control: All construction sites and associated accommodation or welfare facilities will have in place appropriate plans and management controls to prevent fires. The site fire plans will be prepared and will have due regard to the GoS regulations. During operation and maintenance of equipment and vehicles, the Contractor will ensure that its workers are well aware of the procedures and have enough knowledge to comply with them. The specification of non-combustible materials, products and packaging will be pursued wherever reasonably practicable. The project will also have to comply with GoS requirements as may be appropriate at specific sites.

Operation of equipment: The Contractor must take all reasonable precautions to ensure that equipment is operated in a manner so as not to cause safety risk and/or nuisance to surrounding residents and occupiers. Operations of crane and other large equipment will have to be closely supervised. Permission may be required as per GoS regulations.

Clearance of the construction site after completion: On completion of the works the Contractor will clear away and remove all materials and rubbish and temporary works of every kind. The site will be left clean and in a condition to the satisfaction of the PRMSC and/or delegated agencies.

5. Management of Environment and Sanitation

Nuisance, Dust and Noise Control

To control nuisance, dust and noise in the construction sites the Contractor should:

(a) To the extent possible, maintain noise levels associated with all machinery and equipment at or below 90 db.
(b) In sensitive areas (including residential neighborhoods, hospitals, etc.) more strict measures may need to be implemented to prevent undesirable noise levels. Minimize production of dust and particulate materials at all times, to avoid impacts on surrounding families and businesses, and especially to vulnerable people (children, elders).
(c) Place dust screens around construction areas, fencing should be provided along the boundary so that the emissions do not affect the immediate neighbors, paying particular attention to areas close to housing, commercial areas, and recreational areas.
(d) Spray water periodically as needed on construction areas, especially at site located near residential area
(e) Apply proper measures to minimize disruptions from vibration or noise coming from construction activities.

Disposal of Construction Waste

The Contractor shall establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for construction debris.

Debris generated due to the demolition of the existing structures shall be suitably reused, to the extent feasible. The disposal of remaining debris shall be carried out only at sites identified and approved by local authorities. The contractor should ensure that these disposal sites: (a) are not located within designated forest areas; (b) do not impact natural drainage courses; Under no circumstances shall the contractor dispose of any material in environmentally sensitive areas. Dispose in authorized areas all of garbage, metals, used oils, and excess material generated during construction, incorporating recycling systems and the separation of materials. In the event

any debris or silt from the sites is deposited on adjacent land, the Contractor shall immediately remove such debris and restore the affected area to its original state to the satisfaction of the PRMSC and/or delegated agencies and local communities.

Water quality

The Contractor must take all the efforts to prevent wastes (solid and liquid) discharge into all rivers and canals and to protect surface and groundwater from pollution and other adverse impacts including changes to water levels, flows and general water quality. Whenever possible, the Contractor must minimize the amounts of wastewater that need to be discharged and find alternative means of disposal. Liquid spills of lubricant, fuel and oil within the site should be attended at the earliest in order to minimize land & groundwater contamination. The Contractor will ensure that any seepage and wastewater arising from the works must be collected and discharged via a settlement tank. Water drainage must be designed to avoid stagnant conditions that could create bad smell and unsanitary condition in the construction area and surrounding environment.

Workforce and Workers; Sanitation

The Contractor should whenever possible locally recruit the majority of the workforce and shall provide appropriate training as necessary.

The Contractor shall not allow the use of fuel wood for cooking or heating at the construction site or surrounding area.

The Contractor shall ensure that site offices, depots, and workshops are located in appropriate areas. Clean and well-maintained toilets should be made available.

Clean water shall be adequately provided for workers by the Contractor.

Safety during Construction

The Contractor's responsibilities include the protection of every person and nearby property from construction accidents. The Contractor shall be responsible for complying with all government safety requirements and any other measures necessary to avoid accidents, including the following:

(a) Notice signs/board shall properly be installed at the construction sites
(b) If school children are in the vicinity, include traffic safety personnel to direct traffic during school hours;
(c) Conduct safety training for construction workers prior to beginning work;
(d) Provide necessary personal protective equipment and clothing (goggles, gloves, respirators, dust masks, hard hats, steel-toed and –shanked boots, etc.,) for construction workers and enforce their use;
(e) During emergencies of any kind, suspend all work.

Community Relations

To enhance adequate community relations the Contractor shall:

(a) Inform the local authorities and community about construction and work schedules, interruption of services, traffic detour routes and provisional bus routes, as appropriate.

(b) Limit construction activities at night. When necessary, ensure that night work is carefully scheduled and the community is properly informed so they can take necessary measures.

Physical Cultural Property Chance-finds Procedures

If the Contractor discovers archeological sites, historical sites, remains and objects the Contractor shall:

(c) Stop the construction activities in the area of the chance find;
(d) Delineate the discovered site or area;
(e) Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the Directorate of Archeology take over;
(f) Notify the supervisory Engineer who in turn will notify the responsible local authorities immediately (within 24 hours or less);
(g) Responsible local authorities, would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;
(h) Decisions on how to handle the finding shall be taken by the responsible authorities. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage;
(i) Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities; and
(j) Construction work could resume only after permission is given from the responsible local authorities concerning safeguard of the heritage.

Annex-XV

COVID-19 SOPs

STANDARD OPERATING PROCEDURES (SOPs) FOR COVID-19
(Based on World Bank Guidelines)

1 Introduction

The COVID-19 pandemic presents Governments with unprecedented challenges. Addressing COVID-19 related issues in both existing and new operations starts with recognizing that this is not business as usual and that circumstances require a highly adaptive responsive management design to avoid, minimize and manage what may be a rapidly evolving situation. In many cases, reasonable efforts must be put in during the circumstances, recognizing that what may be possible today may be different next week (both positively, because more supplies and guidance may be available, and negatively, because the spread of the virus may have accelerated).

2 Challenges with Construction/ Civil Works

Projects involving construction/ civil works frequently involve a large work force, together with suppliers and supporting functions and services at the designated location. The work force may comprise workers from local areas more specifically. They may need to live in on-site accommodation, lodge within communities close to work sites or return to their homes after work. There may be different contractors permanently present on site, carrying out different activities, each with their own dedicated workers.

Given the complexity and the concentrated number of workers, the potential for the spread of infectious disease in projects involving construction is extremely serious, as are the implications of such a spread. Projects may experience large numbers of the work force becoming ill, which will strain the project's health facilities, have implications for local emergency and health services and may jeopardize the progress of the construction work and the schedule of the project. Such impacts will be exacerbated where a work force is large and/or the project is in remote or under-serviced areas. In such circumstances, relationships with the community can be strained or difficult and conflict can arise, particularly if people feel they are being exposed to disease by the project or are having to compete for scarce resources. The project must also exercise appropriate precautions against introducing the infection to local communities.

3 Responsibility/ Planning of the PRMSC

PRMSC shall ensure that sub projects (i) are taking adequate precautions to prevent or minimize an outbreak of COVID-19, and (ii) have identified what to do in the event of an outbreak.

4 Contractor cover

The Contractor should identify measures to address the COVID-19 situation. What will be possible will depend on the context of the project: the location, existing project resources, availability of supplies, capacity of local emergency/ health services, the extent to which the virus already exist in the area. A systematic approach to planning, recognizing the challenges associated with rapidly changing circumstances, will help the project put in place the best measures possible to address the situation. As discussed above, measures to address COVID-19 may be presented in different ways (as a contingency plan, as an extension of the existing project emergency and preparedness plan or as standalone procedures). PRMSC and contractor should refer to guidance issued by relevant authorities, both national and international (e.g., WHO).

Addressing COVID-19 at a project site goes beyond occupational health and safety, and is a broader project issue which will require the involvement of different members of a project management team. In many cases, the most effective approach will be to establish procedures to address the issues, and then to ensure that these procedures are implemented systematically. Where appropriate given the project context, a designated team should be established to address COVID-19 issues, including PRMSC representatives, the Supervising Engineer, management (e.g. the project manager) of the contractor and sub-contractors, security, and medical and OHS professionals. Procedures should be clear and straightforward, improved as necessary, and supervised and monitored by the COVID-19 focal point(s). Procedures should be documented, distributed to all contractors, and discussed at regular meetings to facilitate adaptive management. The issues set out below include a number that represent expected good workplace management but are especially pertinent in preparing the project response to COVID- 19.

(a) Assessing Workforce Characteristics

Many construction sites will have a mix of workers e.g., workers from the local communities specifically; workers from a different part of the country. Workers will be employed under different terms and conditions and be accommodated in different ways. Assessing these different aspects of the workforce will help in identifying appropriate mitigation measures:

- The Contractor should prepare a detailed profile of the project work force, key work activities, schedule for carrying out such activities, different durations of contract and rotations (e.g., 4 weeks on, 4 weeks off).
- This should include a breakdown of workers who reside at home (i.e., workers from the community), workers who lodge within the local community and workers in on-site accommodation. Where possible, it should also identify workers that may be more at risk from COVID-19, those with underlying health issues or who may be otherwise at risk.
- Consideration should be given to ways in which to minimize movement in and out of site. This could include lengthening the term of existing contracts, to avoid workers returning home to affected areas, or returning to site from affected areas.
- Workers accommodated on site should be required to minimize contact with people near the site, and in certain cases be prohibited from leaving the site for the duration of their contract, so that contact with local communities is avoided.
- Consideration should be given to requiring workers lodging in the local community to move to site accommodation (subject to availability) where they would be subject to the same restrictions.
- Workers from local communities, who return home daily, weekly or monthly, will be more difficult to manage. They should be subject to health checks at entry to the site (as set out above) and at some point, circumstances may make it necessary to require them to either use accommodation on site or not to come to work.

(b) Entry/ Exit to the Work Site and Checks on Commencement of Work

Entry/ exit to the work site should be controlled and documented for both workers and other parties, including support staff and suppliers. Possible measures may include:

Establishing a system for controlling entry/ exit to the site, securing the boundaries of the site, and establishing designating entry/ exit points (if they do not already exist). Entry/ exit to the site should be documented.

- Training security staff on the (enhanced) system that has been put in place for securing the site and controlling entry and exit, the behaviors required of them in enforcing such system and any COVID -19 specific considerations.
- Training staff who will be monitoring entry to the site, providing them with the resources they need to document entry of workers, conducting temperature checks and recording details of any worker that is denied entry.
- Confirming that workers are fit for work before they enter the site or start work. While procedures should already be in place for this, special attention should be paid to workers with underlying health issues or who may be otherwise at risk. Consideration should be given to demobilization of staff with underlying health issues.
- Checking and recording temperatures of workers and other people entering the site or requiring self-reporting prior to or on entering the site.
- Providing daily briefings to workers prior to commencing work, focusing on COVID-19 specific considerations including cough etiquette, hand hygiene and distancing measures, using demonstrations and participatory methods.
- During the daily briefings, reminding workers to self-monitor for possible symptoms (fever, cough) and to report to their supervisor or the COVID-19 focal point if they have symptoms or are feeling unwell.
- Preventing a worker from an affected area or who has been in contact with an infected person from returning to the site for 14 days or (if that is not possible) isolating such worker for 14 days.
- Preventing a sick worker from entering the site, referring them to local health facilities if necessary or requiring them to isolate at home for 14 days.

(c) General Hygiene

Requirements on general hygiene should be communicated and monitored, to include:

- Training workers and staff on site on the signs and symptoms of COVID-19, how it is spread, how to protect themselves (including regular handwashing and social distancing) and what to do if they or other people have symptoms (for further information see WHO COVID-19 advice for the public).
- Placing posters and signs around the site, with images and text in local languages.
- Ensuring handwashing facilities supplied with soap, disposable paper towels and closed waste bins exist at key places throughout site, including at entrances/exits to work areas; where there is a toilet, canteen or food distribution, or provision of drinking water; in worker accommodation; at waste stations; at stores; and in common spaces. Where handwashing facilities do not exist or are not adequate, arrangements should be made to set them up. Alcohol based sanitizer (if available, 60-95% alcohol) can also be used.
- Review worker accommodations, and assess them in light of the requirements set out in IFC/EBRD guidance on Workers' Accommodation: processes and standards, which provides valuable guidance as to good practice for accommodation.
- Setting aside part of worker accommodation for precautionary self-quarantine as well as more formal isolation of staff who may be infected (see paragraph (f)).

(d) Cleaning and Waste Disposal

Conduct regular and thorough cleaning of all site facilities. Review cleaning protocols for key construction equipment (particularly if it is being operated by different workers). This should include:

- Providing cleaning staff with adequate cleaning equipment, materials and disinfectant.
- Review general cleaning systems, training cleaning staff on appropriate cleaning procedures and appropriate frequency in high use or high-risk areas.
- Where it is anticipated that cleaners will be required to clean areas that have been or are suspected to have been contaminated with COVID-19, providing them with appropriate PPE: gowns or aprons, gloves, eye protection (masks, goggles or face screens) and boots or closed work shoes. If appropriate PPE is not available, cleaners should be provided with best available alternatives.
- Training cleaners in proper hygiene (including handwashing) prior to, during and after conducting cleaning activities; how to safely use PPE (where required); in waste control (including for used PPE and cleaning materials).

(e) Adjusting Work Practices

Consider changes to work processes and timings to reduce or minimize contact between workers, recognizing that this is likely to impact the project schedule. Such measures could include:

- Decreasing the size of work teams.
- Limiting the number of workers on site at any one time.
- Adapting or redesigning work processes for specific work activities and tasks to enable social distancing, and training workers on these processes.
- Continuing with the usual safety trainings, adding COVID-19 specific considerations. Training should include proper use of normal PPE. While as of the date of this note, general advice is that construction workers do not require COVID-19 specific PPE, this should be kept under review (for further information see WHO interim guidance on rational use of personal protective equipment (PPE) for COVID-19).
- Reviewing work methods to reduce use of construction PPE, in case supplies become scarce or the PPE is needed for medical workers or cleaners. This could include, e.g. trying to reduce the need for dust masks by checking that water sprinkling systems are in good working order and are maintained or reducing the speed limit for haul trucks.
- Arranging (where possible) for work breaks to be taken in outdoor areas within the site.

At some point, it may be necessary to review the overall project schedule, to assess the extent to which it needs to be adjusted (or work stopped completely) to reflect prudent work practices, potential exposure of both workers and the community and availability of supplies, taking into account Government advice and instructions.

(f) Project Medical Services

- Training medical staff, which should include current WHO advice on COVID-19 and recommendations on the specifics of COVID-19. Where COVID-19 infection is suspected, medical providers on site should follow WHO interim guidance on infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected.

- Training medical staff in testing, if testing is available.
- Assessing the current stock of equipment, supplies and medicines on site, and obtaining additional stock, where required and possible. This could include medical PPE, such as gowns, aprons, medical masks, gloves, and eye protection. Refer to WHO guidance as to what is advised (for further information see WHO interim guidance on rational use of personal protective equipment (PPE) for COVID-19).
- If PPE items are unavailable due to world-wide shortages, medical staff on the project should agree on alternatives and try to procure them. Alternatives that may commonly be found on constructions sites include dust masks, construction gloves and eye goggles. While these items are not recommended, they should be used as a last resort if no medical PPE is available.
- Ventilators will not normally be available on work sites, and in any event, intubation should only be conducted by experienced medical staff. If a worker is extremely ill and unable to breathe properly on his or her own, they should be referred immediately to the local hospital (see (g) below).
- Review existing methods for dealing with medical waste, including systems for storage and disposal (for further information see WHO interim guidance on water, sanitation and waste management for COVID-19, and WHO guidance on safe management of wastes from health-care activities).

(g) Local Medical and Other Services

Given the limited scope of project medical services, the project may need to refer sick workers to local medical services. Preparation for this includes:

- Obtaining information as to the resources and capacity of local medical services (e.g. number of beds, availability of trained staff and essential supplies).
- Conducting preliminary discussions with specific medical facilities, to agree what should be done in the event of ill workers needing to be referred.
- Considering ways in which the project may be able to support local medical services in preparing for members of the community becoming ill, recognizing that the elderly or those with pre-existing medical conditions require additional support to access appropriate treatment if they become ill.
- Clarifying the way in which an ill worker will be transported to the medical facility, and checking availability of such transportation.
- Establishing an agreed protocol for communications with local emergency/medical services.
- Agreeing with the local medical services/specific medical facilities the scope of services to be provided, the procedure for in-take of patients and (where relevant) any costs or payments that may be involved.
- A procedure should also be prepared so that project management knows what to do in the unfortunate event that a worker ill with COVID-19 dies. While normal project procedures will continue to apply, COVID-19 may raise other issues because of the infectious nature of the disease. The project should liaise with the relevant local authorities to coordinate what should be done, including any reporting or other requirements under national law.

(h) Instances or Spread of The Virus

- If a worker has symptoms of COVID-19 (e.g. fever, dry cough, fatigue) the worker should be removed immediately from work activities and isolated on site.
- If testing is available on site, the worker should be tested on site. If a test is not available at site, the worker should be transported to the local health facilities to be tested (if testing is available).
- If the test is positive for COVID-19 or no testing is available, the worker should continue to be isolated. This will either be at the work site or at home. If at home, the worker should be transported to their home in transportation provided by the project.
- Extensive cleaning procedures with high-alcohol content disinfectant should be undertaken in the area where the worker was present, prior to any further work being undertaken in that area. Tools used by the worker should be cleaned using disinfectant and PPE disposed of.
- Co-workers (i.e. workers with whom the sick worker was in close contact) should be required to stop work, and be required to quarantine themselves for 14 days, even if they have no symptoms.
- Family and other close contacts of the worker should be required to quarantine themselves for 14 days, even if they have no symptoms.
- If a case of COVID-19 is confirmed in a worker on the site, visitors should be restricted from entering the site and worker groups should be isolated from each other as much as possible.
- If workers live at home and has a family member who has a confirmed or suspected case of COVID-19, the worker should quarantine themselves and not be allowed on the project site for 14 days, even if they have no symptoms.

(i) Training and Communication with Workers

- Training of workers should be conducted regularly, as discussed in the sections above, providing workers with a clear understanding of how they are expected to behave and carry out their work duties.
- Training should address issues of discrimination or prejudice if a worker becomes ill and provide an understanding of the trajectory of the virus, where workers return to work.
- Training should cover all issues that would normally be required on the work site, including use of safety procedures, use of construction PPE, occupational health and safety issues, and code of conduct, taking into account that work practices may have been adjusted.
- Communications should be clear, based on fact and designed to be easily understood by workers, for example by displaying posters on handwashing and social distancing, and what to do if a worker displays symptoms.