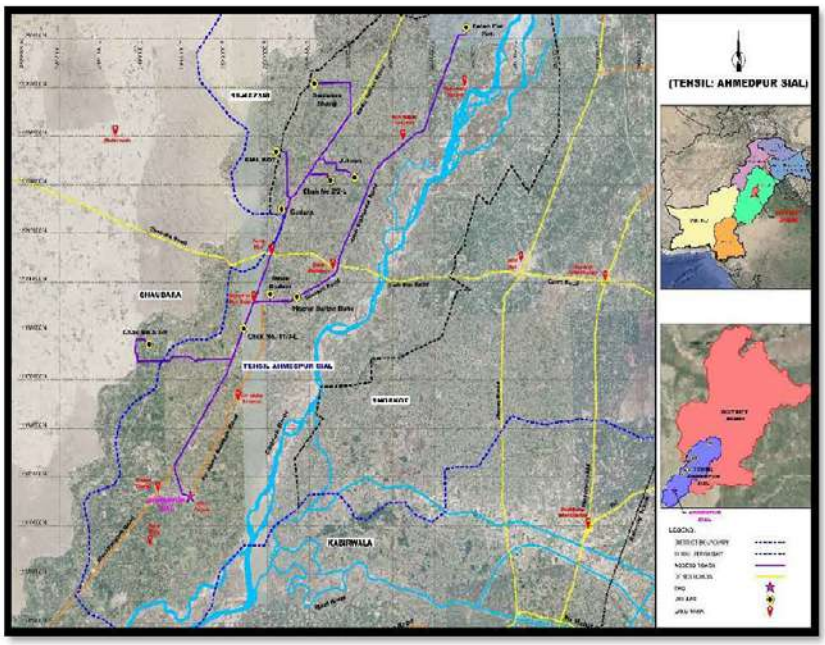
Punjab Rural Municipal Services Company (PRMSC)

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)











Draft Report

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

10 Villages of Tehsil Ahmadpur Sial (Fatehpur Pirti, Hazrat Sultan Bahu, Doluani Shargi, Gudara, Basti Sial Kot, Jaiwan, Chak No 2/2-L, Chak No 3/11-L, Chak No 3/3-R and Sewa Sadaat)

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: Central – I".

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. The Punjab Environmental Protection Agency (PEPA) 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 ten (10) nos. villages of Tehsil Ahmadpur Sial namely Mouza Jaiwan, Chak No. 2/2L, Sial Kot, Gudara, Dauluana Sharqi, Fatehpur Pirti, Hazrat Sultan Bahu, Sewa Sadaat, Chak No. 3/3R and Chak No. 11/3L. These villages have been selected on priority basis in Central-I cluster as per the request of the Client and World Bank (WB).

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 ten (10) Mouzas/ villages are summarized below:

Water Supply Issues:

- No water supply Network in the villages;
- Most of the Household use shallow groundwater;
- Shallow ground water is not fit for drinking;
- Polluted Groundwater is causing water borne dieses.

Sewerage Issues:

- Sewerage system does not exist in Priority Villages;
- 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;
- 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 941.01 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 will be approximately 140 workers per day.

4. Baseline Profile

A. Physical Environment

The proposed project sites are rural settlements comprising residential and agriculture areas. Active flood plains are narrow strips along the river and its tributaries. The plains are inundated almost every year, covered with rich alluvium and are suitable for agriculture. Subrecent flood plains also called alluvial terraces are depositional and are separated from the adjoining active flood plains by the river cut bluffs ranging in height from 1m to 5m.

The proposed project sites are rural settlements comprising residential and agriculture areas. The ground elevations vary from 473.89 feet to 450.94 feet in our selected (10) villages of Tehsil Ahmadpur Sial. The topography survey was conducted in villages, where piped network is proposed.

Geologically, the soils found here are loamy, rich in clay content, and deficient in organic matter and phosphorus.[1] The whole district is an alluvial plain, much of it being of recent formation.[2] Active floodplains are located alongside rivers.

[1] "Characterization of salinity and fertility status of canal water irrigated soils in tehsil Ahmadpur Sial Punjab, Pakistan," Azhar Mahmood, Muhammad Abdullah, Muhammad T. Shah, Sajid Ali, Amanat Ali, and Khan A. R. Khan.

[2] https://jhang.punjab.gov.pk/geography

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 46 ºC and 30 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 22 ºC and 5 ºC in January.

Highest intensity of precipitation is also observed in the months of June, July and August ranges between 5-10mm or 10-20 mm.

Groundwater investigation study reveals that sweet water under un-confined conditions. The depth to water table is ranging from 10 ft. (3 m) to 25 ft. (7.6 m) below NSL. Borehole depth of existing water wells varies from 25 ft. (7.6 m) to 110 ft. (33.5 m) below NSL with maximum discharge rate of 112 USGPM (0.25 cusec). TDS measured during inventory reveal general water quality of deep water is good as compared to shallow.

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.

In the area common animals found are dogs, cats, house rats and bats. Domestic livestock that was observed during field visit include buffalo, cattle, goats, sheep, hens and donkeys that are used by the local residents for their living and mobilization purposes.

Major crops are Sugarcane, wheat and Rice that cultivated in the project area.

The major floral species of the project area include Saccharum spontaneum (Wild Sugarcane), Phrangmites communis (Common reed), Tamarix dioica (Ghaz tree), Arundo donax (Giant reed) and Erianthus spp (Sweetcane).

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 ten villages.

Primary data was collected through a socioeconomic survey with the help of a structured questionnaire. A sample size of 106 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.

<u>Grievance Redress Mechanism (GRM)</u>

The Grievance Redressal Mechanism (GRM) will be consistent with the requirements of the World Bank safeguard policies to ensure the mitigation of community concerns, risk management, and maximization of environmental and social benefits. 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 ESMP is worked out to be about **PKR 37.32 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: Central – I".

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 Environmental Protection Department (EPD), Punjab. 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 ESMP 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[3]. 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[4] 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.

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

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

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 "Central-I" 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.

However, the NESPAK team with the joint venture partner ACE Consultants selected 10 villages of Tehsil Ahmadpur Sial in consultation with the Client i.e., Mouza Jaiwan, Chak No. 2/2L, Sial Kot, Gudara, Dauluana Sharqi, Fatehpur Pirti, Hazrat Sultan Bahu, Sewa Sadaat, Chak No. 3/3R and Chak No. 11/3L for the provision of Water Sanitation and Hygiene (WASH) facilities.

The anticipated environmental and social impacts of the selected ten (10) Villages are mostly localized, site-specific and temporary; few (if any) of them are irreversible and could be easily mitigated through appropriate measures. According to the findings of the Environmental and Social Screening study, this project falls in Category B and requires an ESMP.

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 ESMP 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 ESMP delineates proper mitigation measures. As a planning tool, the ESMP 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 assess the compliance status of the proposed activities with respect to the national and provincial environmental legislation and WB's OPs;
- 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 ESMP 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), and solid waste management system in all ten selected Villages of Tehsil Ahmadpur Sial i.e., Mouza Jaiwan, Chak No. 2/2L, Sial Kot, Gudara, Dauluana Sharqi, Fatehpur Pirti, Hazrat Sultan Bahu, Sewa Sadaat, Chak No. 3/3R and Chak No. 11/3L.

1.4 Contractual Requirements/ Obligations of EIA

The impacts and their mitigation measures, summarized in ESMP, will be part of the Bidding Documents to ensure that Contractors implement ESMP recommendations at all project stages. The ESMP requirements will be part of the Contract and the details prescribed in the ESMP will be mandatory. The ESMP 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 ESMP when preparing the bid and pricing the items of Work. The Contractor will need to accept that the prescriptions and clauses detailed in the ESMP 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 ESMP. The Contractor should, therefore, be aware that in case the Contractor or Subcontractors fail to implement the ESMP recommendations, the Engineer shall take necessary action(s) to ensure that the ESMP 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 14 to 16, March and 19 to 20 April, 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 14 to 15 March, 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 Ahmadpur Sial 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. 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 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.

G. 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 March 14 to March 16, 2023 & 19 to 20 April, 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.

H. 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.

I. 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, propose 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).

J. 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 and procedures and applicable World Bank Operational Policies (OPs).

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 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 Ahmadpur Sial, District Jhang. All relevant provisions of environmental policies laid down by the Government of Pakistan Government of Punjab along with applicable World Bank Policies 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 ESMP (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/ aseptic 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 / ESMP.

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 Ahmadpur Sial.
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-EPA. Punjab-EPA is headed by a Director General, and sections are headed by Directors, i.e., Director Technical, Director Administration and Finance, and Director Laboratory. Punjab-EPA has established District Environment Offices at district level.

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

3 PROJECT DESCRIPTION

Ten (10) nos. villages of Tehsil Ahmadpur Sial namely Mouza Jaiwan, Chak No. 2/2L, Sial Kot, Gudara, Dauluana Sharqi, Fatehpur Pirti, Hazrat Sultan Bahu, Sewa Sadaat, Chak No. 3/3R and Chak No. 11/3L has been selected in consultation with the Client for provision of Water Sanitation and Hygiene (WASH) facilities. The subproject involves provision of water supply, sewerage, overhead tanks, pumping stations with sewage treatment plants, soakage pit/ aseptic tank & stand post.

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 all Ten (10) villages are summarized below:

Water Supply Issues:

- No water supply Network in the villages;
- Most of the Household use shallow groundwater;
- Shallow ground water is not fit for drinking;
- Polluted Groundwater is causing water borne dieses.

Sewerage Issues:

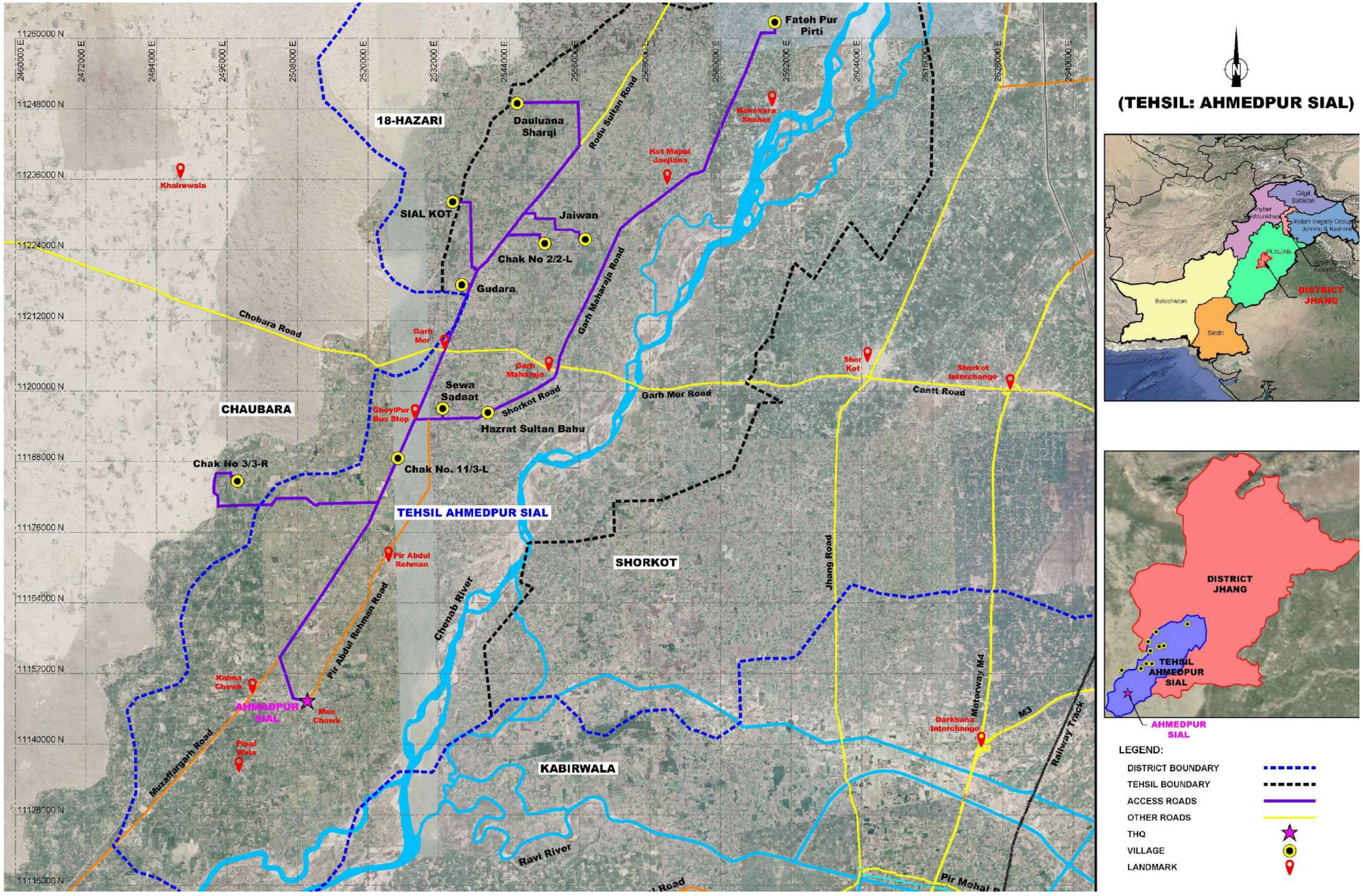
- Sewerage system does not exist in Priority Villages;
- Existing open drains are damaged and collect sewage only from some houses;
- No proper Disposal Point in all the villages;
- Sewage collected in soakage pits and open plots seeps into ground and contaminates groundwater;
- Raw sewage ponds are a breeding ground for diseases.

3.2 Project Location

Sewa Sadaat is located on Shorkot Road, at approx. 1.5 km from Muzaffargarh Road, on latitude of 30.816717° and longitude of 71.842589°. Chak 11/3-L is located on Main Muzaffargarh Road on latitude of 30.795022° and longitude of 71.818958°. Basti Hazrat Sultan Bahu is located on Shorkot Road, at approx. 4.5 km from Garh Maharaja-Garh Morr Road, west of Garh Maharaja town on latitude of 30.80641556° and longitude of 71.86233521°. Fatehpur Pirti is located close to Garh Maharaja Road on latitude of 30.994773° and longitude of 72.028506°. Gudara, Jaiwan, Dauluana Sharqi, Chak 2/2L and Sial Kot is located close to Rodu Sultan Road and Chak 3/3-R is located at latitude of 30.787176° and longitude of 71.731947°. The location map of all (10) 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.



(TEHSIL: AHMEDPUR SIAL)

LEGEND:

- DISTRICT BOUNDARY
- TEHSIL BOUNDARY
- ACCESS ROADS
- OTHER ROADS
- THQ
- VILLAGE
- LANDMARK

Figure 3.1 : Location map of Villages in Tehsil Ahmadpur Sial, Cluster Central-I

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 ten (10) villages. At present, domestic boreholes are the main water source for the village which is available at a depth of around 25-50 ft varies at different villages. In some villages peoples reported that water is sweet but smelly and it turns yellow after a few minutes of extraction. Deeper tube wells at depth of around 80-110 ft are also bored to access better quality water. Most of the people brings drinking water from deep borehole near the village or take it from their own domestic borehole. Whereas, according to villagers the drinking water is unhygienic which results to major waterborne diseases like hepatitis, cholera, diabetes, stomach infection and diarrhea in the village.

B. Existing Sewerage System

There is no existing sewerage pipe network or disposal station in selected ten (10) villages. There are some unplanned open drains which dispose sewage in the ponds on private land or into fields for irrigation use. Some houses are also disposing of their sewer directly into the streets while some collects through drains and dispose into small soakage pits.

In most of the village's sewage pond exists which are used as a main sewage recipient. Most of the drains dispose of into this sewer ponds and rest of the drains after collecting sewage from the adjacent areas disposed of into nearest fields haphazardly.

3.4.1.2 Proposed System

A. Criteria for selection of facilities

According to minutes of the meeting received vide letter No. PRMSC/PRWSWSSP/EDCS/Central-I/494 dated 27.01.2023, the Client instructed the Consultants to provide interventions in major settlements of revenue villages based on the number of households (2023) as per criteria mentioned below in 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<200	Public Standposts with Chlorination (Non-Piped System)	Septic Tanks and Soakage Pits (Non-Piped System)
HH>200	Piped Water Supply System with Chlorination	Piped Sewage Collection System with Treatment Plant

B. Design Principal of Sewerage system

Proper sewerage system is not present in these villages. There are multiple disposal points in each village. The main objective of the proposed sewerage system is to converge the whole system towards a single point and then dispose of into pumping point that would eventually pump into proposed treatment plant. Following components are proposed in village. Typical figure of proposed house connection with sewer line is shown in below **Figure 3.2.**

- House connections chambers;
- Lateral sewer lines; these will dispose of into trunk lines;
- Trunk sewer lines;
- Sewage Pumping station;
- Sewage Treatment Plant;
- Septic tanks and Soakage pits.

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 Ten (10) Mouzas/ villages pipe network will be given in Three Mouzas/ villages Sial Kot, Hazarat Sultan Bahu & Chak # 11/3L. Village wise summary of proposed system is given in below **Table 3.2** & Schematic of Proposed Sewerage System (For Piped System) is shown below in **Figure 3.3.**

In case of aseptic tank and soakage pits, aseptic 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. Aseptic tank & soakage pits will be given in 07 selected Mouzas/ villages. Details are given in below **Table 3.2** & Schematic of Proposed Septic Tank with Soakage Pit (For Un-Piped System) is given below in **Figure 3.4.**

C. Design Principal of Water Supply System

According to the criteria of intervention, piped network will be provided in 3 revenue villages. Groundwater will be extracted through Tubewell that 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, Public Standpost will be provided. A small pump will be installed along with drinking water storage tanks. Taps would be attached to these tanks; hence residents of minor settlements would be able to collect drinking water from these tanks. Village wise summary of proposed system is given in below **Table 3.2**.

Table 3.2: Village Wise Summary of Proposed System

Sr. No.	Revenue Villages	Selected Settlements	No. of House	Water supply Components	Sewerage System
1	Jaiwan	Basti Haveli Jaiwan	170	Standpost	Septic Tank+ Soakage pits
2		Basti Naulan Wala	73	Standpost	Septic Tank+ Soakage pits
3		Basti Jaiwan	80	Standpost	Septic Tank+ Soakage pits
4	Chak No. 2/2L	Settlement 01	120	Standpost	Septic Tank+ Soakage pits
5		Settlement 02	45	Standpost	Septic Tank+ Soakage pits
6	Sial Kot	Sial Kot & Chak Mohsin Shaheed	203	Pipe Network	Pipe Network +PS+ ABR
7	Gudara	Chak Azmat Kamal	93	Standpost	Septic Tank+ Soakage pits
8		Gudara Main Bazar	123	Standpost	Septic Tank+ Soakage pits
9		Basti Tawran Wali	140	Standpost	Septic Tank+ Soakage pits
		Basti Nazimabad	50	Standpost	Septic Tank+ Soakage pits
10	Daulua na Sharqi	Basti Jalal Wala	66	Standpost	Septic Tank+ Soakage pits
11	Fatehpur Pirti	Basti Fatehpur Pirti	61	Standpost	Septic Tank+ Soakage pits
12		Chak Raitrhi	61	Standpost	Septic Tank+ Soakage pits
13	Hazrat Sultan Bahu	Basti Tahir Sultan & Basti Sultan Bahu	233	Pipe Network	Pipe Network +PS+ ABR
14		Basti Aray Wala	93	Standpost	Septic Tank+ Soakage pits
15		Basti Ghulam Jellani	77	Standpost	Septic Tank+ Soakage pits
16		Basti Samundari	74	Standpost	Septic Tank+ Soakage pits
		Basti Purani	59	Standpost	Septic Tank+ Soakage pits
17		Basti Rarhi Wala	124	Standpost	Septic Tank+ Soakage pits
18	Sewa Sadaat	Basti Sewa Sadaat	92	Standpost	Septic Tank+ Soakage pits
19		Basti Bhirki Wala	53	Standpost	Septic Tank+ Soakage pits
20	Chak No. 3/3R	Chak 3/3R	134	Standpost	Septic Tank+ Soakage pits
21	Chak No. 11/3L	Chak 11/3L	207	Pipe Network	Pipe Network + PS+ABR

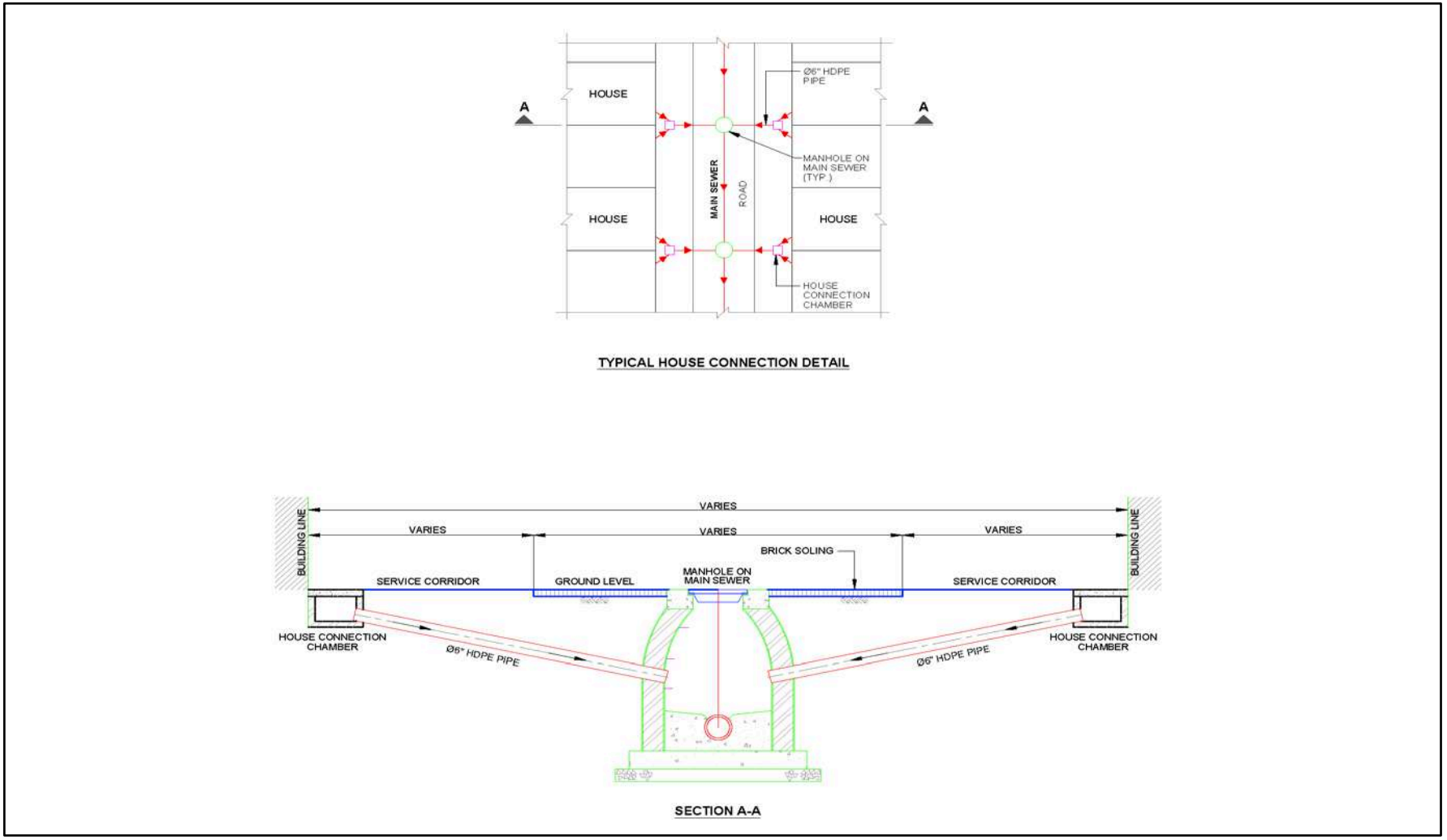


Figure 3.2: Typical Detail of Proposed House Connections with Sewer Line

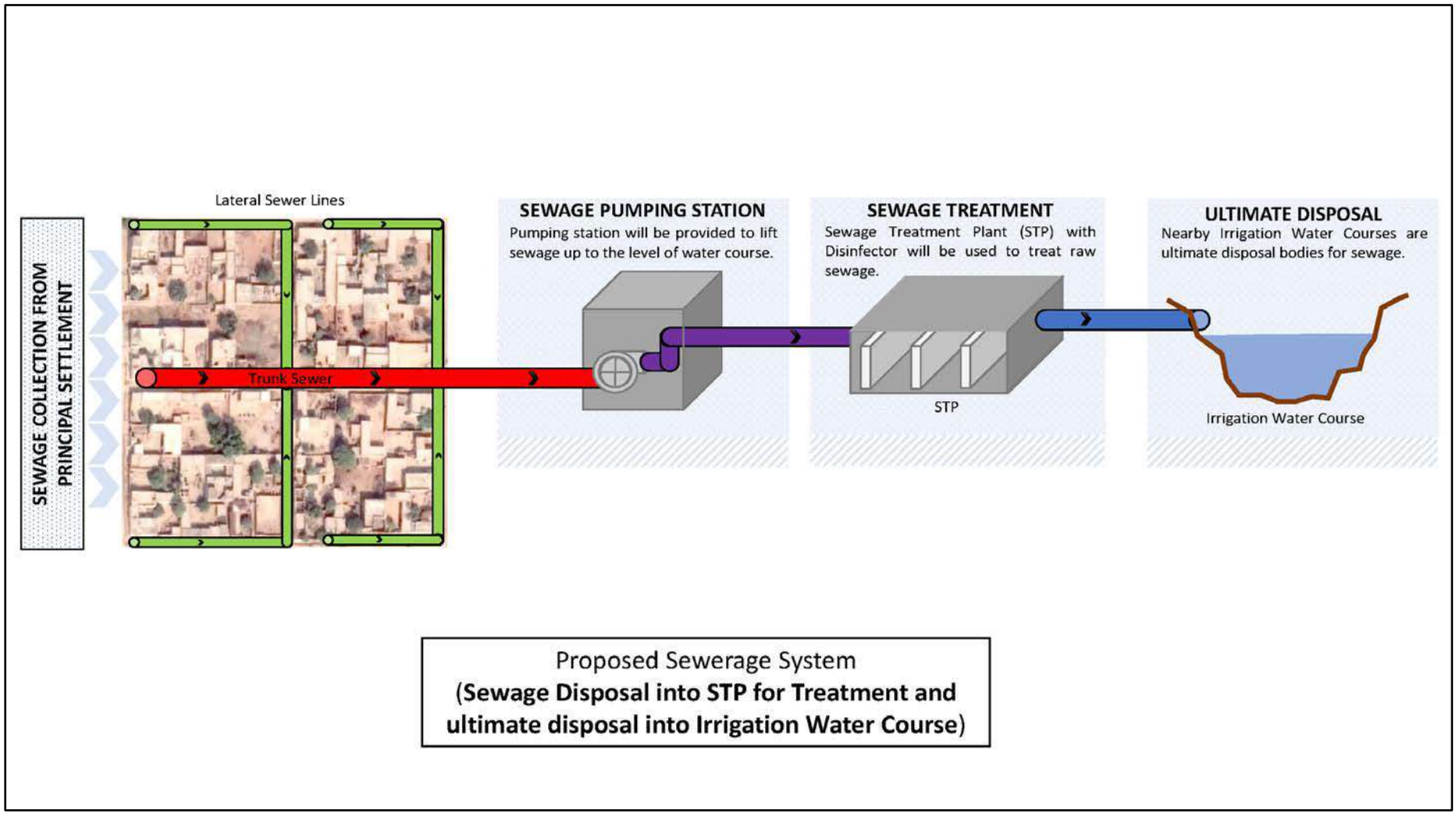


Figure 3.3: Schematic of Proposed Sewerage System (For Piped System)

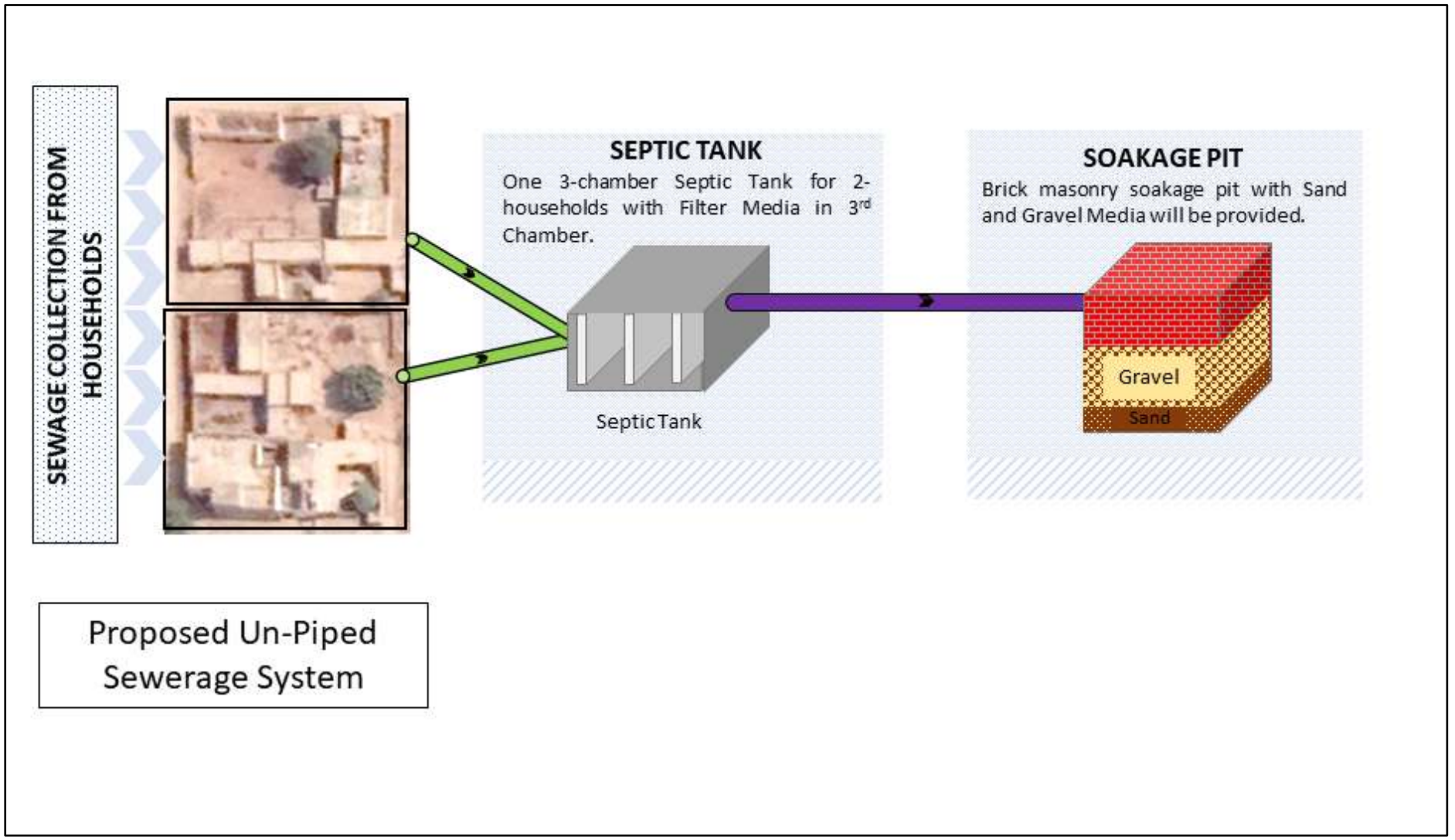


Figure 3.4: Schematic of Proposed Septic Tank with Soakage Pit (For Un-Piped System)

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 941.01 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 (Sial Kot, Hazarat Sultan Bahu & Chak # 11/3L), and for stand posts in remaining seven Mouzas/ villages. The total land requirement will be 19.11 Kanal. for all ten 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 Jhang, 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 3.3 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 3.3: 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 Tire 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 pumping station, sewage treatment plant (STP), soakage pits/aseptic tank & stand post would include coarse aggregates (crush), bricks, fine aggregates (sand), soil, water, pipes (RCC & HDPE), cement, reinforcement, asphalt etc.

3.12 Workforce Requirement

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

<u>Workforce during Construction Phase</u>

Total man power required on site for proposed Project will be approximately 140 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 59 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[5]

The solid waste generation is estimated to be 40 kg/day for 140 construction workers during construction phase of the proposed Project.

Operation Phase[6]

The solid waste generation is estimated to be 17 kg/day for 59 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 700 gallons/day for 140 construction workers during construction phase of the proposed Project.

Operation Phase

The water consumption is estimated to be 590 gallons/day for 59 workers during operation phase of the proposed project.

3.15 Power Requirement During Construction Phase

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

[5] 0.28kg/capita/day)
[6] 0.28kg/capita/day)

3.16 Wastewater Generation during Construction Phase

The wastewater generation is estimated to be 560[7] gallons/day for 140 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 restored.

[7] 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.

ESMP team conducted the reconnaissance and detailed surveys of the project area for baseline data collection during field visits from March 14 to March 19, 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** to **Figure 4.10** represents the AoI of the Mouza Jaiwan & Chak No. 2/2L, Sial Kot, Gudara (3 Settlements), Gudara (Basti Tawran), Dauluana Sharqi, Fatehpur Pirti, Hazrat Sultan Bahu, Sewa Sadaat, Chak No. 3/3R and Chak No. 11/3L respectively.

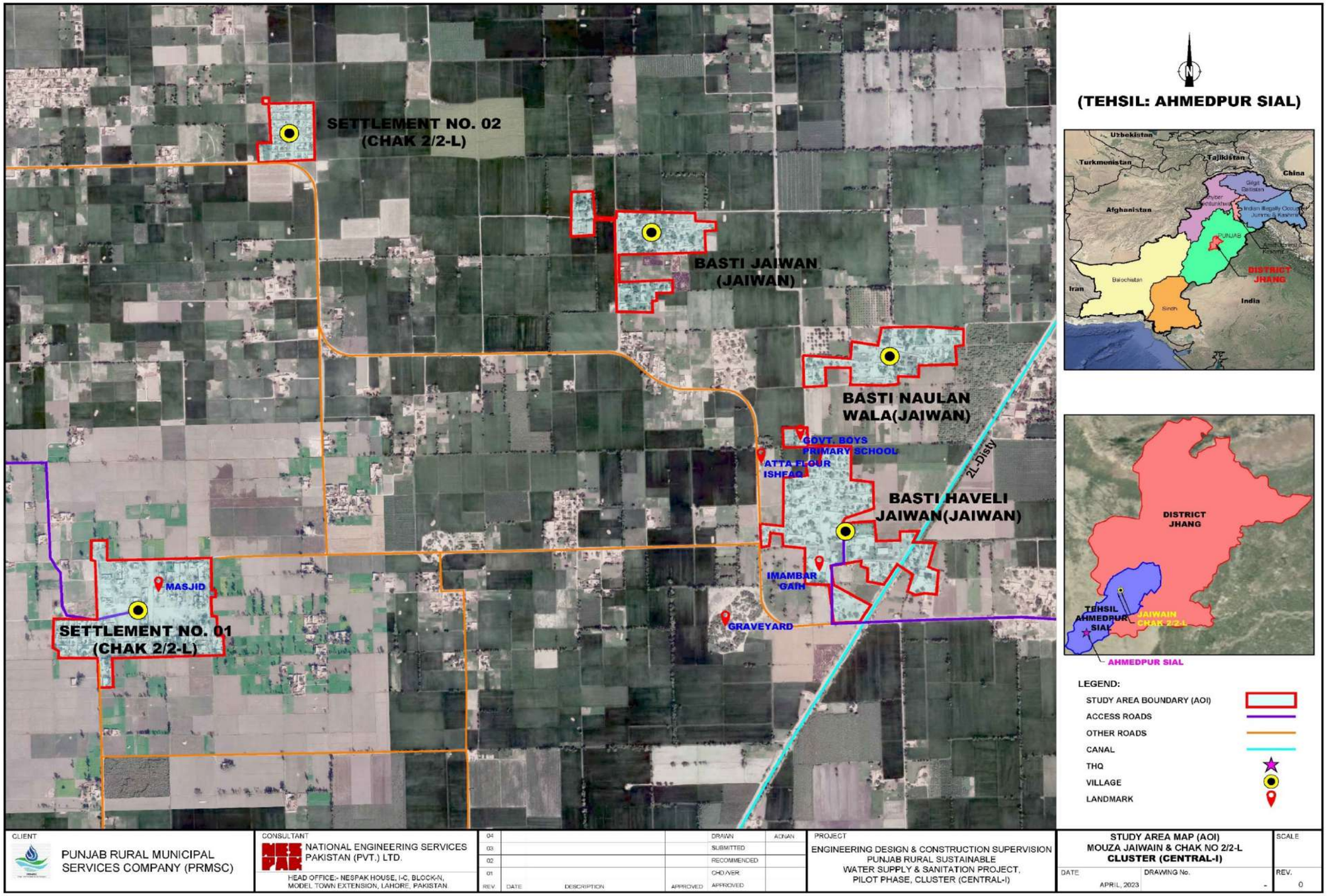


Figure 4.1: Study Area Map / AoI of Mouza Jaiwan and Chak No. 2/2L

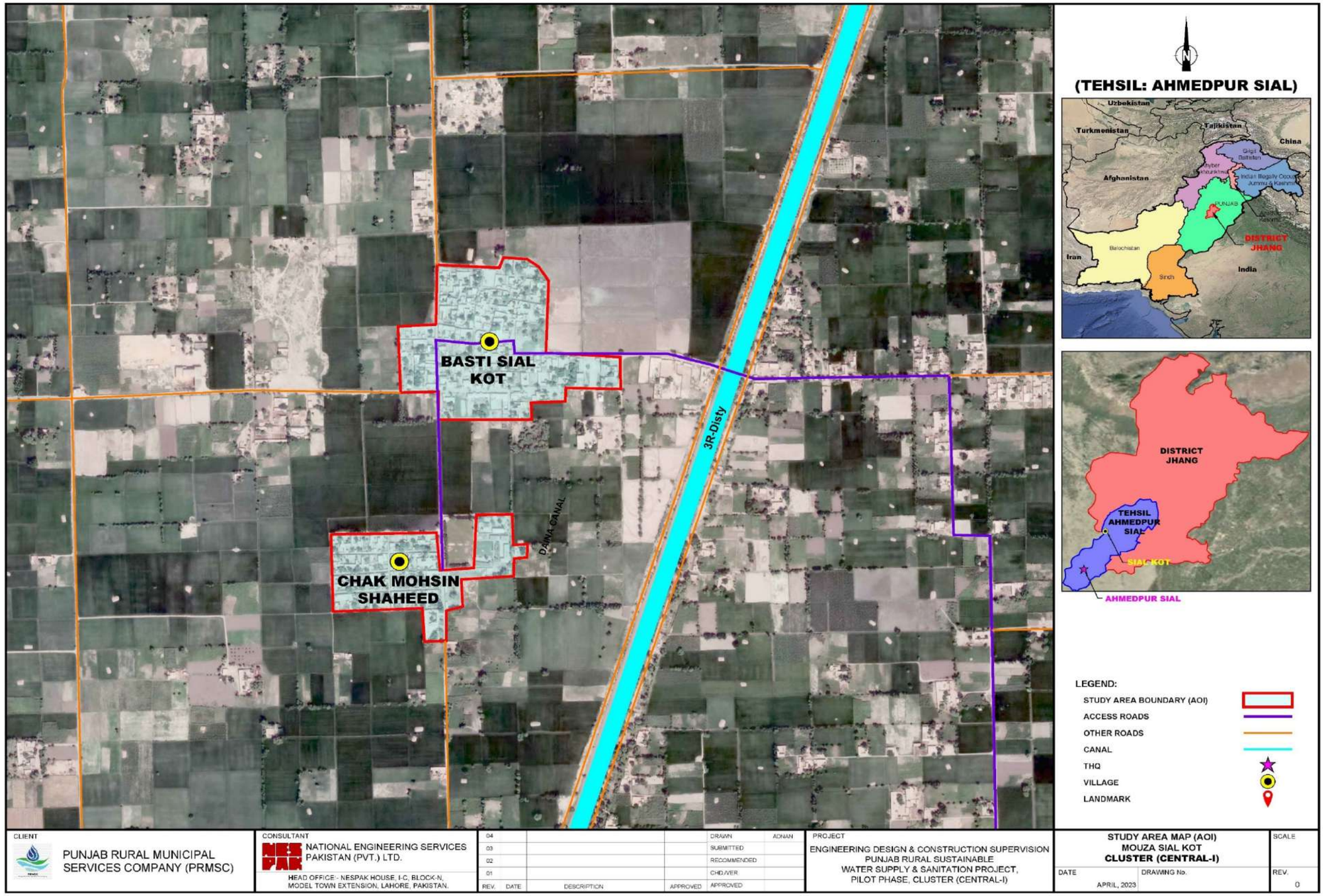


Figure 4.2: Study Area Map / AoI of Sial Kot

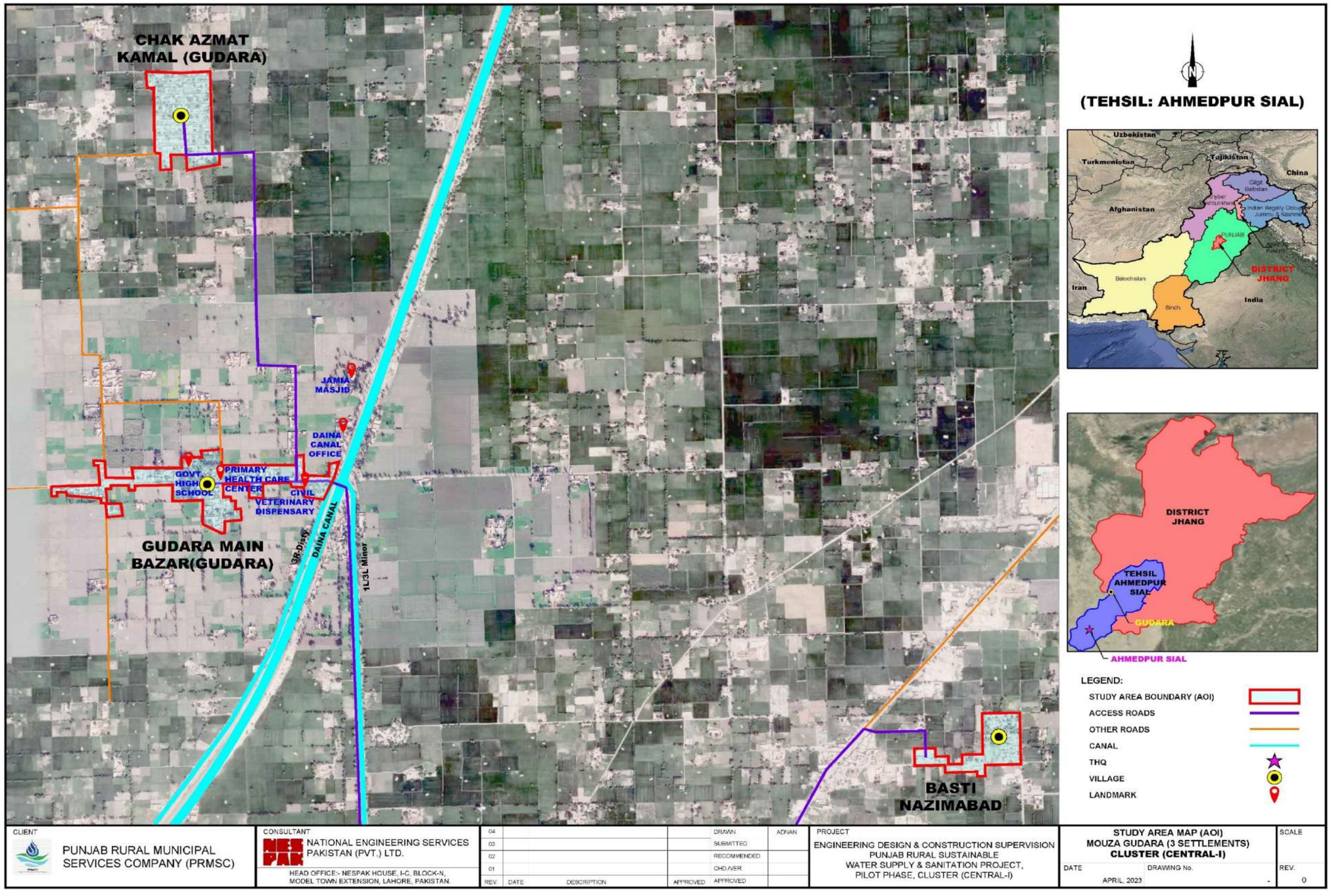


Figure 4.3: Study Area Map / AoI of Gudara (3 Settlements)

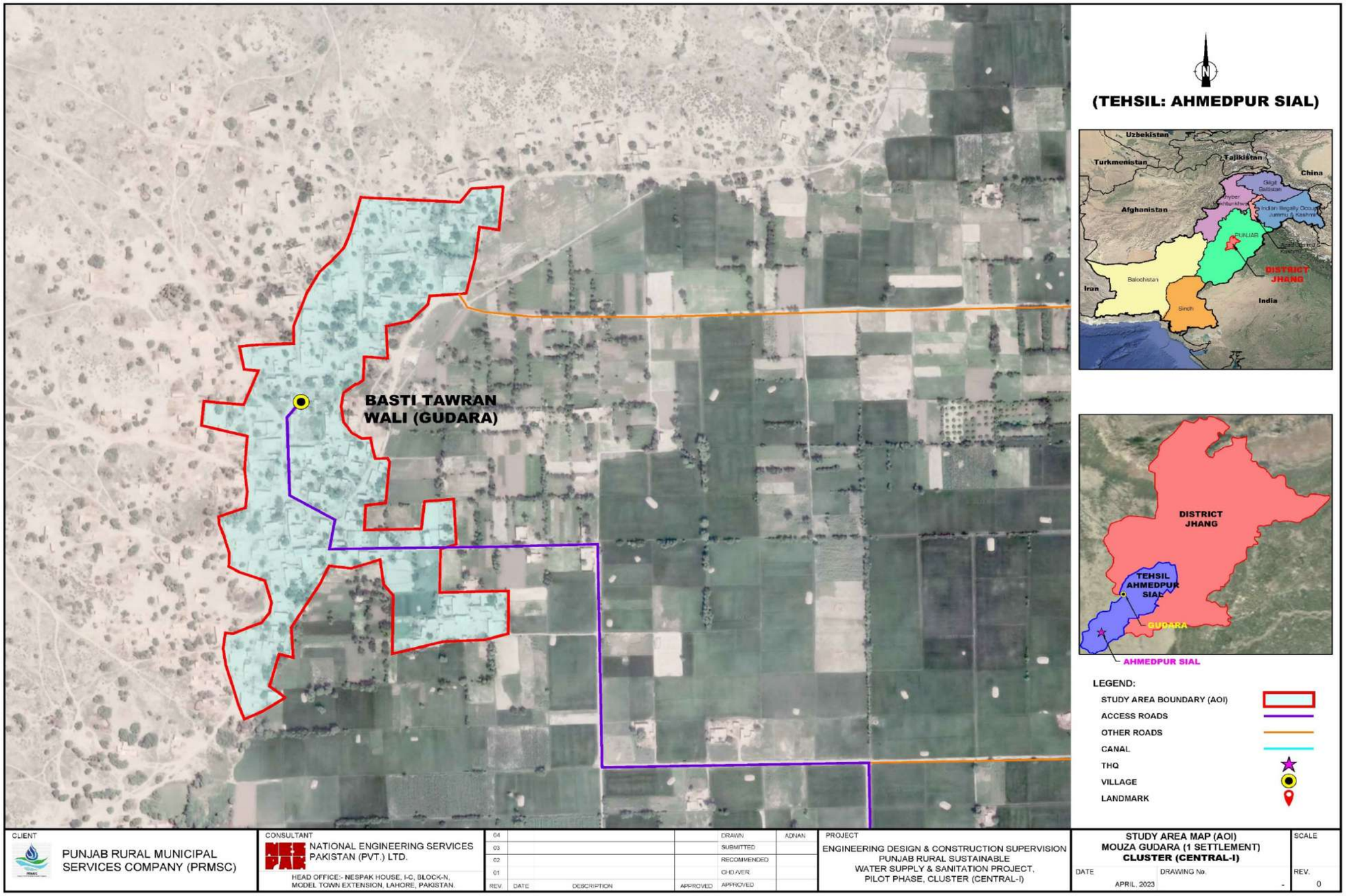


Figure 4.4: Study Area Map / AoI of Gudara (Basti Tawran)

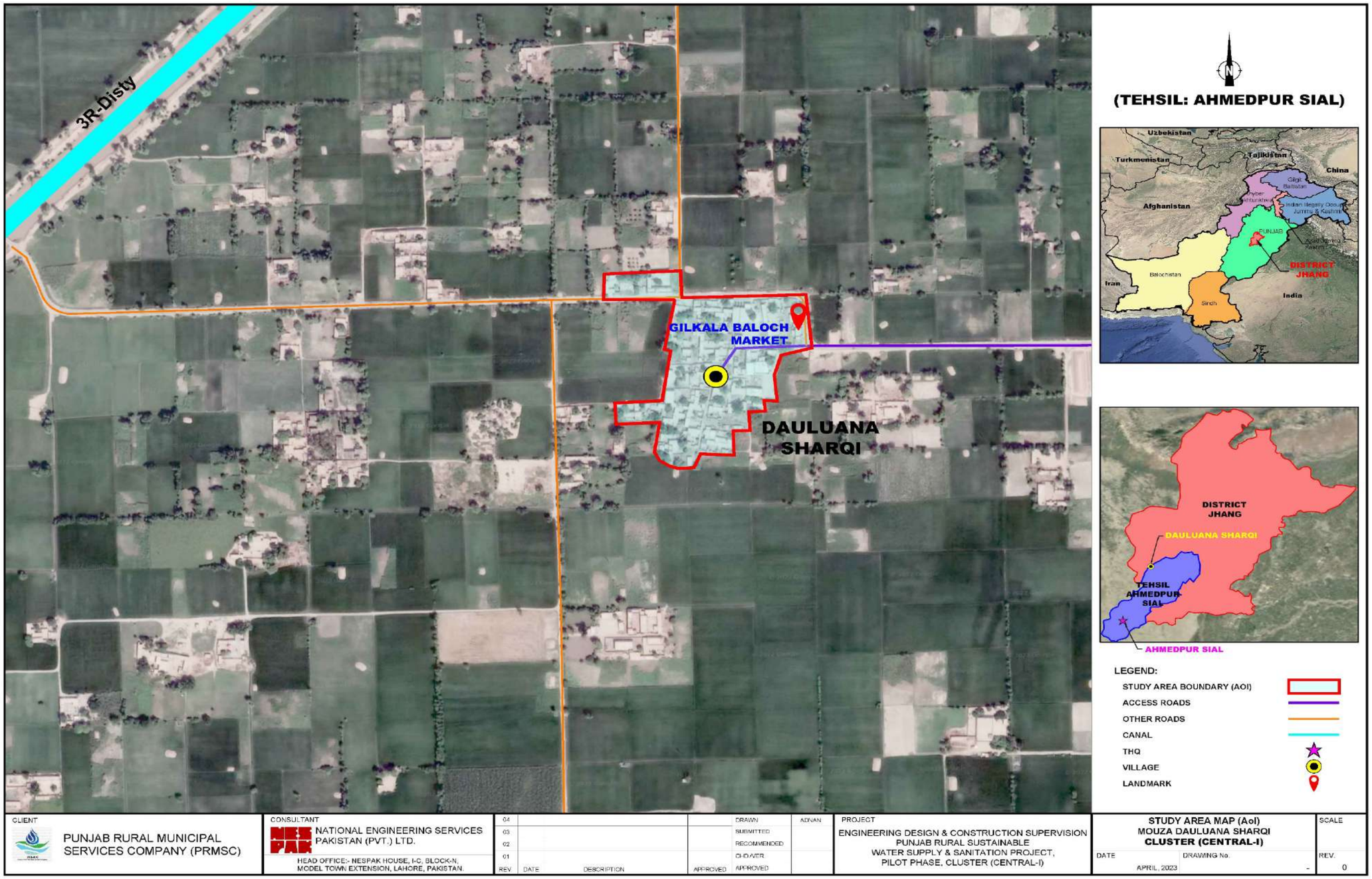


Figure 4.5: Study Area Map / AoI of Dauluana Sharqi

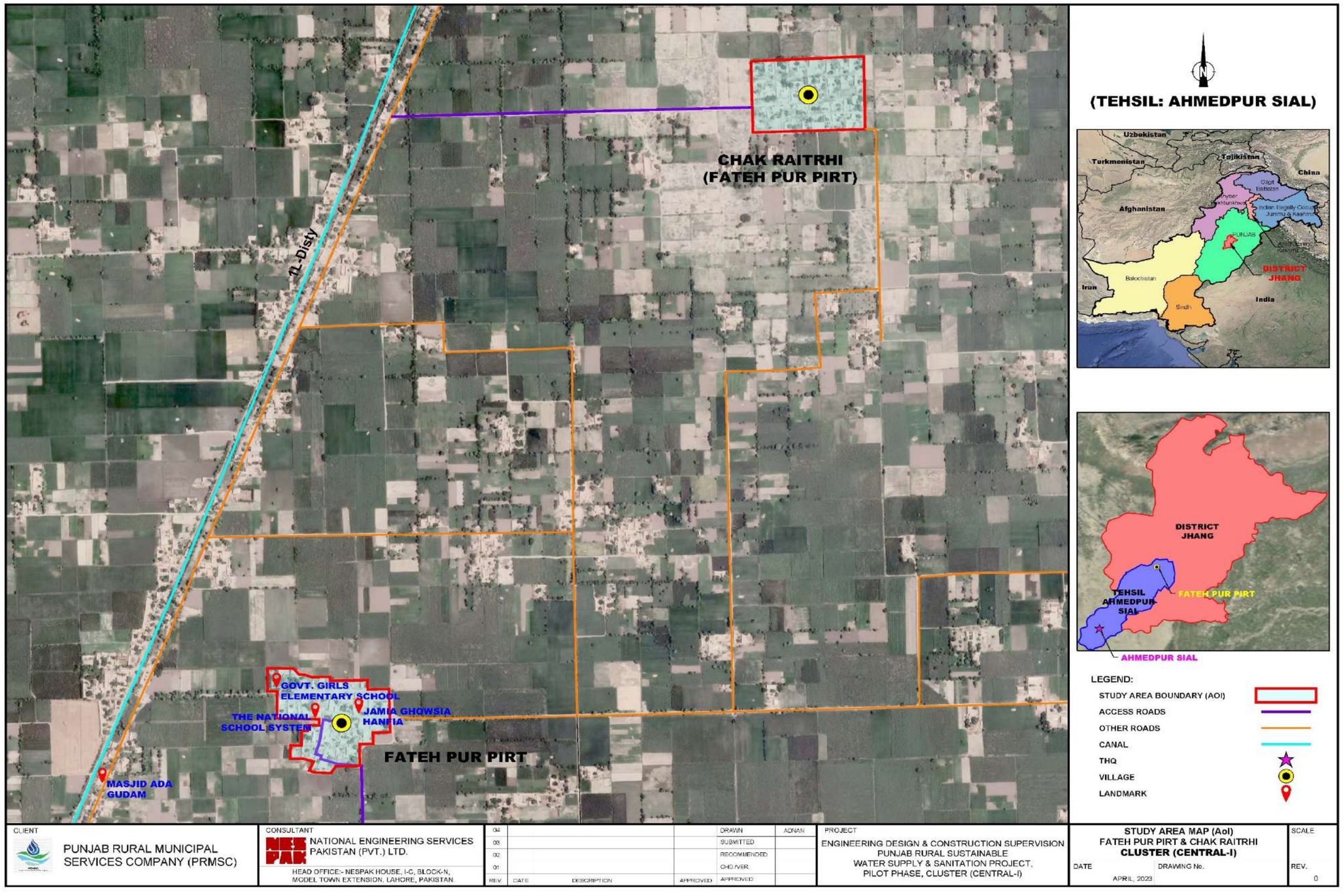


Figure 4.6: Study Area Map / AoI of Fatehpur Pirti

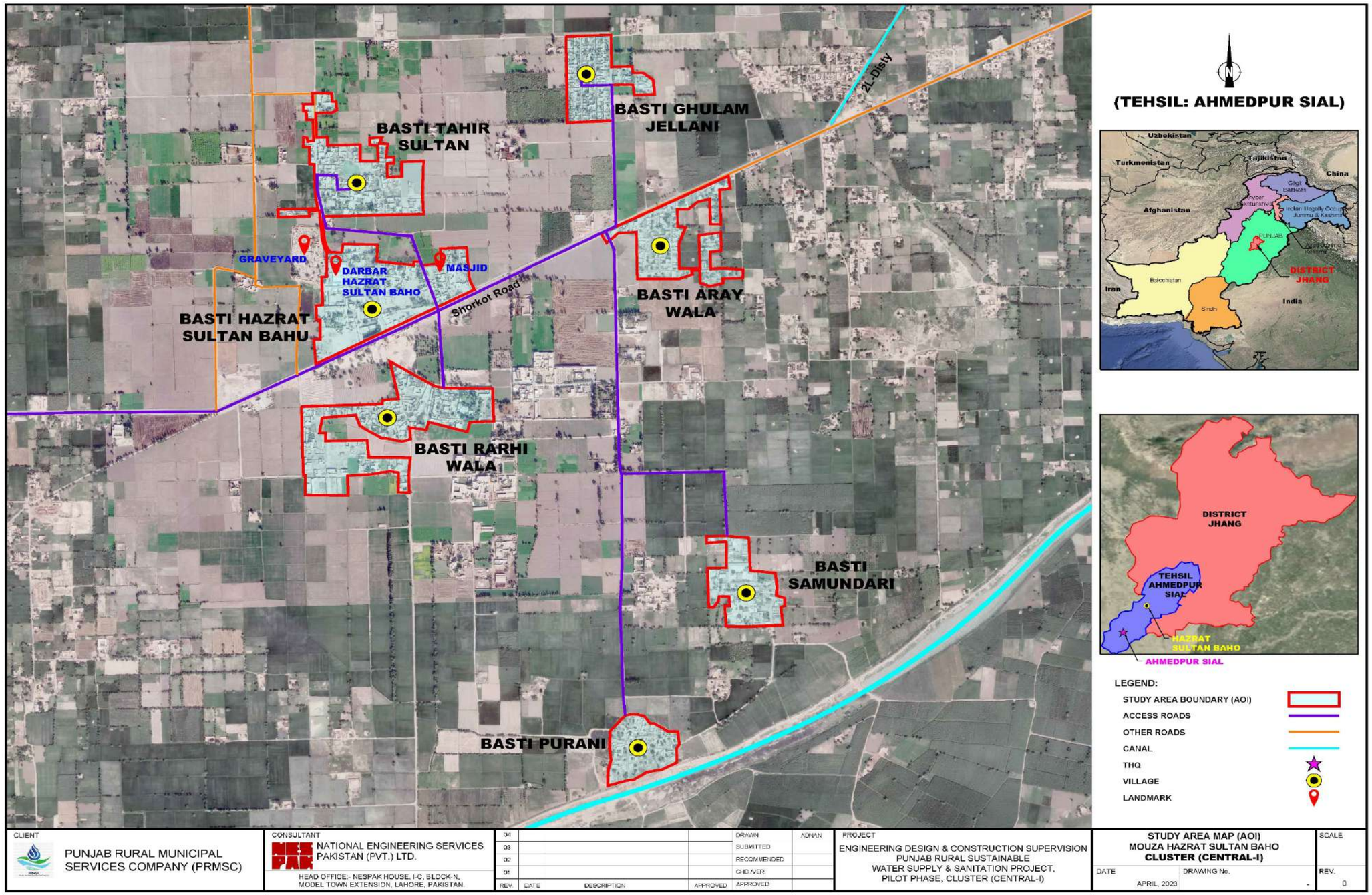


Figure 4.7: Study Area Map / AoI of Hazrat Sultan Bahu

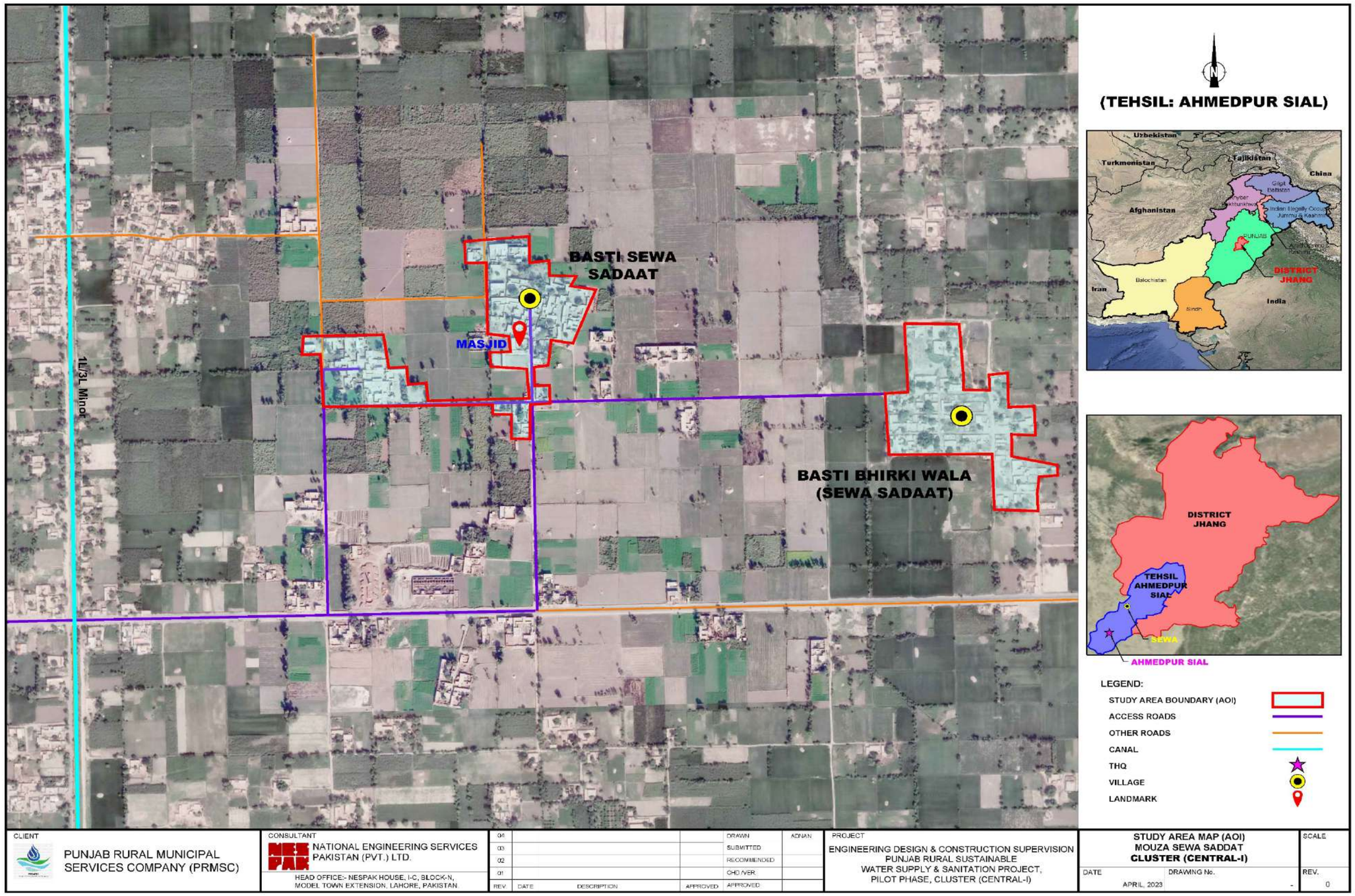


Figure 4.8: Study Area Map / AoI of Sewa Sadaat

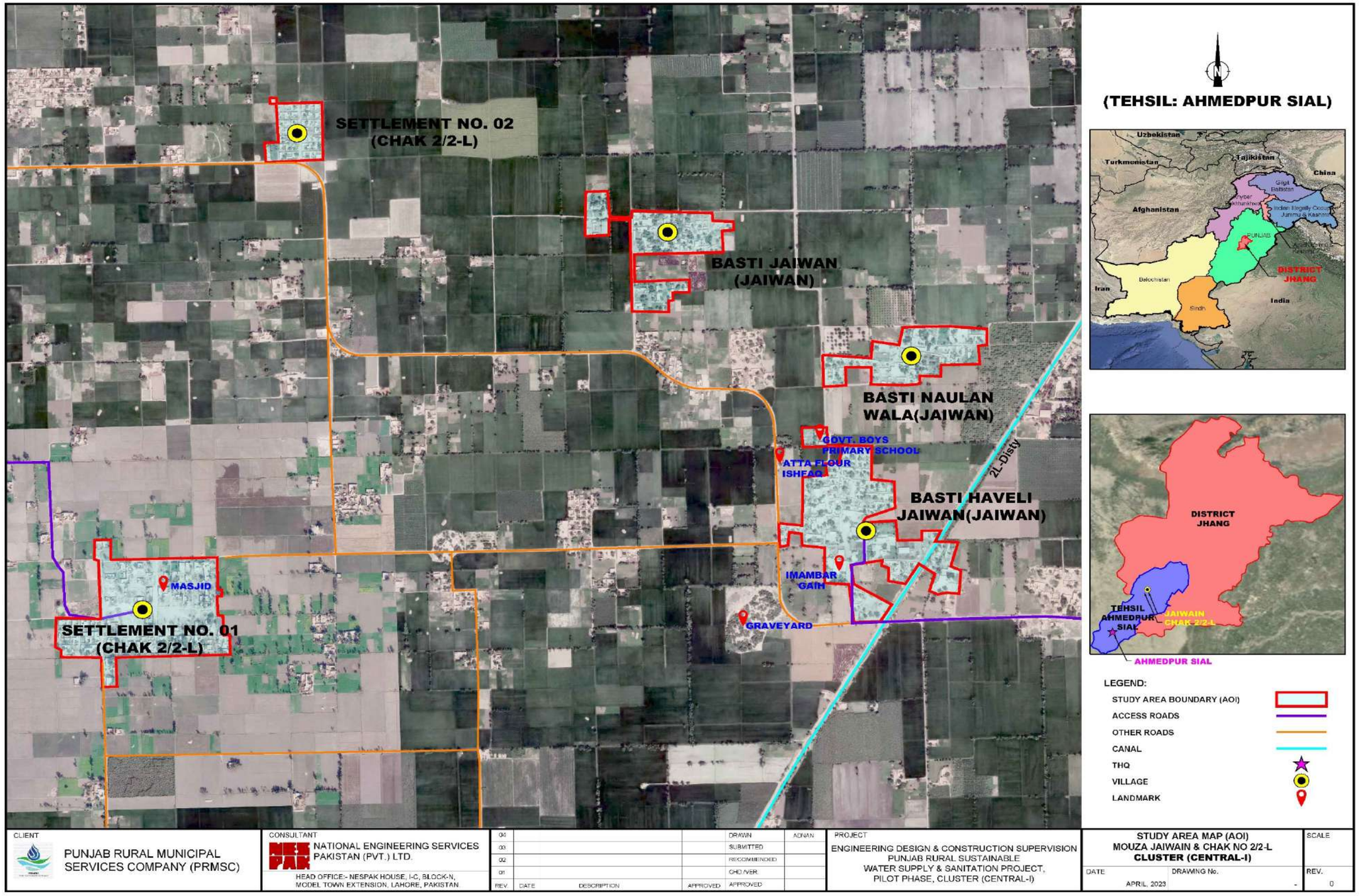


Figure 4.9: Study Area Map / AoI of Chak No. 3/3R

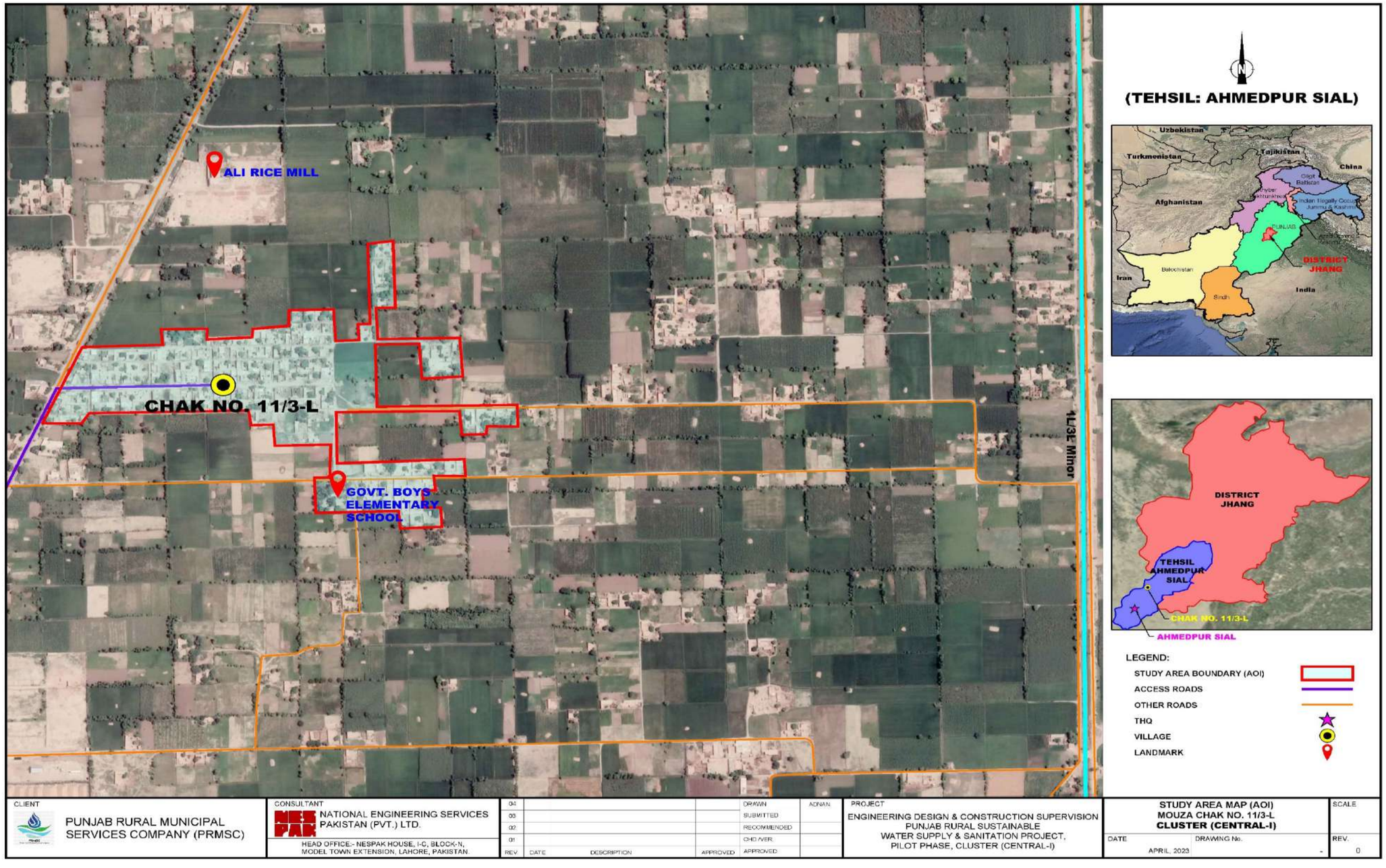


Figure 4.10: Study Area Map / AoI of Chak No. 11/3L

As per the national and provincial regulations along with the requirements of World Bank's OP's, 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 proposed project sites are rural settlements comprising residential and agriculture areas. The ground elevations vary from 473.89 feet to 450.94 feet in our selected (10) villages of Tehsil Ahmadpur Sial. Active flood plains are narrow strips along the river and its tributaries. The plains are inundated almost every year, covered with rich alluvium and are suitable for agriculture. Subrecent flood plains also called alluvial terraces are depositional and are separated from the adjoining active flood plains by the river cut bluffs ranging in height from 1m to 5m. The topography survey was conducted in villages, where piped network is proposed & there minimum and maximum elevation is given below.

Village	Minimum Elevation (feet)	Maximum Elevation (feet)
Sial Kot	473.89	466.58
Hazrat Sultan Bahu	458.54	450.94
Chak No. 11/3L	466.83	463.48

4.4.2 Geology

Ahmad Pur Sial, a tehsil of district Jhang, is located at 30.41°'N, 71.46°'E having an altitude of 390 feet, in a low-lying area alongside the Chenab and Jhelum rivers. The soils found here are loamy, rich in clay content, and deficient in organic matter and phosphorus.[8] The whole district is an alluvial plain, much of it being of recent formation.[9] Active floodplains are located alongside rivers. Subrecent floodplains, called alluvial terraces, are depositional and separated from active flood plains by river-cut bluffs 1 to 5 metres high. No fault lines traverse through the project area.

[8] "Characterization of salinity and fertility status of canal water irrigated soils in tehsil Ahmadpur Sial Punjab, Pakistan," Azhar Mahmood, Muhammad Abdullah, Muhammad T. Shah, Sajid Ali, Amanat Ali, and Khan A. R. Khan.

[9] https://jhang.punjab.gov.pk/geography

4.4.3 Climate and Meteorology

i. Average Temperatures

Figure 4.11 represents 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 Ahmadpur Sial. 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.[10]

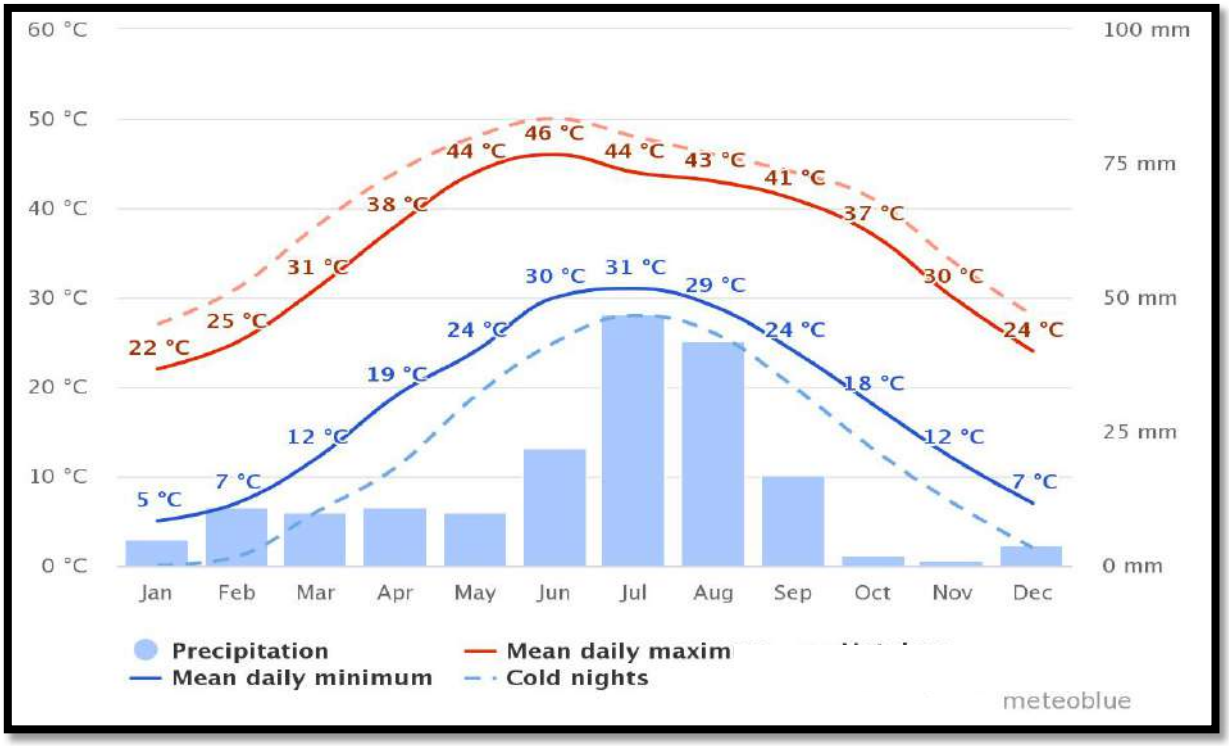


Figure 4.11: Average Temperatures

As it can be seen from **Figure 4.11**. 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 46 ºC and 30 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 22 ºC and 5 ºC in January. The maximum temperatures are presented in **Figure 4.12.**

[10] https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/ahmadpur-sial_pakistan_1356491

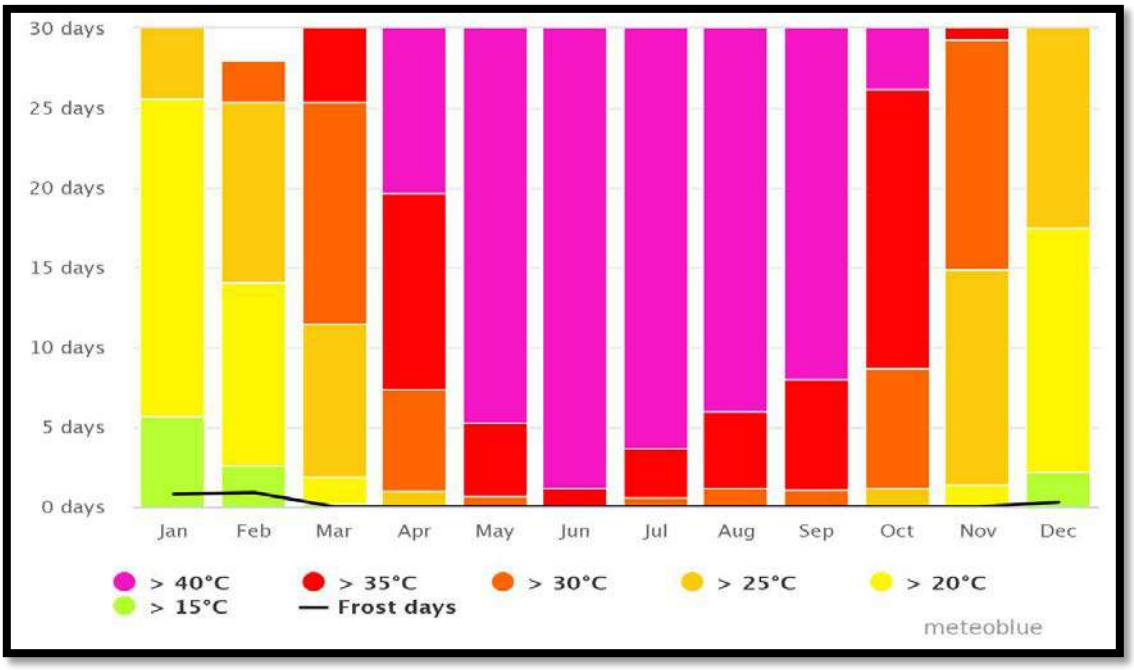


Figure 4.12: Maximum Temperatures

Figure 4.13 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 June to August.[11]

[11] https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/ahmadpur-sial_pakistan_1356491

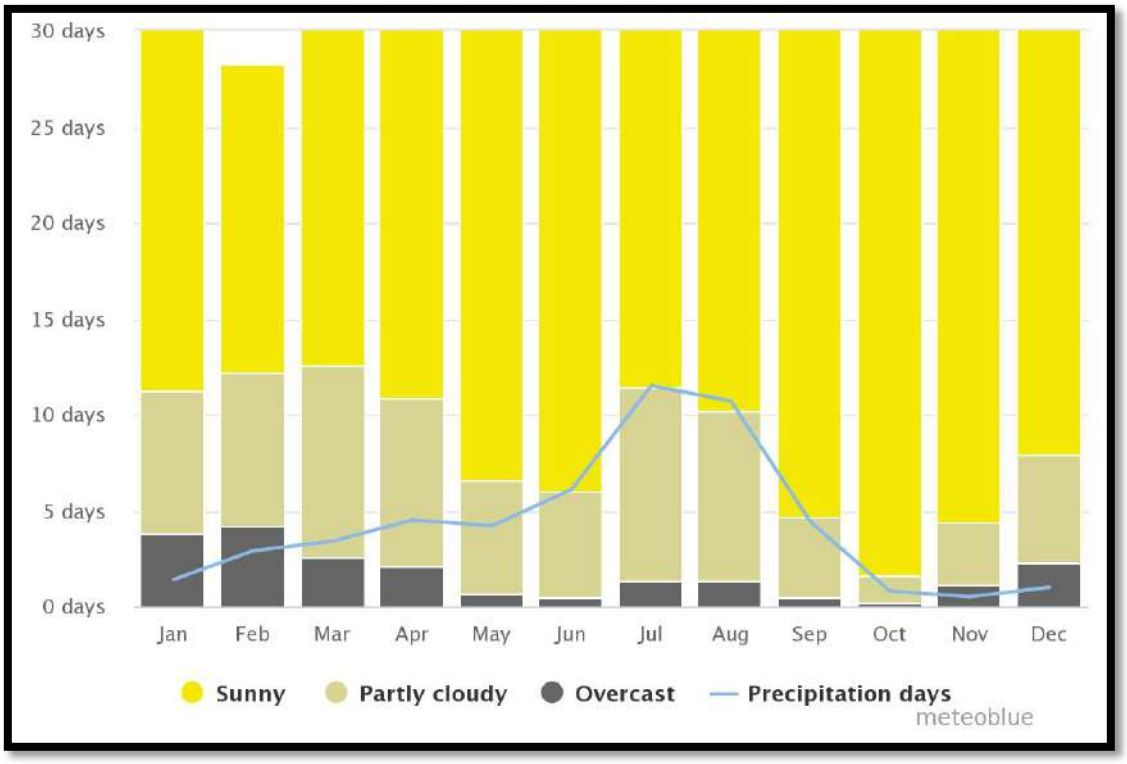


Figure 4.13: Cloudy, Sunny and Precipitation Days

Figure 4.14 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 2-5 mm. Highest intensity of precipitation is also observed in the months of June, July and August ranges between 5-10mm or 10-20 mm as Shown in **Figure 4.14**.

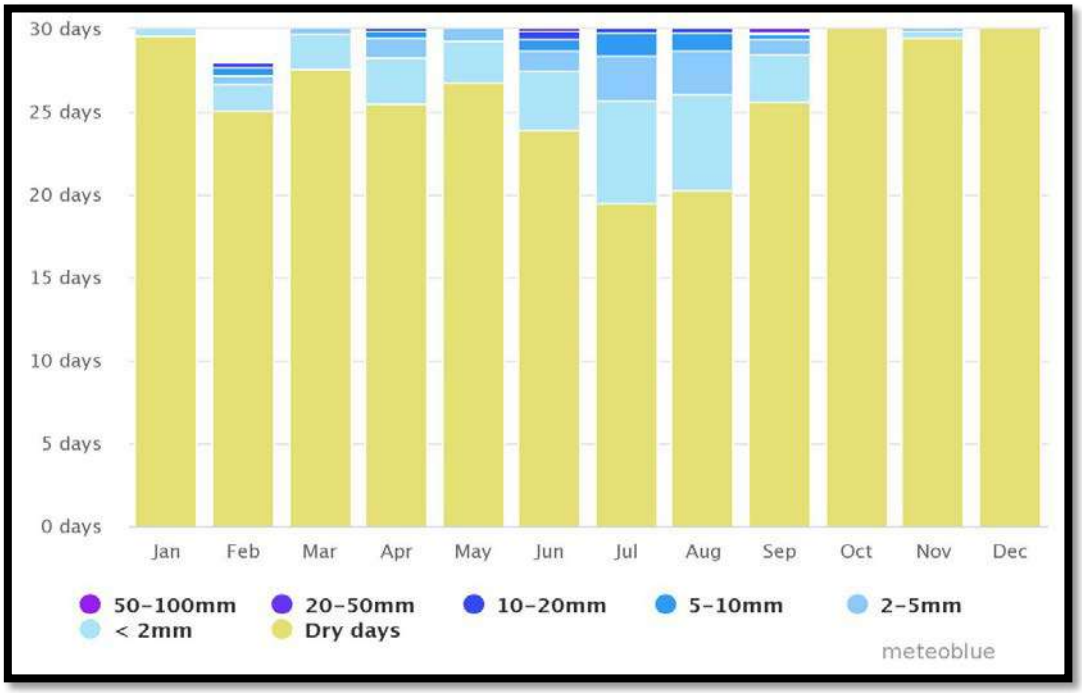


Figure 4.14: Precipitation Amounts

ii. Wind

Figure 4.15 shows the days per month, during which the wind reaches a certain speed. Maximum wind speeds can be observed in the months of March to June which is >28 km/h. Wind speed >12 km/h dominates throughout the year.

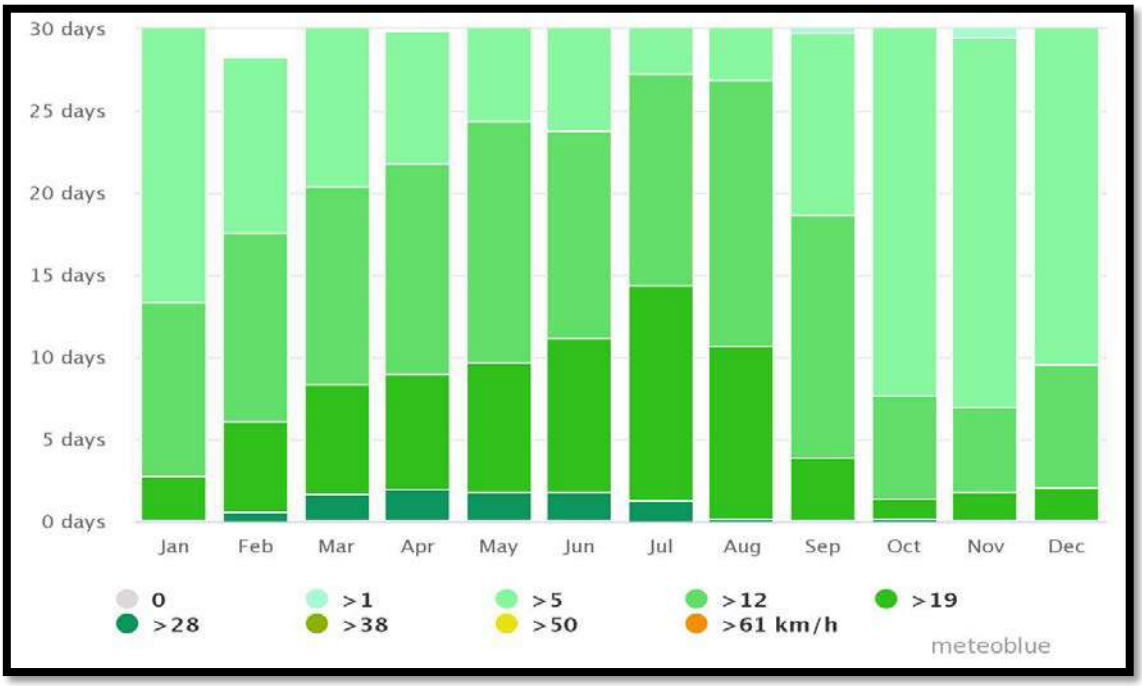


Figure 4.15: Wind Speed

The wind rose for Ahmadpur Sial shows how many hours per year the wind blows from the indicated direction. Wind rose is shown in **Figure 4.16**. It can be seen from the wind rose that dominant wind direction is towards North (N), NNW NW, South (S), SSW and NNE.

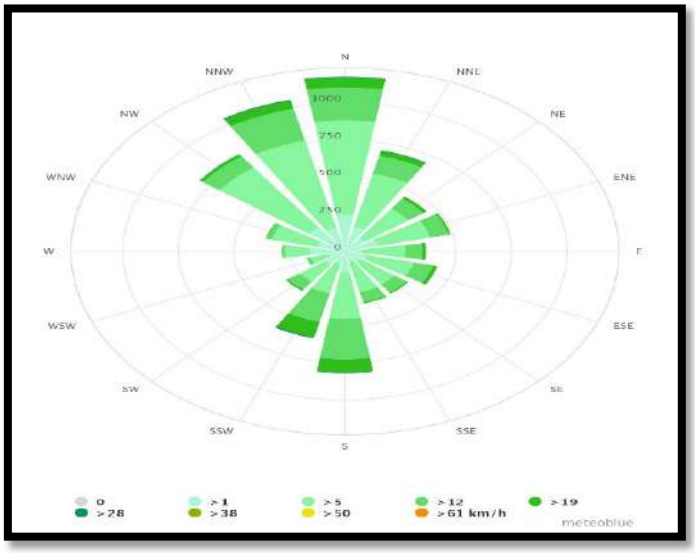


Figure 4.16: Wind Rose

4.4.4 Water Resources

The description of the water resources of Ahmadpur Sial is as under. Hydrology Map of Ahmadpur Sial is shown in **Figure 4.12.**

A. Surface water

At Jaiwan and Chak No.2/2L nearest surface water resource is the 2L Distributary which is existing on the eastern side of village and passing within the boundary of its settlement Basti Haveli Jaiwan, Rangpur canal exist on the eastern side of Sial Kot, 2R distributary on eastern side of Gudara approximately at a distance of 1.5km, Rangpur canal on the western side of Doulana sharqi, 1L distributary on the western side of Fatehpur Pirti, River Chenab which is adjacent to Basti Purani and 2L-Distributary is located at a distance of 400 m from the boundary of the settlement Basti Aray Wali of Sultan Bahu. 1L/3L Minor is located at a distance of 400m from Sewa Sadaat, Rangpur Canal & 3R distributary on eastern side of Chak No. 3/3R and 1L/3L Minor is located at a distance of 880 m from Chak No. 11/3L.

B. Groundwater

Groundwater investigation study reveals that sweet water under un-confined conditions. The depth to water table is ranging from 10 ft. (3 m) to 25 ft. (7.6 m) below NSL. Borehole depth of existing water wells varies from 25 ft. (7.6 m) to 110 ft. (33.5 m) below NSL with maximum discharge rate of 112 USGPM (0.25 cusec). TDS measured during inventory reveal general water quality of deep water is good as compared to shallow.

Groundwater is extracted through water wells installed for public and private agencies, ejector pumps, centrifugal pump and hand pumps installed by inhabitants and donors. Total forty-nine (49) different water points in the project area has been visited to assess the groundwater quantity, quality and depth to water table (DWT).

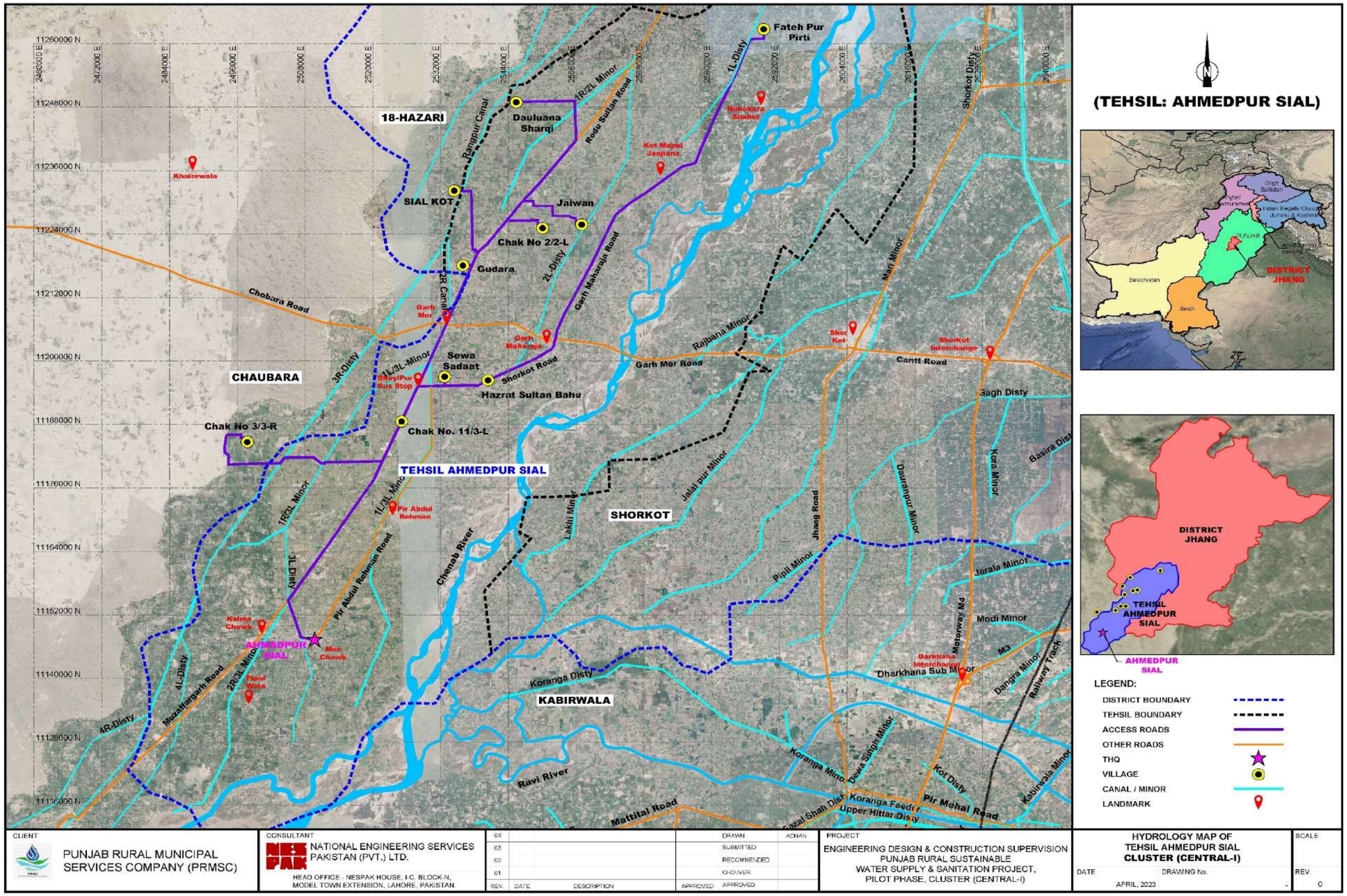


Figure 4.17: Hydrology Map of Ahmadpur Sial

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 (09) 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 villages is shown in **Figure 4.18.**

The task of environmental monitoring and testing was awarded to EPA 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 Haweli Jeewan, from March 14, 2023 to March 15, 2023 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
				Haweli Jeewan	
1	Carbon monoxide		mg/m³ (8 Hour)	0.978	5
2	Sulphur dioxide		µg/m³	29.16	120
3	Ozone		µg/m³ (1 Hour)	61.9	130
4	Nitric oxide		µg/m³	0.71	40
5	Nitrogen Dioxide		µg/m³	11.0	80
6	PM (2.5)		µg/m³	33.7	35
7	PM (10)		µg/m³	142.9	150
8	Suspended particulate Matter (SPM)		µg/m³	402	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 (L_{eq}) dB(A)		PEQS Limit dB(A)	
		Day Time	Night Time	Day Time	Night Time
1	Haweli Jaiwan	65.6	54.8	**75**	**65**

C. Groundwater/ Drinking Water Quality

Groundwater/ Drinking water samples were collected from villages of Ahmadpur Sial from March.14, 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 drinking water quality are given in **Table 4.3** and attached as **Annex-II** respectively.

Table 4.3: Results of Groundwater

Sr. No.	Measuring Parameter	Units	PEQS Limits	Chak Azmat Kamal Gudara	Sial Kot	Dalona Samri Jalalabad	FatehPur Pirti	Haweli Jeewan	2/2L	Hazrat Sultan Bahu	Sewa Sadaat	3/3R
1	PH @ 25˚C		6.5-8.5	7.663	7.688	7.373	7.75	7.704	7.69	7.771	7.743	7.773
2	Colour	TCU	<15TCU	0	0	0	0	0	0	0	0	0
3	Taste	…..	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable
5	Odour	…..	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable
4	Turbidity	NTU	5	0.26	0.30	0.40	0.25	38.0	0.42	0.35	9.92	0.25
6	Total Dissolved Solids	TDS (mg/L)	<1000	1350	830	1160	630	930	780	1140	910	900
7	Total Hardness as CaCO3	(mg/L)	<500	200	180	420	330	290	330	370	220	230
8	Aluminium	Al^{+3} (mg/L)	≤0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	Antimony	Sb (mg/L)	≤0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	Arsenic	As (mg/L)	≤50	BDL	0.0035	BDL	0.0207	0.0016	BDL	BDL	BDL	0.0230
11	Barium	Ba (mg/L)	0.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Boron	B(mg/L)	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Sr. No.	Measuring Parameter	Units	PEQS Limits	Chak Azmat Kamal Gudara	Sial Kot	Dalona Samri Jalalabad	FatehPur Pirti	Haweli Jeewan	2/2L	Hazrat Sultan Bahu	Sewa Sadaat	3/3R
13	Cadmium	Cd^{+2} (mg/L)	0.003	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Chloride	Cl^{1-} (mg/L)	<250	100	50	120	55	90	70	115	75	80
15	Chromium	Cr (mg/L)	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.0614
16	Copper	Cu^{2+} (mg/L)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Flouride	F^{-} (mg/L)	≤1.5	0.9	0.6	0.9	0.5	0.7	0.5	0.6	0.4	0.5
18	Lead	Pb^{+2} (mg/L)	≤0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Manganese	Mn^{2+} (mg/L)	≤0.5	BDL	0.0930	0.1986	0.4206	0.3392	BDL	0.2984	0.0379	0.0570
20	Mercury	Hg^{+2} (mg/L)	≤0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Nickel	Ni^{+2} (mg/L)	≤0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Nitrate	NO_3^- (mg/L)	≤50	0.459	0.152	0.348	BDL	0.095	BDL	0.390	0.108	0.136
23	Nitrite	NO_2^- (mg/L)	≤3	0.140	0.012	0.084	BDL	0.010	BDL	0.140	0.025	0.014
24	Selenium	Se^{+2} (mg/L)	0.01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Residual Chlorine	Cl_2 (mg/L)	0.2-0.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Zinc	Zn^{+2} (mg/L)	5	0.1670	0.0090	0.0435	0.0081	0.5233	BDL	0.2850	0.0691	0.0090

Sr. No.	Measuring Parameter	Units	PEQS Limits	Chak Azmat Kamal Gudara	Sial Kot	Dalona Samri Jalalabad	FatehPur Pirti	Haweli Jeewan	2/2L	Hazrat Sultan Bahu	Sewa Sadaat	3/3R
27	Phenolic compound	Phol (mg/L)	-	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Sodium	(mg/L)	-	358.48	178.59	185.27	58.5810	170.64	111.43	200.94	186.69	194.58
29	Potassium	(mg/L)	-	34.98	8.97	13.96	6.78	7.31	8.18	8.34	8.73	9.52
30	Total Iron	(mg/L)	-	BDL	BDL	BDL	BDL	3.03	BDL	BDL	BDL	BDL
31	Total Coliform	TC (count/100 ml)	0/100ml	Nil	Nil	Nil	Nil	35.6	95.2	78.5	35.6	Nil
32	Escherichia Coli	E.Coli (count/100 ml)	0/100ml	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
33	Feacal Coliform	F.Coli (count/100 ml)	0/100ml	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

D. Wastewater Quality

Wastewater samples were collected from all five villages on March. 14 2023 by Pak Green Laboratory and was analyzed for its parameters. The analysis results of wastewater samples are compared with PEQS. The detailed monitored results for wastewater quality are given in **Table 4.4 and** attached as **Annex-II** respectively.

Table 4.4: Results of Wastewater

Sr. No.	Measuring Parameter	Units	PEQS Limits	Haweli Jeewan
1	Temperature	◦C	---	23.9
2	PH @ 25 ˚C	pH	6.5 to 8.5	7.64
3	Biological Oxygen Demand	BOD5 (mg/L)	80	158
6	Chemical Oxygen Demand	COD (mg/L)	150	256
10	Total Suspended Solids (Settled)	TSS (mg/L)	200	450
11	Total Dissolved Solids (TDS)	TDS (mg/L)	3500	1460
12	Oil & Grease	O.Gr(mg/L)	10	BDL
13	Phenolic Compound	Phol (mg/L)	--	BDL
14	Chloride	Cl1- (mg/L)	<250	190
15	Fluoride	F^{-} (mg/L)	≤1.5	0.6
16	Anionic Detergent	Det (mg/L)	20	0.846
17	Sulfate	SO_4-2(mg/L)	600	165
18	Sulfide	S-² mg/L)	1.0	BDL
19	Ammonia	NH3(mg/L)	40	24.8
20	Cadmium	Cd·² (mg/L)	0.01	BDL
21	Chromium	Cr (mg/L)	≤0.05	BDL
22	Copper	Cu2+ (mg/L)	2.0	0.0380
23	Lead	Pb·² (mg/L)	≤0.005	0.1068
24	Mercury	(Hg) (mg/L)	≤0.001	BDL
25	Selenium	Se·² (mg/L)	0.01	BDL
26	Nickel	Ni·² (mg/L)	≤0.02	BDL
27	Silver	Ag (mg/L)	1.0	BDL
28	Zinc	Zn·² (mg/L)	5.0	0.2021
29	Arsenic	As (mg/L)	≤50	0.0243
30	Barium	Ba (mg/L)	0.7	BDL

Sr. No.	Measuring Parameter	Units	PEQS Limits	Haweli Jeewan
31	Total Iron	Fe2+ (mg/L)	8.0	10.25
32	Manganese	Mn^{+2}(mg/L)	≤0.5	0.70
33	Boron	B(mg/L)	6.0	BDL
34	Chlorine	mg/L	1.0	BDL
35	Total Toxic Metals (Cd, Cr, Cu, Pb, Hg, Se, Ni, Ag, As, Ba, B)	(mg/L)	2.0	0.1691
36	Sodium	(mg/L)	-	259.17
37	Cyanide	CN^{-} (mg/L)	1.0	BDL

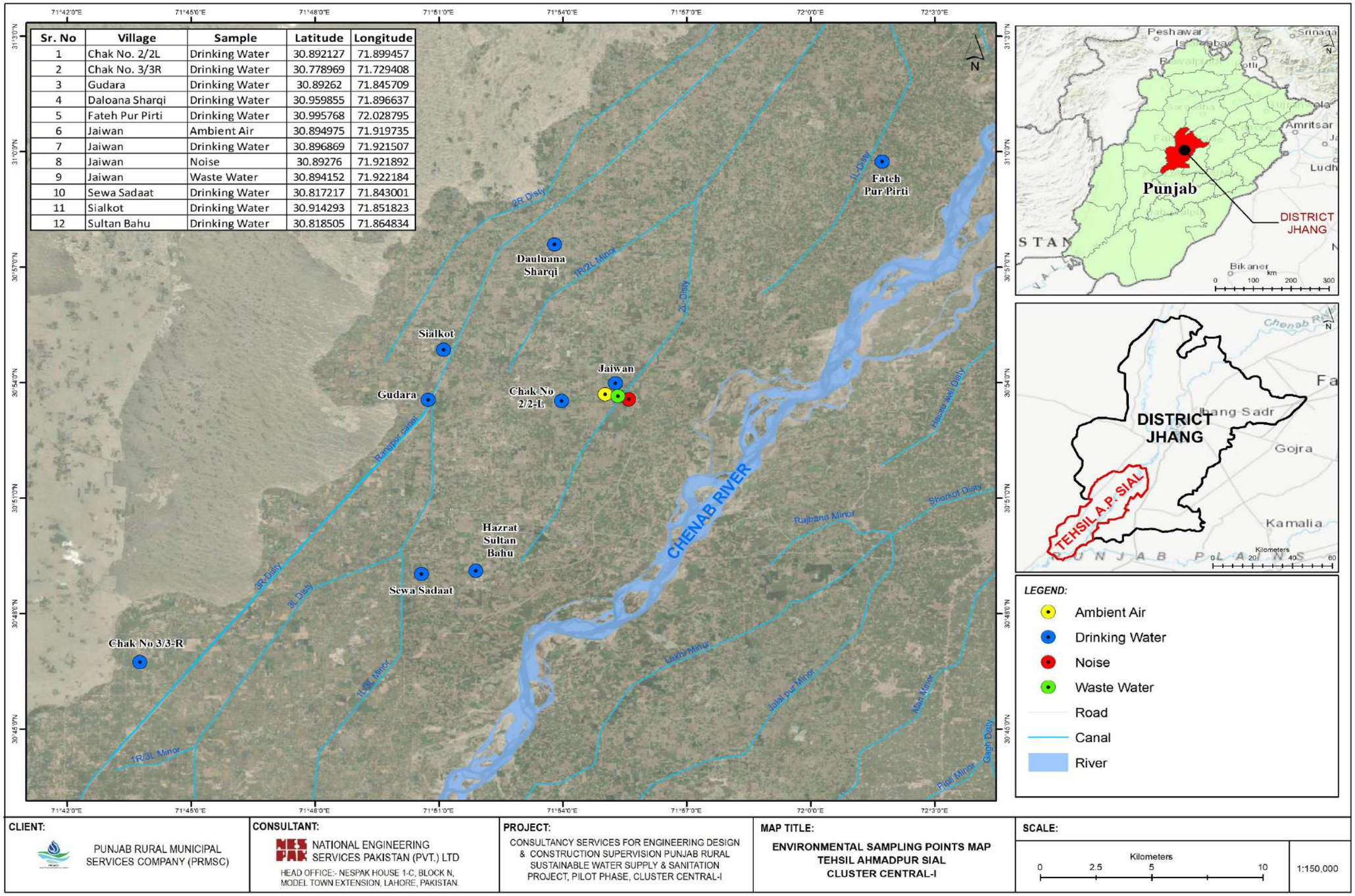


Figure 4.18: Environmental Sampling Points Location

4.4.6 Seismology

Tehsil Ahmadpur Sial is located in a low Hazard earthquake zone. **Figure 4.19** shows the seismic zoning map of Ahmadpur Sial 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 4.5**.

Table 4.5: 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 –

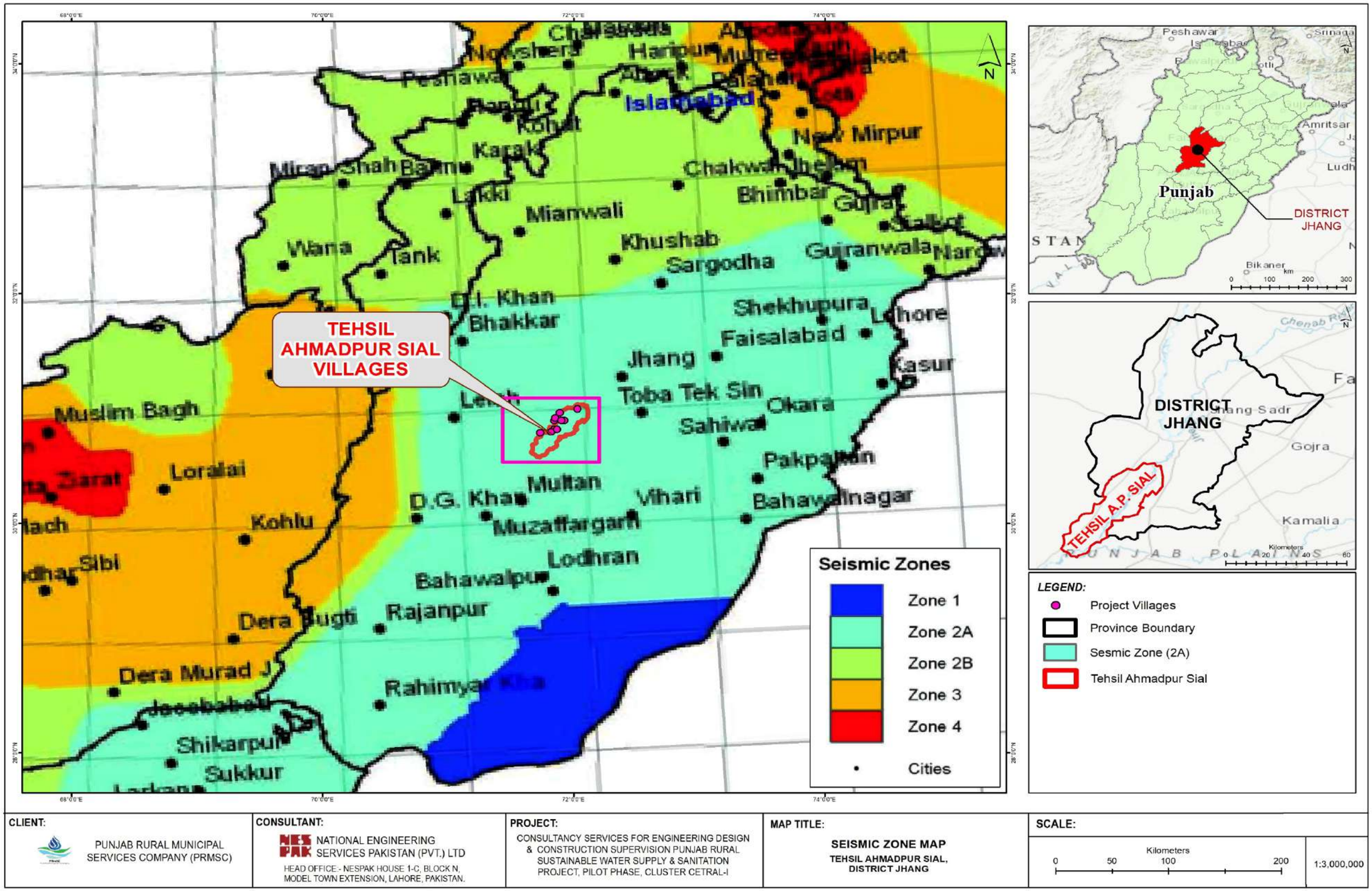


Figure 4.19: Seismic Zone Map of Project Area

4.4.7 Land use of Project Area

The project area predominantly comprises agricultural land along with built up area. There are schools, mosques, and graveyards etc. A view of Ahmadpur Sial villages is shown in **Plate 4.3.**



Jaiwan (Basti Haveli)



Basti Jaiwan



Chak 2/2L



Chak 3/3R



Chak 11/3L



Dauluana Sharqi



Fatehpur Peerti



Gudara



Basti Tahir Sultan (Hazrat Sultan Bahu)



Basti Rarhi wala (Hazrat Sultan Bahu)



Sewa Sadaat



Basti Sialkot

Plate 4.1: Land use in project Area of Ahmadpur Sial

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 ten villages are listed in **Table 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14 respectively.** A comprehensive map showing sensitive receptors of all ten villages of Ahmadpur Sial such as schools, Mosques, Graveyard, Hospital, etc. are attached as **Annex-III.**

Table 4.6: Environmental Sensitive Receptors and their Sensitivity in Basti Jaiwan

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Basti Jaiwan	Govt. Elementary School (Haveli Jaivan)	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
B	**Holy Places/ Shrines**	
Basti Jaiwan	Mosque (Haveli Jaivan)	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.
	Jaamia Masjid Jafria (Haveli Jaivan)	
	Imam Bargah (Haveli Jaivan)	
	Masjid (Basti Naulawalan)	
	Imam Bargah (Basti Naulawalan)	
	Masjid (Basti Darbar Wali)	
	Imam Bargah (Basti Karbla)	
C	**Health Institutions / Health Care**	
Basti Jaiwan	Al-Abbas Homeopathic (Haveli Jaivan)	Sensitivity due to access, dust, noise and vibrations especially during excavation. Noise and vibration may effect on mental health of staff.

Table 4.7: Environmental Sensitive Receptors and their Sensitivity In 2/2L

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
2/2L	Govt. Model Insaf Elementary School (Girls)	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
	Govt. Model Elementary School (Boys)	

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
B	**Holy Places/ Shrines**	
2/2L	Masjid	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.
	Masjid	

Table 4.8: Environmental Sensitive Receptors and their Sensitivity in Basti Sialkot

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Basti Sialkot	Govt. Elementary School	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
B	**Holy Places / Shrines**	
Basti Sialkot	Jaamia Masjid Siddique Akbar	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.
	Masjid (Ahl-e-Tashie)	
	Masjid Usman-e-Ghani	
C	**Graveyard**	
Basti Sialkot	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 Gudara (Chak Azmat Kamal)

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Gudara	Superior Model School	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
B	**Holy Places / Shrines**	
Gudara	Masjid Bilal Rizvi	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.

Table 4.10: Environmental Sensitive Receptors and their Sensitivity in Dauluana Sharqi

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Holy Places/ Shrines**	
Dauluana Sharqi	Madrassa	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.

Table 4.11: Environmental Sensitive Receptors and their Sensitivity in Fatehpur Peerti

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Fatehpur Peerti	Govt. middle school	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
	The National Eng. Medical School	
	Govt. Girls Elementary school	
B	**Holy Places / Shrines**	
Fatehpur Peerti	Jaamia Masjid Ghausia Hanfia	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.

Table 4.12: Environmental Sensitive Receptors and their Sensitivity in Mauza Sultan Bahu

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Sultan Bahu	Decent school system (Basti Aray wali)	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
B	**Holy Places/ Shrines**	
Sultan Bahu	Masjid (Basti Tahir Sultan)	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.
	Darbar Sultan Bahu (Basti Sultan Tahir)	
	Darbar Baba Gaman shah (Basti Aray wali)	
	Masjid (Basti Ghulam)	
C	**Health Institutions / Health Care**	

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
Sultan Bahu	Health House (Basti Rarhi)	Sensitivity due to access, dust, noise and vibrations especially during excavation. Noise and vibration may affect on mental health of staff.
D	**Graveyard**	
Sultan Bahu	Graveyard (Basti Sultan Tahir)	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 Mauza Sewa Sadaat

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
Sewa Sadaat	Govt. Model Girls Elementary school	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
	Govt. Insaf Girls school	
B	**Holy Places / Shrines**	
Sewa Sadaat	Imam Bargah (Birki Wala)	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.

Table 4.14: Environmental Sensitive Receptors and their Sensitivity in 3/3R & 11/3L

S.N.	Name/Type of Physical Sensitive Receptor	Remarks
A	**Educational institutions**	
11/3L	Govt. Boys Elementary School (11/3L)	Sensitivity due to access, dust, noise and vibrations especially during teaching hours.
B	**Holy Places / Shrines**	
3/3R	Masjid Bilal (3/3R)	Holy places are sensitive due to access to fulfill the religious rituals. Noise and Vibration will cause direct impact during prayer hours.

4.5 Biological Environment

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

4.5.1 Flora

The major floral species of the project area include:

i.	Saccharum spontaneum,	Wild Sugarcane
ii.	Phrangmites communis,	Common reed
iii.	Tamarix dioica,	Ghaz tree
iv.	Typha elephantina,	Bora. Elephant grass
v.	Typha angustata,	Narrow-leaf Cat Tail
vi.	Arundo donax,	Giant reed
vii.	Paspalum ditichum,	knotgrass
viii.	Erianthus spp	Sweetcane

A. Major Crops

While during the stakeholder consultation at Agriculture Department the Assistant Director briefed the expert team that major crops are Sugarcane, wheat and Rice that cultivated in the project area.

4.5.2 Fauna

In the area common animals found are dogs, cats, house rats and bats. Domestic livestock that was observed during field visit include buffalo, cattle, goats, sheep, hens and donkeys that are used by the local residents for their living and mobilization purposes and some other are as followed;

1. Wild Pig (Sus scrofa),
2. Hog Deer (Axis porcinus).
3. Smooth-coated Indian Otter (Lutrogale perspicillata).
4. Fishing Cat (Prionailurus viverrinus),
5. Yellow-bellied Scotophil Bat (Scotophilus healthii).

A. Endangered Species

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

4.6 Socioeconomic Environment

4.6.1 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 Ten (10) villages of Ahmadpur Sial. The survey tool used for the socio-economic survey tool is attached as **Annex-IV.**

4.6.2 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

4.6.3 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 106 respondents were asked about their concerns from all the villages of 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 and average annual growth rate from 1998 to 2017 as shown in **Table 4.15.**

Table 4.15: Secondary Data Result of Project Area

Village Name	Area (Acre)	Population				Literacy rate
		Male	Female	Trans-gender	All Sexes	
Chak No 11/3-L	1669	2,560	2,488	-	5,048	53.61%

Village Name	Area (Acre)	Population				Literacy rate
		Male	Female	Trans-gender	All Sexes	
Hazrat Sultan Bahu	3603	3,982	3,183	3	7,168	63.42%
Fatehpur Pirti	2796	3,943	3,862	-	7,805	45.79%
Doulana Sharqi	3093	2,520	2,420	-	4,940	51.56%
Gudara	5309	4,992	4,847	-	9,839	51.95%
Basti Sial Kot	2221	2,562	2,514	1	5,077	54.41%
Jaiwan	3520	2,589	2,508	-	5,097	38.21%
Chak No 2/2-L	493	302	310	-	612	54.32%
Sewa Sadaat	804	1,092	1,073	-	2,165	54.32%
Chak 3/3-R	1206	1,220	1,116	-	2,336	57.24%

4.6.4 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 4.20** presents the age compositions of the respondents.

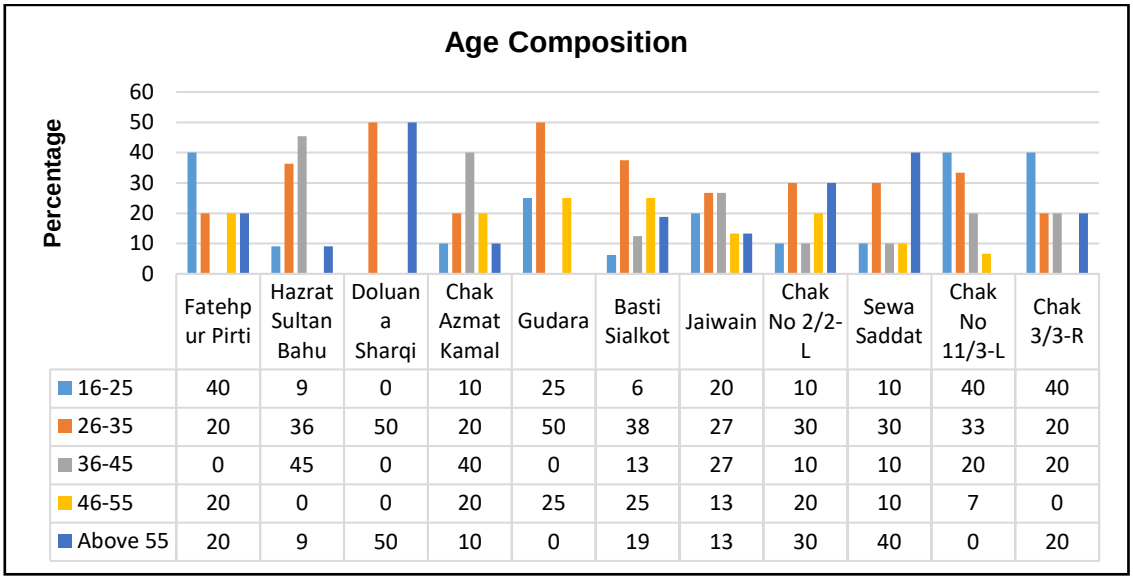
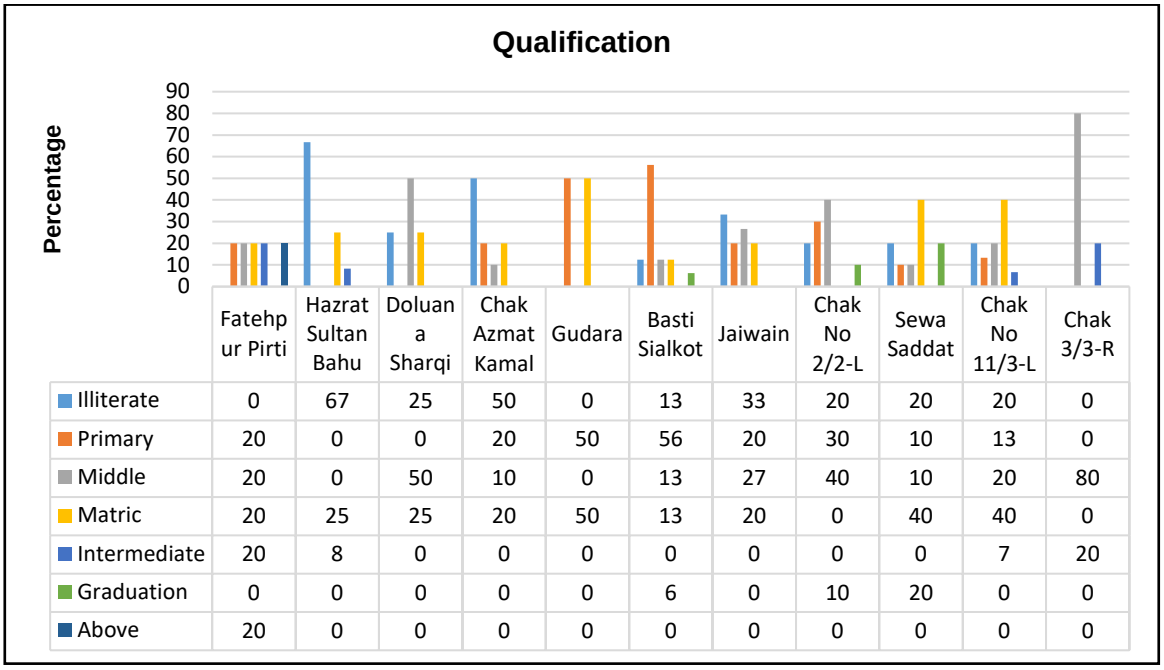


Figure 4.20: Age Composition of the Respondents

B. Qualification of Respondents

Majority of the respondents in most of the villages were literate, expect in Hazrat Sultan Bahu where most of the respondents were illiterate. While the most common level of education attain from all the settlements is up to matriculation. Whereas as few numbers of people get higher education in Fatehpur pirti. 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 4.21.**

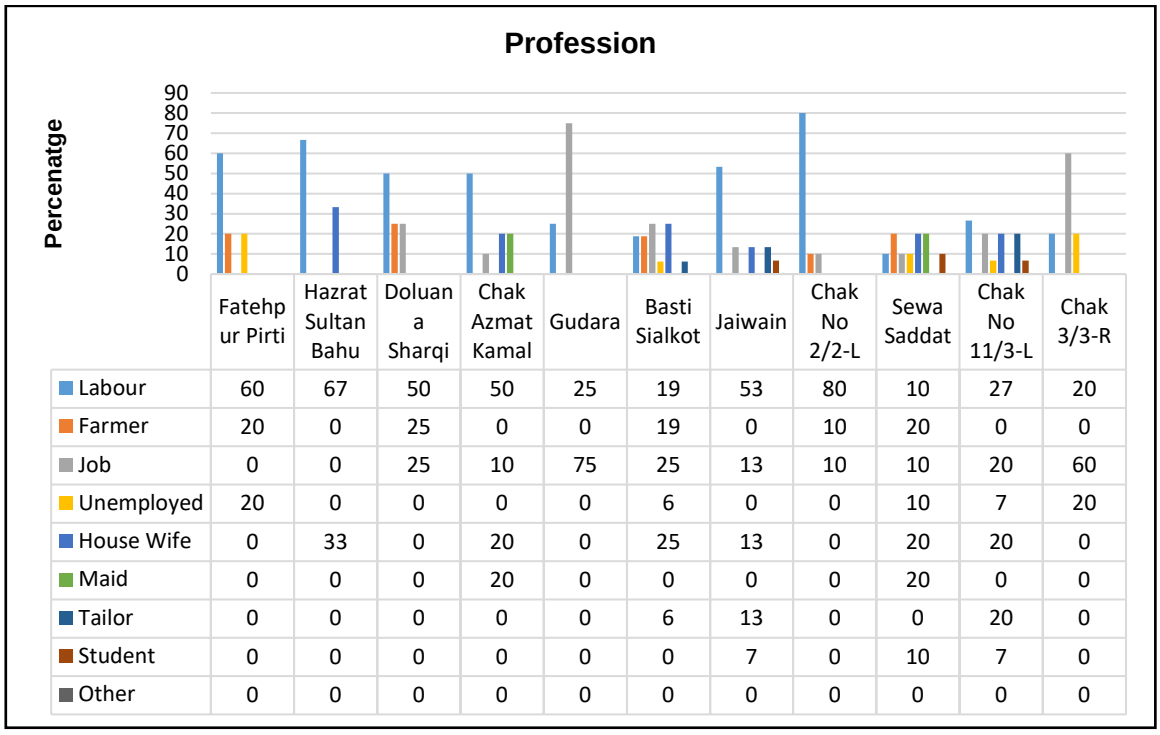


	Fatehpur Pirti	Hazrat Sultan Bahu	Doluana Sharqi	Chak Azmat Kamal	Gudara	Basti Sialkot	Jaiwain	Chak No 2/2-L	Sewa Saddat	Chak No 11/3-L	Chak 3/3-R
Illiterate	0	67	25	50	0	13	33	20	20	20	0
Primary	20	0	0	20	50	56	20	30	10	13	0
Middle	20	0	50	10	0	13	27	40	10	20	80
Matric	20	25	25	20	50	13	20	0	40	40	0
Intermediate	20	8	0	0	0	0	0	0	0	7	20
Graduation	0	0	0	0	0	6	0	10	20	0	0
Above	20	0	0	0	0	0	0	0	0	0	0

Figure 4.21: Qualification of the Respondents

C. Profession of 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 as shopkeeper, work at petrol station and hair saloon, government employee and lady health care supervision. Majority of female respondents do not work in the field as they are house wives and busy in household chores. **Figure 4.22,** presents percentages of the various professions of the respondents

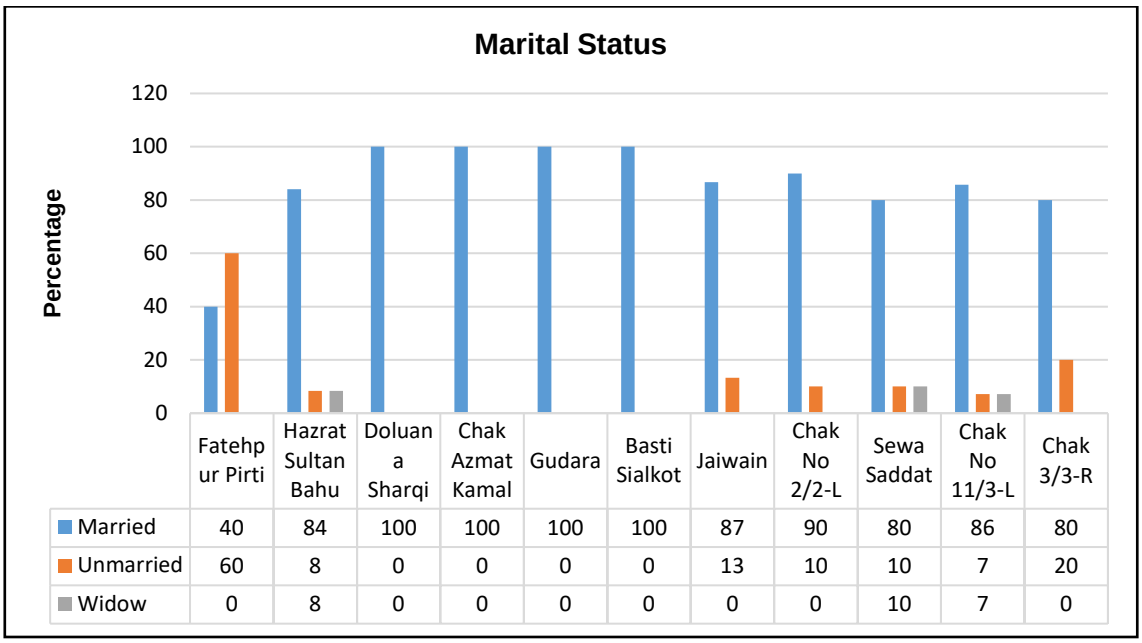


	Fatehpur Pirti	Hazrat Sultan Bahu	Doluana Sharqi	Chak Azmat Kamal	Gudara	Basti Sialkot	Jaiwain	Chak No 2/2-L	Sewa Saddat	Chak No 11/3-L	Chak 3/3-R
Labour	60	67	50	50	25	19	53	80	10	27	20
Farmer	20	0	25	0	0	19	0	10	20	0	0
Job	0	0	25	10	75	25	13	10	10	20	60
Unemployed	20	0	0	0	0	6	0	0	10	7	20
House Wife	0	33	0	20	0	25	13	0	20	20	0
Maid	0	0	0	20	0	0	0	0	20	0	0
Tailor	0	0	0	0	0	6	13	0	0	20	0
Student	0	0	0	0	0	0	7	0	10	7	0
Other	0	0	0	0	0	0	0	0	0	0	0

Figure 4.22: Profession of the Respondents

D. Marital Status and Family System

Survey findings reveal that the ratio of married respondents was higher than the unmarried, few number of females respondents were widow and the majority of them live in joint family systems. **Figure 4.23 & Figure 4.24** present the marital status of the respondents



	Fatehpur Pirti	Hazrat Sultan Bahu	Doluana Sharqi	Chak Azmat Kamal	Gudara	Basti Sialkot	Jaiwain	Chak No 2/2-L	Sewa Saddat	Chak No 11/3-L	Chak 3/3-R
Married	40	84	100	100	100	100	87	90	80	86	80
Unmarried	60	8	0	0	0	0	13	10	10	7	20
Widow	0	8	0	0	0	0	0	0	10	7	0

Figure 4.23: Marital Status of the Respondents

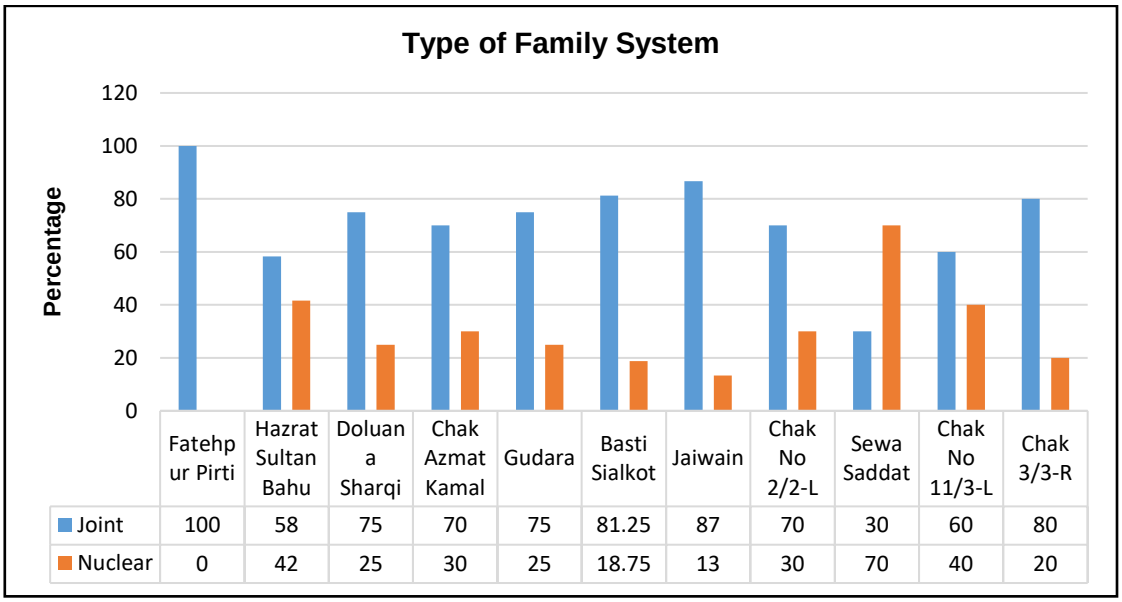


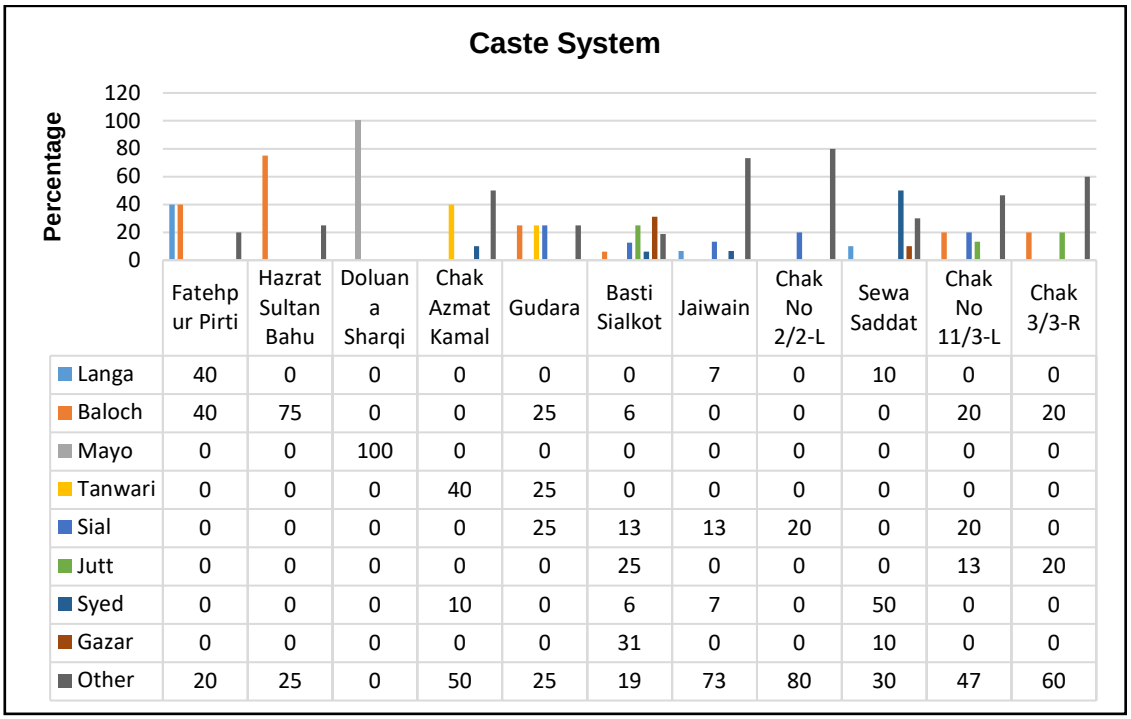
Figure 4.24: Family System of Respondents

E. Religion

The survey area is predominantly made up of Muslim-community, during consultation meeting the respondent were inquire about the existence of any other minority to diminish any religious biasness. 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 Mayo, Baloch, Langa and Sial. Some other castes in minimum ratio include Janjna, Barhial, Darkhan, Hasaly, Malik, Lohar, Modhi, Panwar etc were also reported. The percentages of various castes in the proposed project sites are given in **Figure 4.25.**

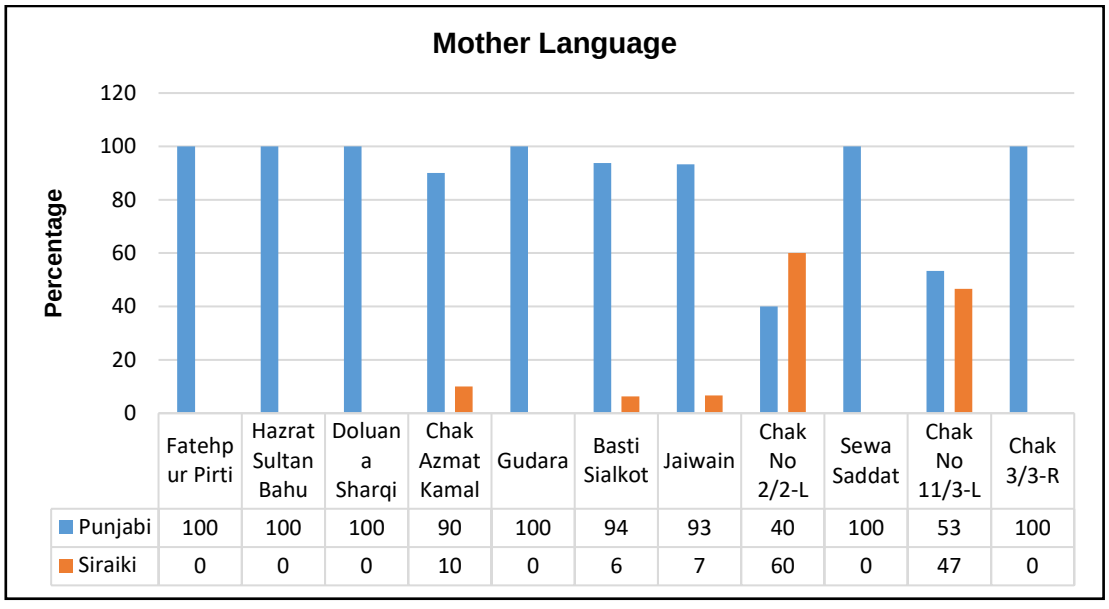


	Fatehpur Pirti	Hazrat Sultan Bahu	Doluana Sharqi	Chak Azmat Kamal	Gudara	Basti Sialkot	Jaiwain	Chak No 2/2-L	Sewa Saddat	Chak No 11/3-L	Chak 3/3-R
Langa	40	0	0	0	0	0	7	0	10	0	0
Baloch	40	75	0	0	25	6	0	0	0	20	20
Mayo	0	0	100	0	0	0	0	0	0	0	0
Tanwari	0	0	0	40	25	0	0	0	0	0	0
Sial	0	0	0	0	25	13	13	20	0	20	0
Jutt	0	0	0	0	0	25	0	0	0	13	20
Syed	0	0	0	10	0	6	7	0	50	0	0
Gazar	0	0	0	0	0	31	0	0	10	0	0
Other	20	25	0	50	25	19	73	80	30	47	60

Figure 4.25: Caste System of the Respondents

G. Languages Spoken

The dominant languages in the projected Villages are Punjabi but the ratio of Saraiki can also be seen in some settlements of the projected area. **Figure 4.26** represent the percentage of language spoken by the respondents.



	Fatehpur Pirti	Hazrat Sultan Bahu	Doluana Sharqi	Chak Azmat Kamal	Gudara	Basti Sialkot	Jaiwain	Chak No 2/2-L	Sewa Saddat	Chak No 11/3-L	Chak 3/3-R
Punjabi	100	100	100	90	100	94	93	40	100	53	100
Siraiki	0	0	0	10	0	6	7	60	0	47	0

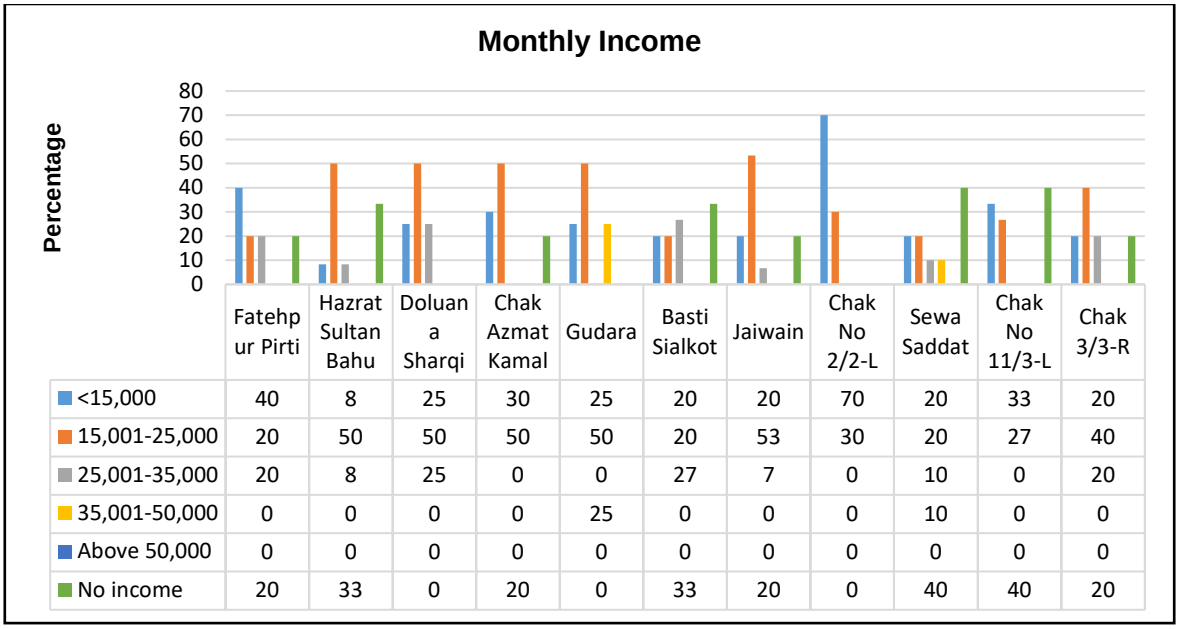
Figure 4.26: Mother Language of the Respondents

4.6.5 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 in Gudara and Sewa Sadaat. Ratio lie under the name of No income are from the female and the unemployed respondents with few numbers of students. Percentage of the average monthly income of the respondents is shown **Figure 4.27.**



	Fatehpur Pirti	Hazrat Sultan Bahu	Doluana Sharqi	Chak Azmat Kamal	Gudara	Basti Sialkot	Jaiwain	Chak No 2/2-L	Sewa Saddat	Chak No 11/3-L	Chak 3/3-R
<15,000	40	8	25	30	25	20	20	70	20	33	20
15,001-25,000	20	50	50	50	50	20	53	30	20	27	40
25,001-35,000	20	8	25	0	0	27	7	0	10	0	20
35,001-50,000	0	0	0	0	25	0	0	0	10	0	0
Above 50,000	0	0	0	0	0	0	0	0	0	0	0
No income	20	33	0	20	0	33	20	0	40	40	20

Figure 4.27: 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 Hazrat Sultan Bahu, the population in projected area 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 4.28**.

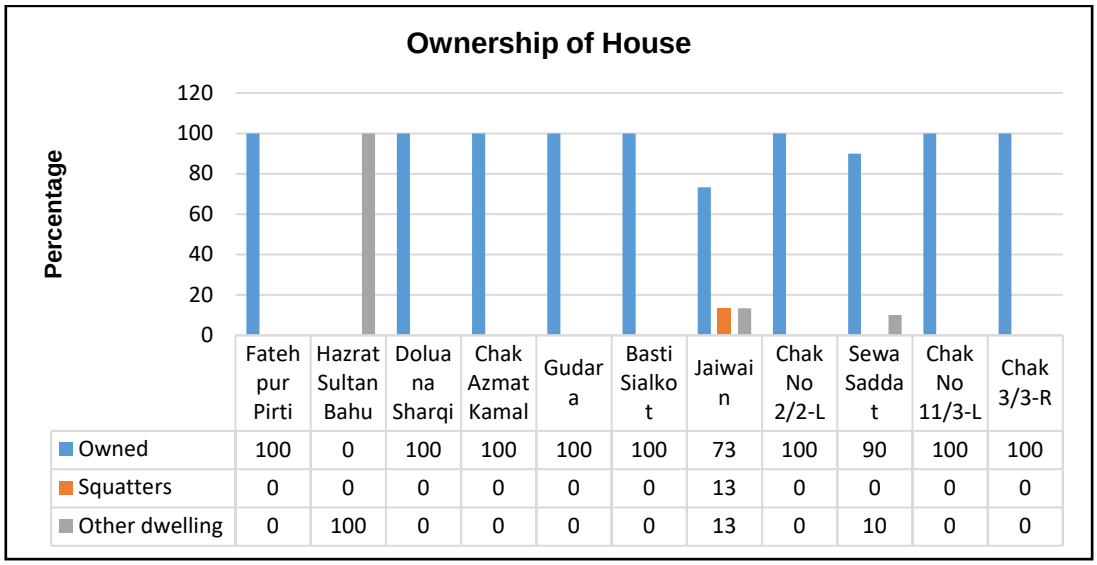


Figure 4.28: Ownership of the Houses of the Respondents

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 4.29.**

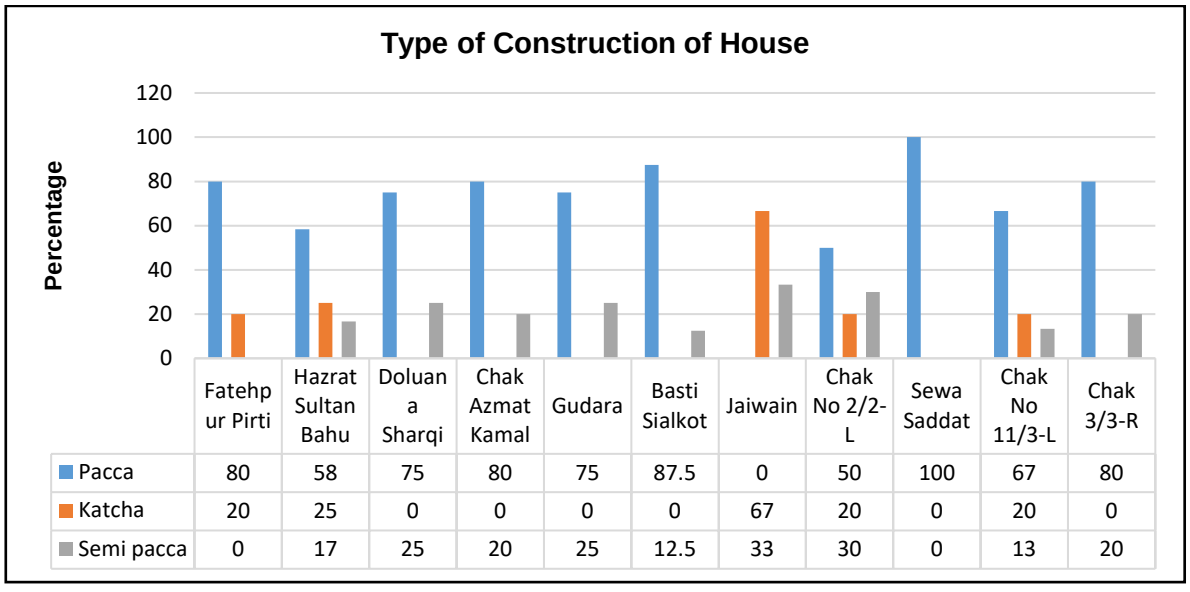


Figure 4.29:Nature of Construction of houses

D. Health Facilities

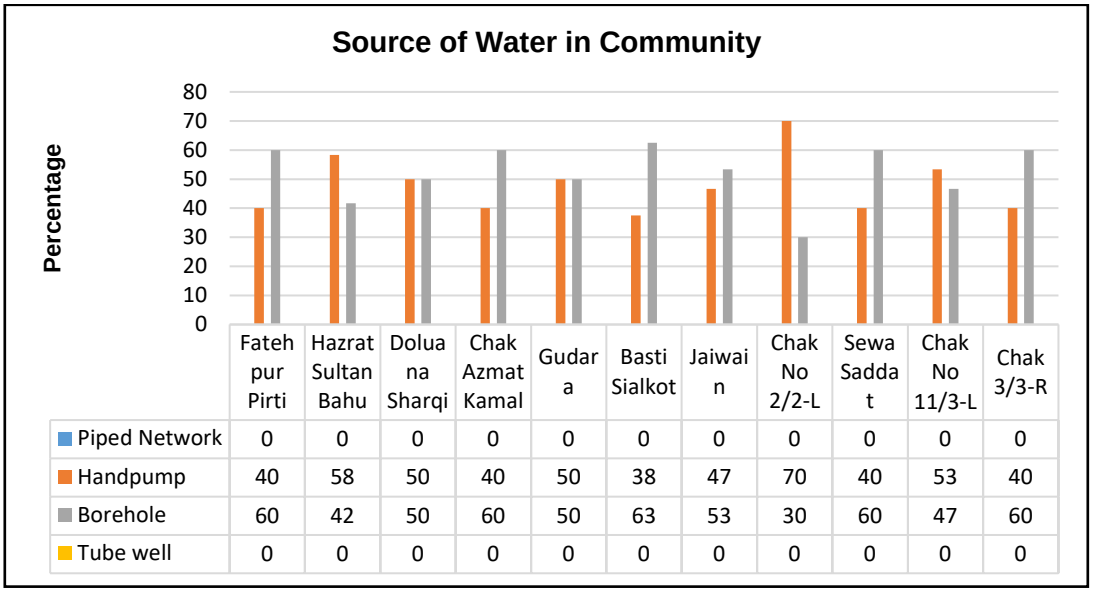
Poor health conditions in the project area are one of the reasons behind the initiation of the proposed project. The health of the people in the proposed project area is continuously

deteriorating due to inadequate water and sanitation facilities. Most of people suffer from water-borne diseases.

Majority of the respondents seek medical facilities from Garh Maha Raja and from private clinic in their local community. While rest of the medicalization concerns are fulfilled from BHU Gudara, THQ Ahmadpur Sial and DHQ Jhang. Whereas, for better health consultation and treatment, the population travel to Multan.

E. Source of Water in Community

Majority of people in project area use handpump and bored water at their houses. All the villages of the projected area have handpumps and boreholes/electric motors which they use for the domestic purposes. While piped network in all the villages is completely absent. Source of water in community is shown in **Figure 4.30**

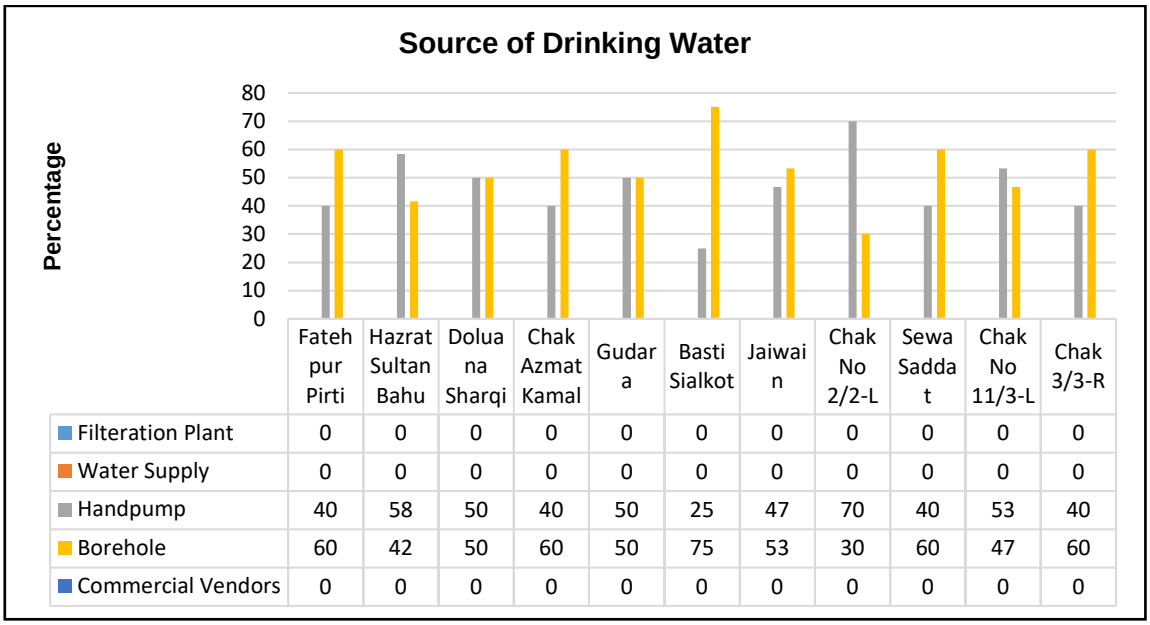


	Fateh pur Pirti	Hazrat Sultan Bahu	Dolua na Sharqi	Chak Azmat Kamal	Gudar a	Basti Sialkot	Jaiwai n	Chak No 2/2-L	Sewa Sadda t	Chak No 11/3-L	Chak 3/3-R
Piped Network	0	0	0	0	0	0	0	0	0	0	0
Handpump	40	58	50	40	50	38	47	70	40	53	40
Borehole	60	42	50	60	50	63	53	30	60	47	60
Tube well	0	0	0	0	0	0	0	0	0	0	0

Figure 4.30: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 and bored water. However, according to respondents' water is undrinkable and causes multiple diseases in local community. Source of water in community is shown in **Figure 4.31.**

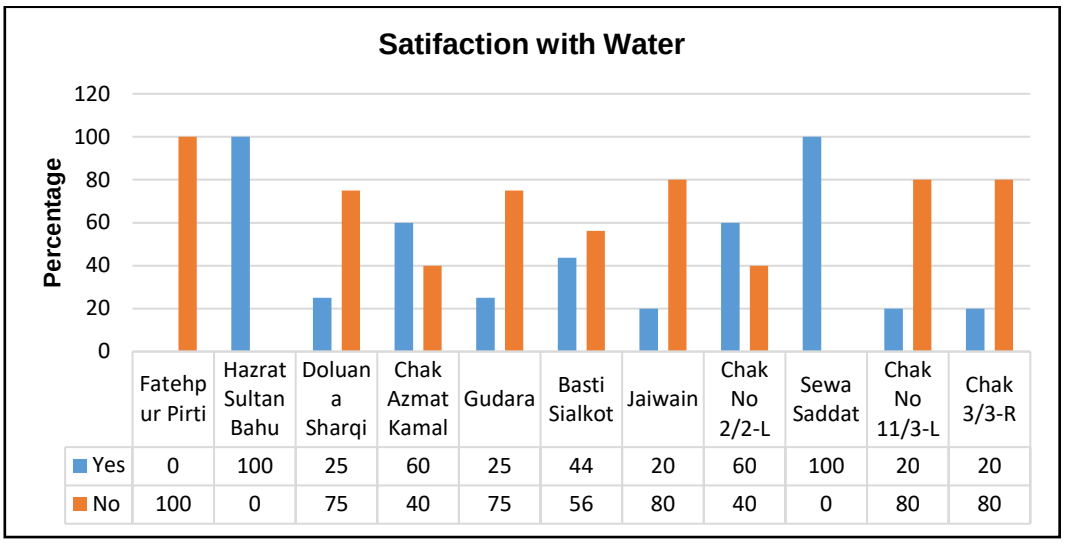


	Fatehpur Pirti	Hazrat Sultan Bahu	Doluana Sharqi	Chak Azmat Kamal	Gudara	Basti Sialkot	Jaiwain	Chak No 2/2-L	Sewa Saddat	Chak No 11/3-L	Chak 3/3-R
Filteration Plant	0	0	0	0	0	0	0	0	0	0	0
Water Supply	0	0	0	0	0	0	0	0	0	0	0
Handpump	40	58	50	40	50	25	47	70	40	53	40
Borehole	60	42	50	60	50	75	53	30	60	47	60
Commercial Vendors	0	0	0	0	0	0	0	0	0	0	0

Figure 4.31: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 Hazrat Sultan Bahu and Sewa Sadaat show maximum level of satisfaction while the rest of the respondents from all the villages are unsatisfied with the quality of water. As the water turn to yellow after being exposed to air and brackish. The respondents share there are many diseases cause due to the bad and contaminated water. Satisfaction with water quality has been shown in **Figure 4.32.**



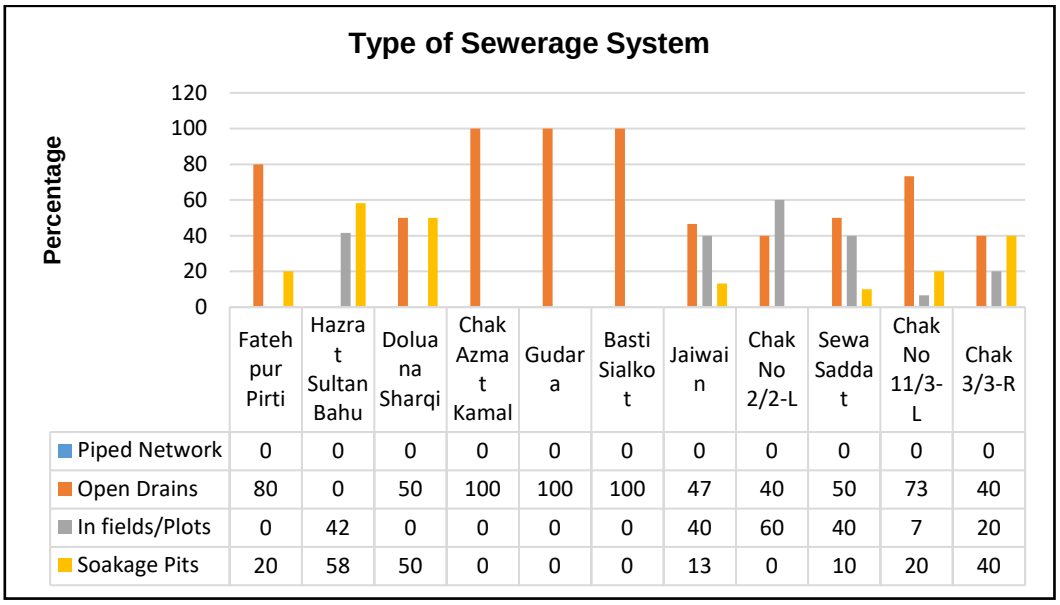
	Fatehpur Pirti	Hazrat Sultan Bahu	Doluana Sharqi	Chak Azmat Kamal	Gudara	Basti Sialkot	Jaiwain	Chak No 2/2-L	Sewa Saddat	Chak No 11/3-L	Chak 3/3-R
Yes	0	100	25	60	25	44	20	60	100	20	20
No	100	0	75	40	75	56	80	40	0	80	80

Figure 4.32:Satisfaction with the Water Quality

H. Type of Sewerage System

Two types of major sewerage system were reported in the survey i.e., open drain and soakage pits while in rest of the population, there is no sewerage system and the sewage is being

disposed of in open fields/Plots. Percentage of type of sewerage system in projected villages has been shown in **Figure 4.33.**

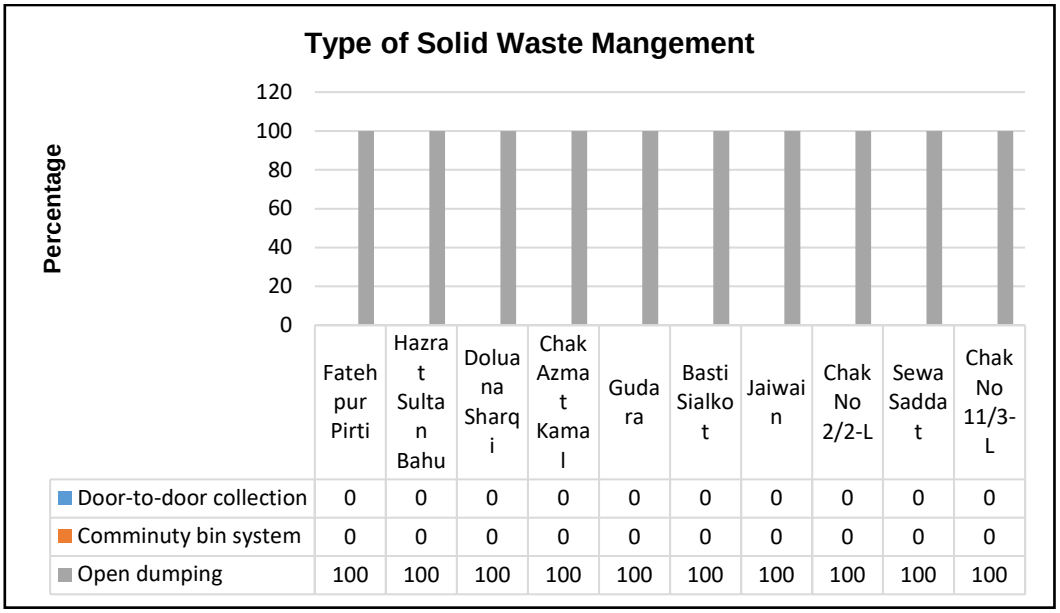


	Fateh pur Pirti	Hazrat Sultan Bahu	Doluana Sharqi	Chak Azmat Kamal	Gudara	Basti Sialkot	Jaiwain	Chak No 2/2-L	Sewa Saddat	Chak No 11/3-L	Chak 3/3-R
Piped Network	0	0	0	0	0	0	0	0	0	0	0
Open Drains	80	0	50	100	100	100	47	40	50	73	40
In fields/Plots	0	42	0	0	0	0	40	60	40	7	20
Soakage Pits	20	58	50	0	0	0	13	0	10	20	40

Figure 4.33: 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. The villagers share the necessity of proper disposal for the solid wastage. As open dumping cause raise in malaria cases in the community.



	Fateh pur Pirti	Hazrat Sultan Bahu	Doluana Sharqi	Chak Azmat Kamal	Gudara	Basti Sialkot	Jaiwain	Chak No 2/2-L	Sewa Saddat	Chak No 11/3-L
Door-to-door collection	0	0	0	0	0	0	0	0	0	0
Comminuty bin system	0	0	0	0	0	0	0	0	0	0
Open dumping	100	100	100	100	100	100	100	100	100	100

Figure 4.34: Type of Solid Waste Management System

J. Major Disease

As projected population share the water being used is contaminated, bitter in taste, yellow aster being exposed to air and contain smell. Disease like Hypertension, Hepatitis, stones in kidney, Gastrointestinal are seen in almost all of the villages due to bad quality of water. However, cases of typhoid, malaria and allergy are reported from some villages.

K. Major Crops

Major crops of the villages of project areas are Wheat, sugarcane, 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 rice and fodder specially for animals. Respondents from Jaiwan share they own a land but the it hasn't been cultivated. And use Canal and Tube well for the irrigation of the fields.

L. Availability of NGOs

During survey, all the respondents from the mentioned villages were question about the presence of any Non- Government Organization working in the project area. But none of the respondent report any NGO working for the welfare of social community.

M. 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 4.35** show the responds of the participant for their willingness to pay tariff.

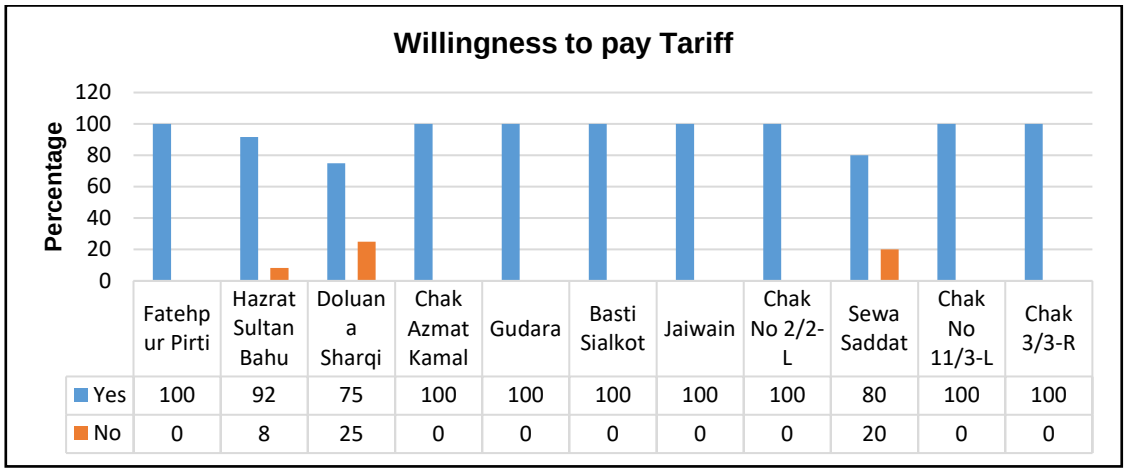
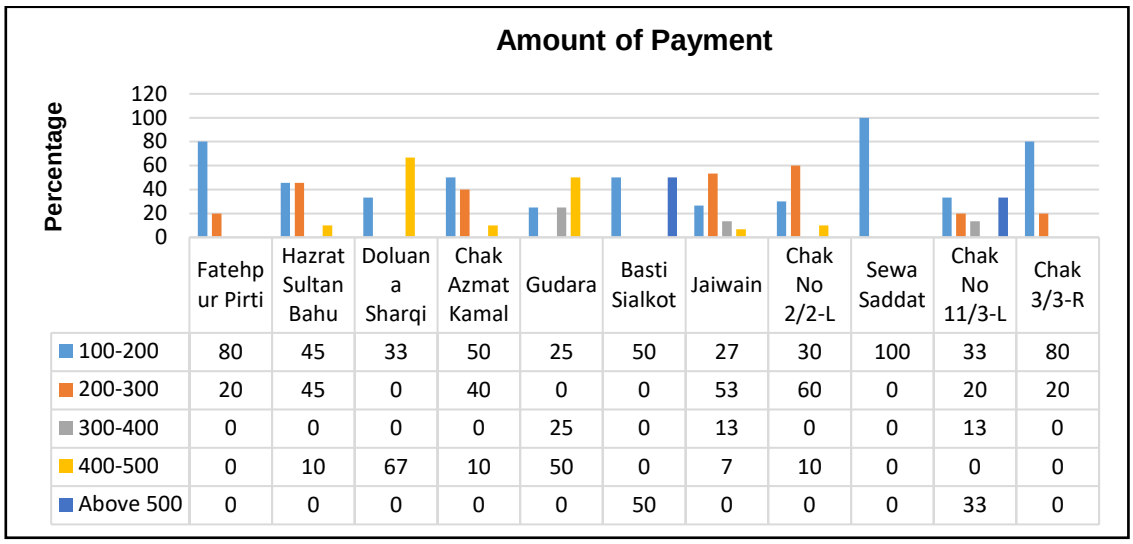


Figure 4.35: Willingness to Pay Tariff

N. 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 4.36** draw the image perfectly



	Fatehpur Pirti	Hazrat Sultan Bahu	Doluana Sharqi	Chak Azmat Kamal	Gudara	Basti Sialkot	Jaiwain	Chak No 2/2-L	Sewa Saddat	Chak No 11/3-L	Chak 3/3-R
100-200	80	45	33	50	25	50	27	30	100	33	80
200-300	20	45	0	40	0	0	53	60	0	20	20
300-400	0	0	0	0	25	0	13	0	0	13	0
400-500	0	10	67	10	50	0	7	10	0	0	0
Above 500	0	0	0	0	0	50	0	0	0	33	0

Figure 4.36: Amount of Tariff

4.7 Gender Situation Analysis

4.7.1 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.

4.7.2 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;

4.7.3 Conducting Field Survey & Data Collection

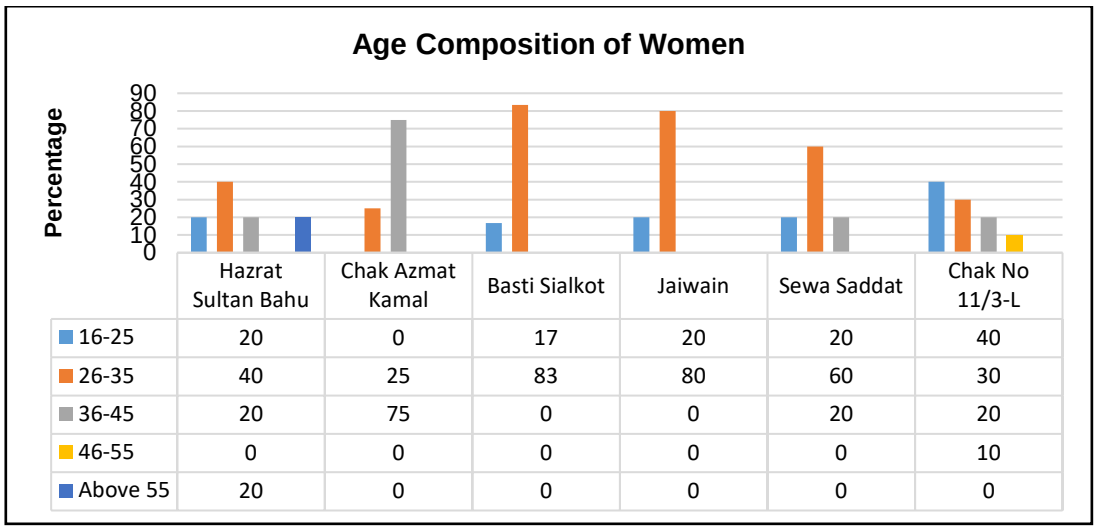
Gender consultation meetings and interviews were conducted in six (06) revenue villages i.e., Hazrat Sultan Bahu, Guadara (Chak Azmat Kamal), Jaiwan, Sewa Sadaat, and Chak 11/3-L from 35 females' respondents during month of April 2023. The meeting was conducting by keeping in view the projection of piped network in each village. While the rest of settlements are proposed to imposed stand-post and rarely have any impact on the females. 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.**

4.7.4 Results of Gender Situation Survey

A. Age Composition of Female Respondents

The gender situation survey **Figure 4.37** 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.



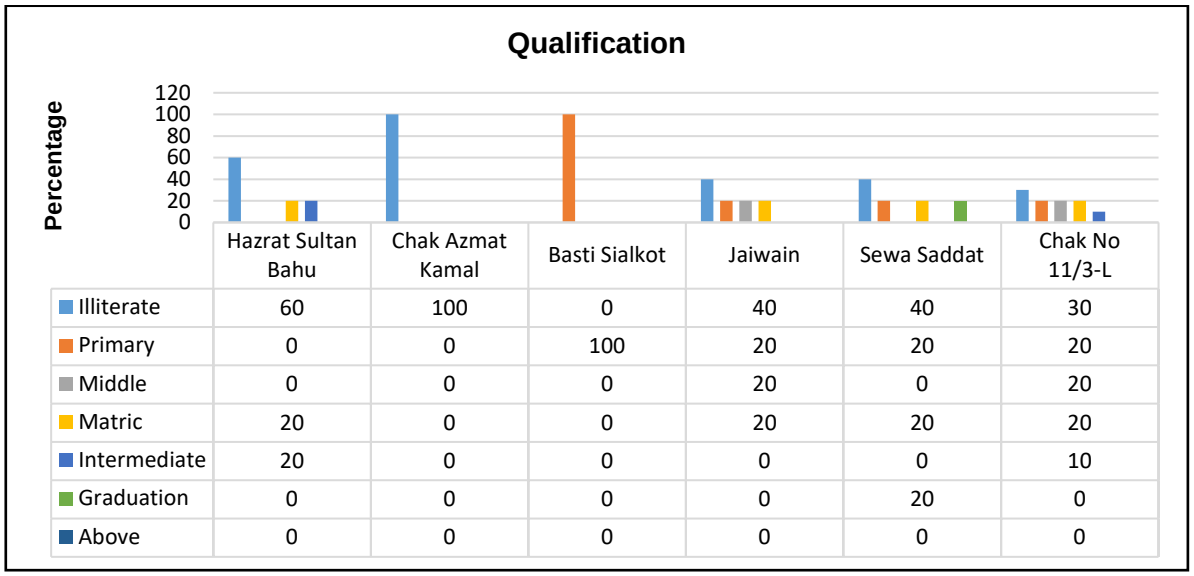
	Hazrat Sultan Bahu	Chak Azmat Kamal	Basti Sialkot	Jaiwain	Sewa Saddat	Chak No 11/3-L
16-25	20	0	17	20	20	40
26-35	40	25	83	80	60	30
36-45	20	75	0	0	20	20
46-55	0	0	0	0	0	10
Above 55	20	0	0	0	0	0

Figure 4.37: Age Composition of Female Respondents

B. Educational Status of the Female Respondents

From survey results **Figure 4.38,** it was found that majority of the respondents were found literate. Basti Sial kot majority females are educated up to primary level. Level of education in females' respondents varies from village to village, but the trend of educating girl can be seen in every settlement expect Chak Azmat Kmal. 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.

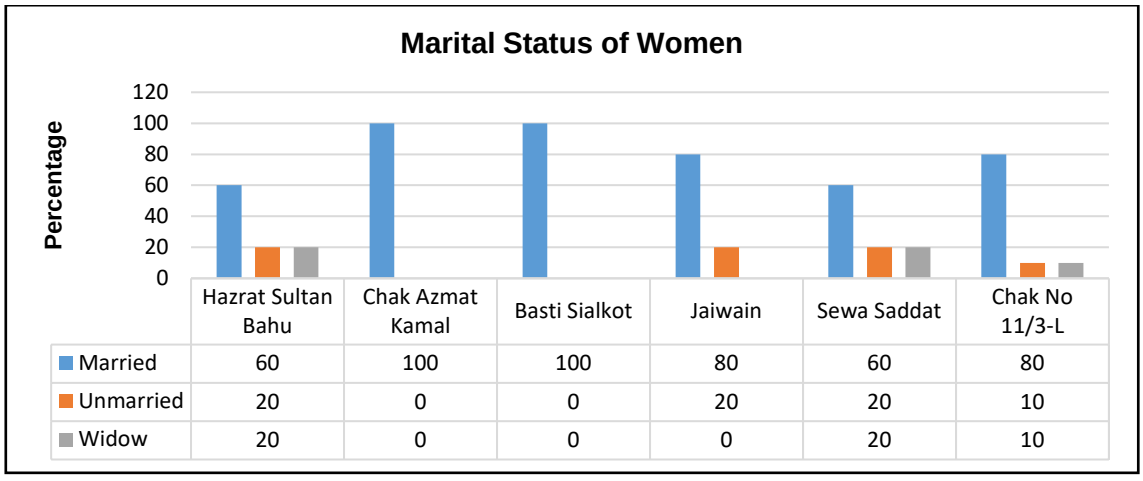


	Hazrat Sultan Bahu	Chak Azmat Kamal	Basti Sialkot	Jaiwain	Sewa Saddat	Chak No 11/3-L
Illiterate	60	100	0	40	40	30
Primary	0	0	100	20	20	20
Middle	0	0	0	20	0	20
Matric	20	0	0	20	20	20
Intermediate	20	0	0	0	0	10
Graduation	0	0	0	0	20	0
Above	0	0	0	0	0	0

Figure 4.38: 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. Majority of the respondents were found married during the gender survey. Whereas cases of widow also get in report from different villages as shown in **Figure 4. 39.**



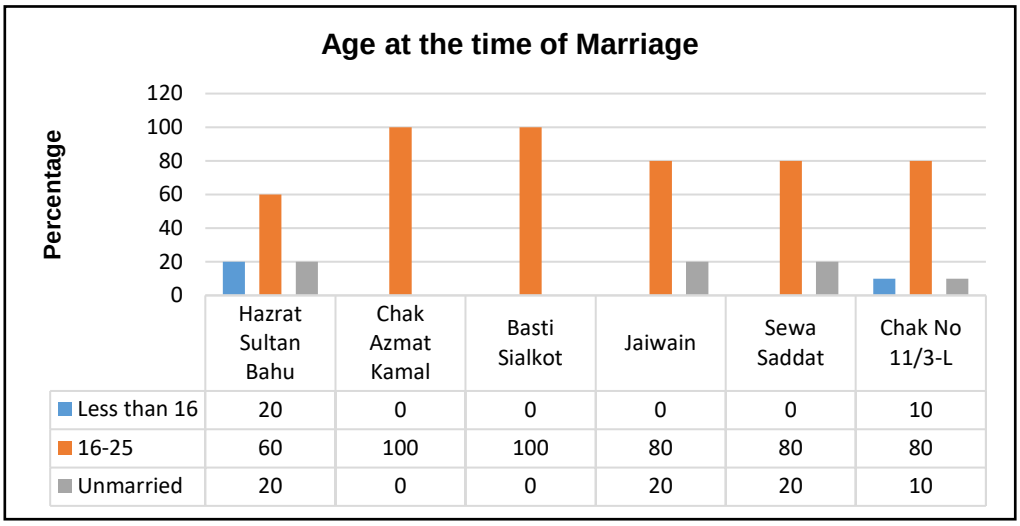
	Hazrat Sultan Bahu	Chak Azmat Kamal	Basti Sialkot	Jaiwain	Sewa Saddat	Chak No 11/3-L
Married	60	100	100	80	60	80
Unmarried	20	0	0	20	20	10
Widow	20	0	0	0	20	10

Figure 4.39: Marital Status of Respondents

D. Age of Female Respondents at Time of Marriage

A huge proportion of young girls are forced to marry at the age between 16 to 25, due to socio-economic and cultural reasons, whereas small percentages of early age marriages visible in

Hazrat Sultan Bahu and Chak No 11/3-L. As a greater percentage of females got married in 16-25 years of age, while other females are unmarried. The minimum age of marriage set by the Federal Shariat Court (FSC) of Pakistan is 16 years[12] under the Child Marriage Restraint Act (CMRA) 1929. Survey findings are summarized in **Figure 4.40** below:

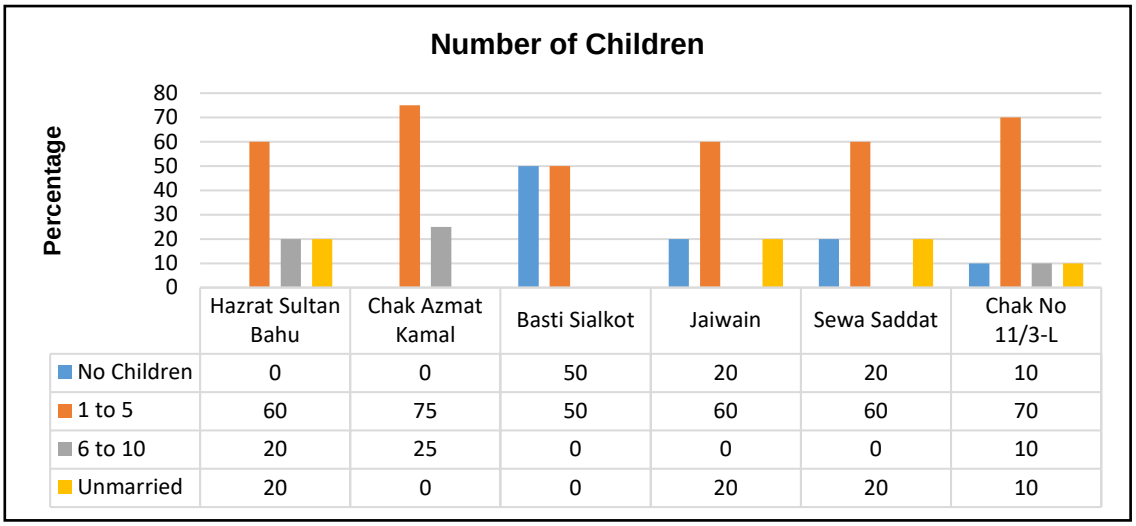


	Hazrat Sultan Bahu	Chak Azmat Kamal	Basti Sialkot	Jaiwain	Sewa Saddat	Chak No 11/3-L
Less than 16	20	0	0	0	0	10
16-25	60	100	100	80	80	80
Unmarried	20	0	0	20	20	10

Figure 4.40: 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 4.41.** Majority of the respondents have up to 5 number of children. While in Basti Sial kot, female share the concern of difficulty in conceiving and many females do not have children even after many years of marriage. The trend of no children can also be seen in other villages with the same concern.



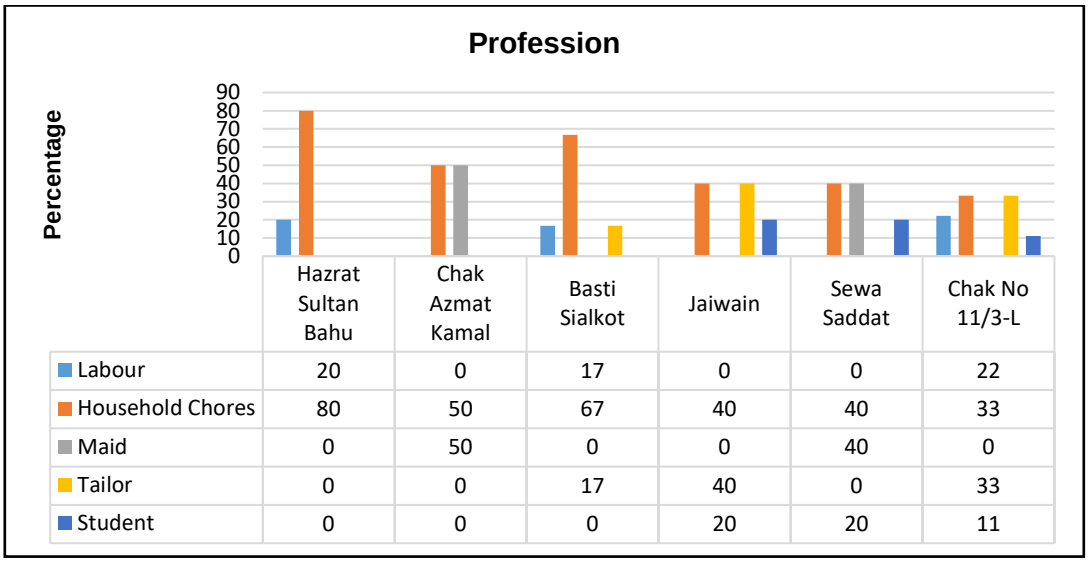
	Hazrat Sultan Bahu	Chak Azmat Kamal	Basti Sialkot	Jaiwain	Sewa Saddat	Chak No 11/3-L
No Children	0	0	50	20	20	10
1 to 5	60	75	50	60	60	70
6 to 10	20	25	0	0	0	10
Unmarried	20	0	0	20	20	10

Figure 4.41: Number of Children

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

F. Occupation of Female Respondents

According to Gender Situation Survey Findings **Figure 4.42,** 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.

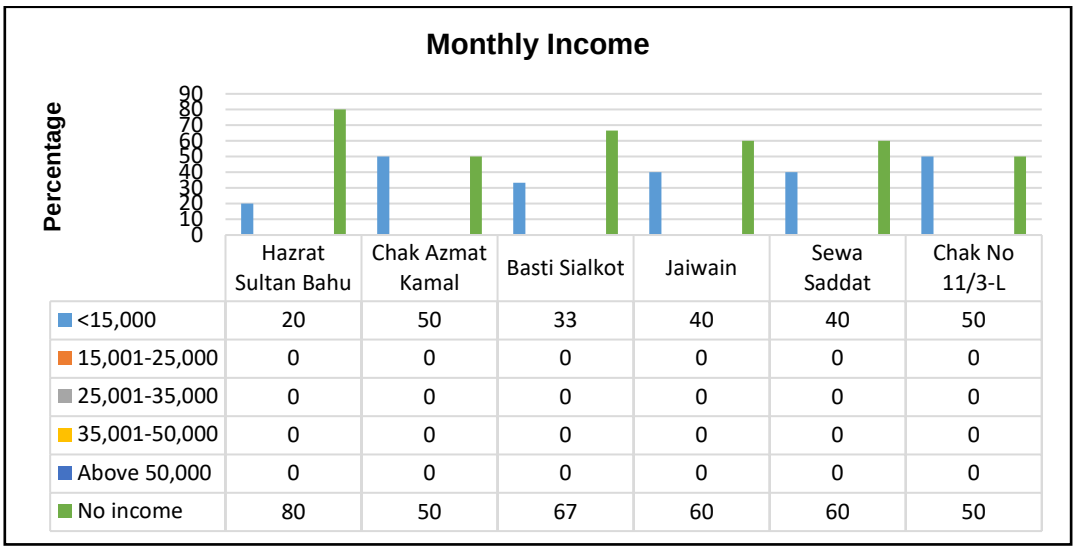


	Hazrat Sultan Bahu	Chak Azmat Kamal	Basti Sialkot	Jaiwain	Sewa Saddat	Chak No 11/3-L
Labour	20	0	17	0	0	22
Household Chores	80	50	67	40	40	33
Maid	0	50	0	0	40	0
Tailor	0	0	17	40	0	33
Student	0	0	0	20	20	11

Figure 4.42: 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 4.43.** 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.



	Hazrat Sultan Bahu	Chak Azmat Kamal	Basti Sialkot	Jaiwain	Sewa Saddat	Chak No 11/3-L
<15,000	20	50	33	40	40	50
15,001-25,000	0	0	0	0	0	0
25,001-35,000	0	0	0	0	0	0
35,001-50,000	0	0	0	0	0	0
Above 50,000	0	0	0	0	0	0
No income	80	50	67	60	60	50

Figure 4.43: Monthly Income of Working Women

H. Power to spend the money

Figure 4.44 shows the majority of respondents have power to spend their money the way they like. While in, Sewa Sadaat and Chak No 11/3-L, the female shows negative concerns

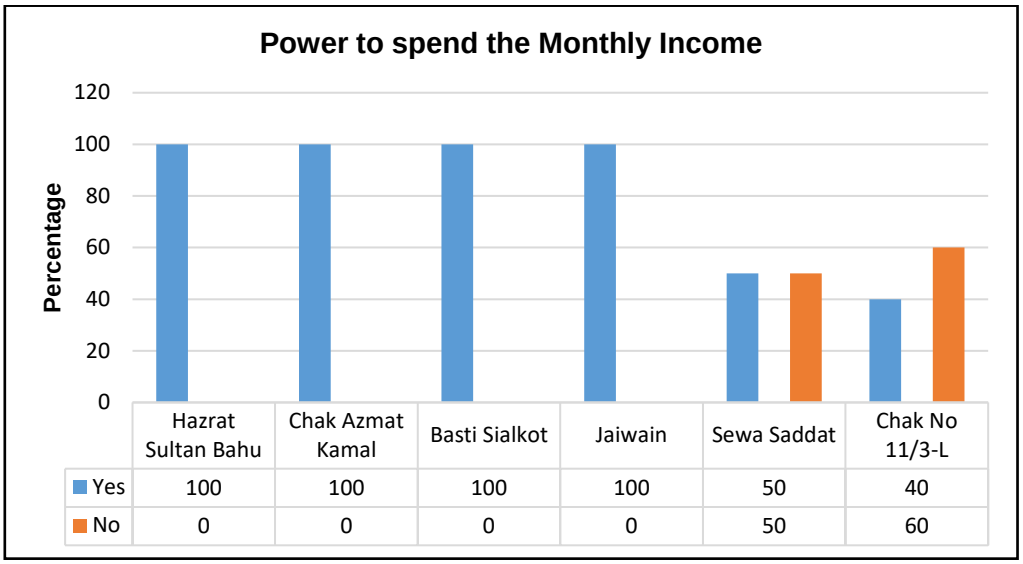


Figure 4.44: Power to spend the money

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 that were received are, due to lack of resources, lack of skills to be a tailor, do any embroidery work or any other labor, and some of them are students and due to busy in household chores. While all the other female participants work and help their family members financially. Survey findings are summarized in **Figure 4.45** below:

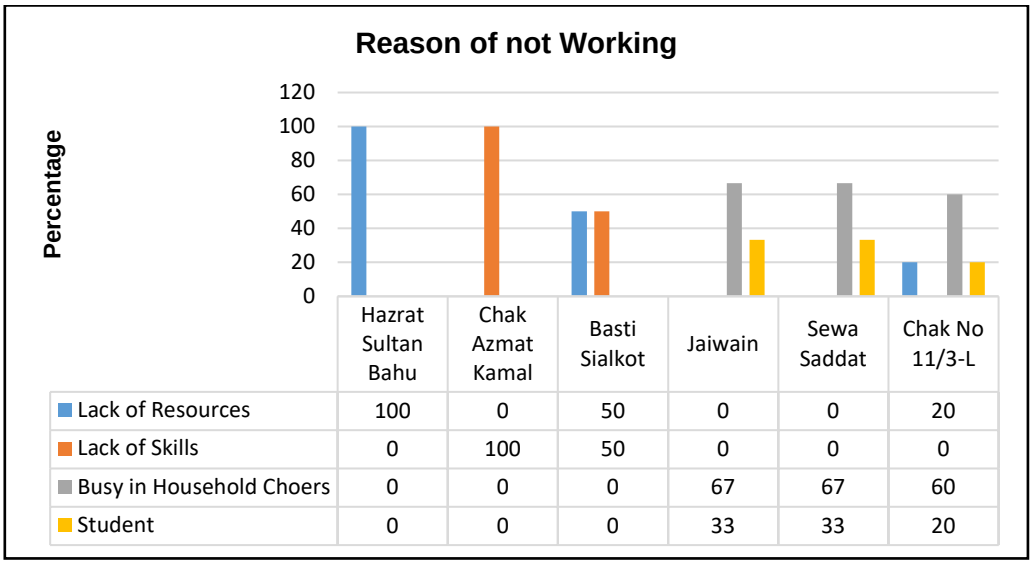


Figure 4.45: Reasons of not Working

J. Monthly Savings

Figure 4.46 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.

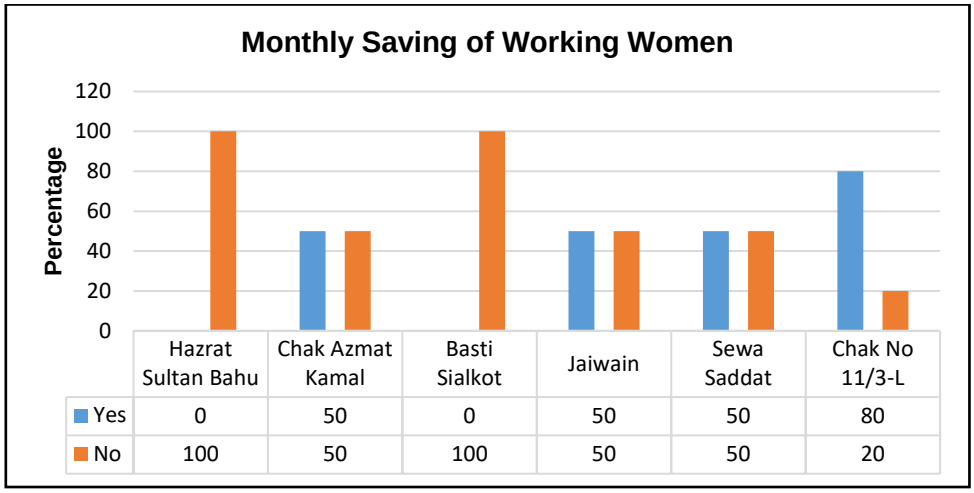


Figure 4.46: Monthly Saving of Working Women

K. Participation in Decision Making

Working women from all the villages were asked, if they hold any power for the decision making of domestic management, business or agriculture affairs. But all the females share, the participation of females in decision making of any household affair or agriculture is totally zero. All the decision are taken by the male members of their family or under the guidance of head of family.

L. 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. While the percentage who didn't perform any task are due to their age factor. Survey findings are summarized in **Figure 4.47** below:

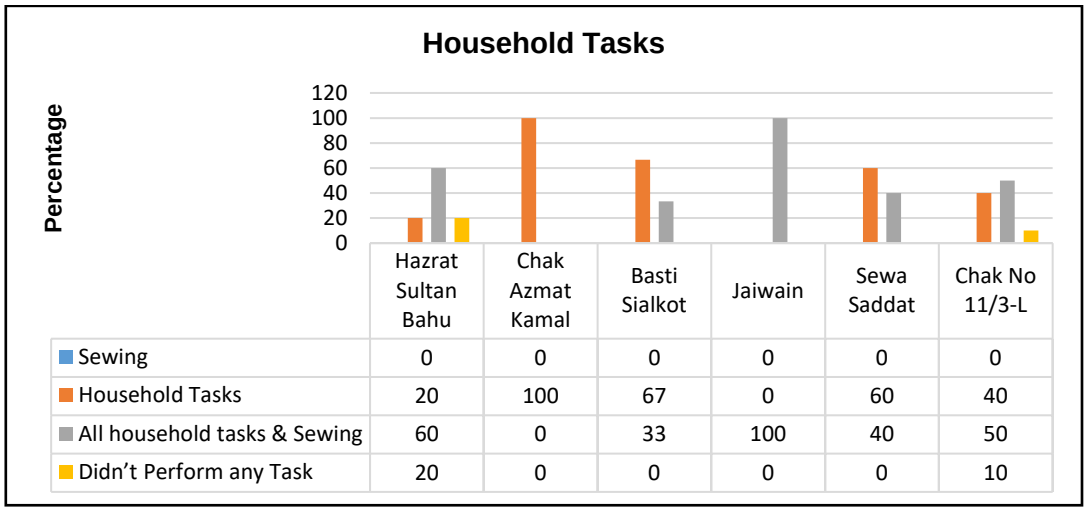


Figure 4.47: Types of Household Tasks of Women

M. 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 take during 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.

N. Type of sanitary material use during Menstrual Cycle

Females were less aware of menstrual hygiene but they do 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 females from Jaiwan, buy sanitary products from main city. Few respondents were at the stage of menopause, but they also use cloth menstrual pad menstrual pads during their cycle previously. Responses are shown in **Figure 4.48**

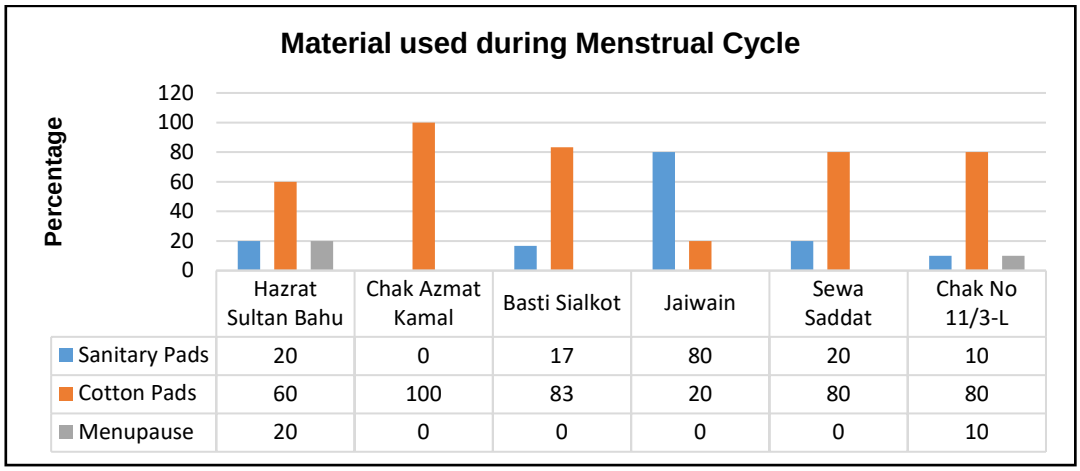


Figure 4.48: Type of sanitary material for use

O. 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. While one female form Chak No 11/3-L, shares that she's a Quran teacher and volunteer to be a teacher for the community children, if there is any provision of any official Madrassa in community from the project team.

P. 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 care 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.

Q. 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.

R. Free Movement of Women

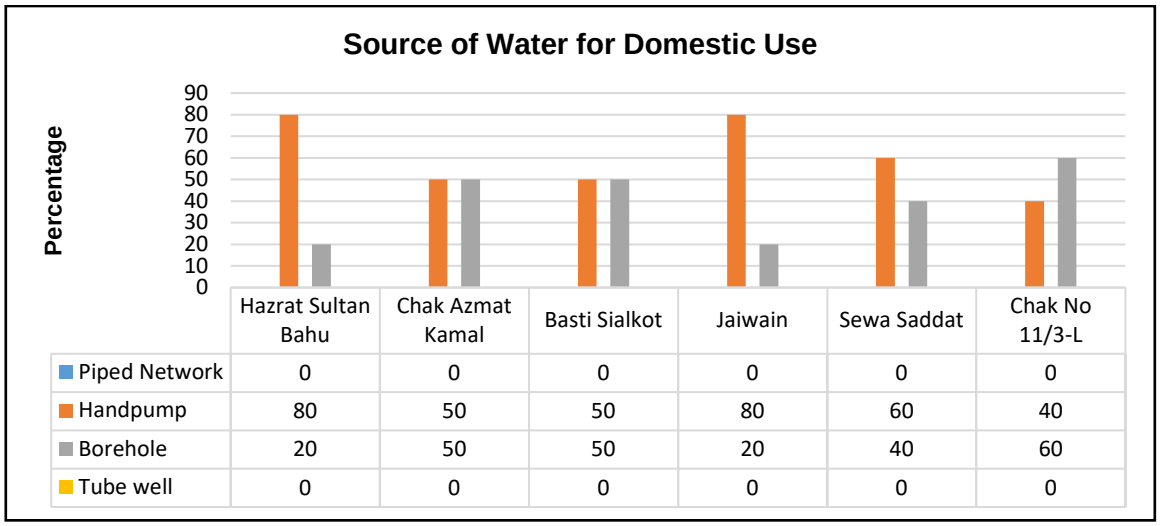
Women were enquired whether they are free to move around or not. The survey results reveal that in all the settlements of projected area, 100 percent females do not have restriction in mobility. Females feel safe and secure to move outside of their houses. All the population of the projected area live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

S. 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.

T. Source of Water for Domestic Use

Figure 4.49 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 and boreholes/Electric motors in households.

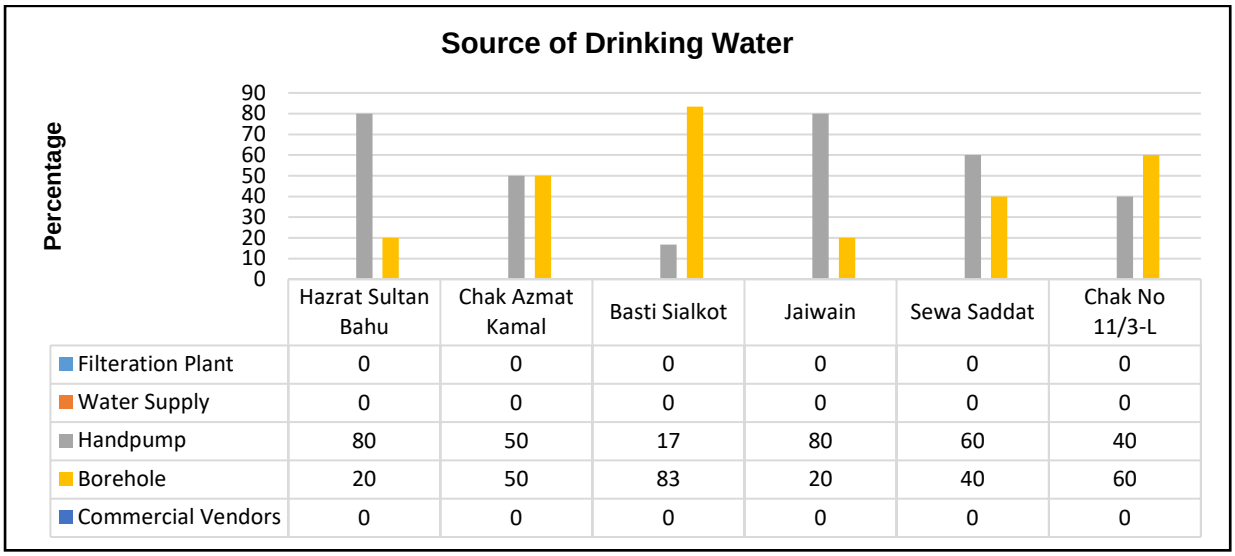


	Hazrat Sultan Bahu	Chak Azmat Kamal	Basti Sialkot	Jaiwain	Sewa Saddat	Chak No 11/3-L
Piped Network	0	0	0	0	0	0
Handpump	80	50	50	80	60	40
Borehole	20	50	50	20	40	60
Tube well	0	0	0	0	0	0

Figure 4.49: Source of Water for Domestic Use

U. Source of Drinking Water

In all villages of project areas majority of people use hand pumps and bored water for the drinking purposes. However according to respondents' water is undrinkable with taste and smell issues and causes multiple diseases in local community. Source of water in community is shown in **Figure 4.50**

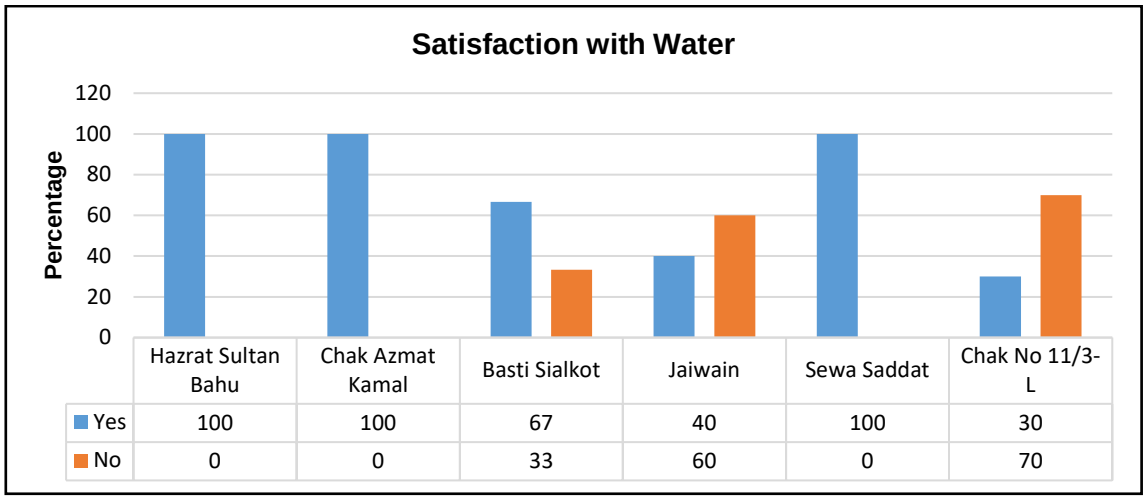


	Hazrat Sultan Bahu	Chak Azmat Kamal	Basti Sialkot	Jaiwain	Sewa Saddat	Chak No 11/3-L
Filteration Plant	0	0	0	0	0	0
Water Supply	0	0	0	0	0	0
Handpump	80	50	17	80	60	40
Borehole	20	50	83	20	40	60
Commercial Vendors	0	0	0	0	0	0

Figure 4.50: Source of Drinking Water

O. Satisfaction with Water Quality

The survey is carried out to check whether the population is satisfied with the water quality or not. So, the majority of female respondents show maximum level of satisfaction. While the rest of the participants from other villages give negative concerns, as the water being consumed is contaminated and yellowish. Satisfaction with water quality has been shown in **Figure 4.51.**



	Hazrat Sultan Bahu	Chak Azmat Kamal	Basti Sialkot	Jaiwain	Sewa Saddat	Chak No 11/3-L
Yes	100	100	67	40	100	30
No	0	0	33	60	0	70

Figure 4.51: Satisfaction with the Water Quality

P. Type of Sewerage System

Two types of major sewerage system were reported in the survey i.e., open drains and soakage pits while in rest of the population, there is no sewerage system and the sewage is being disposed of in open fields/Plots. Percentage of type of sewerage system in projected villages has been shown in **Figure 4.52.**

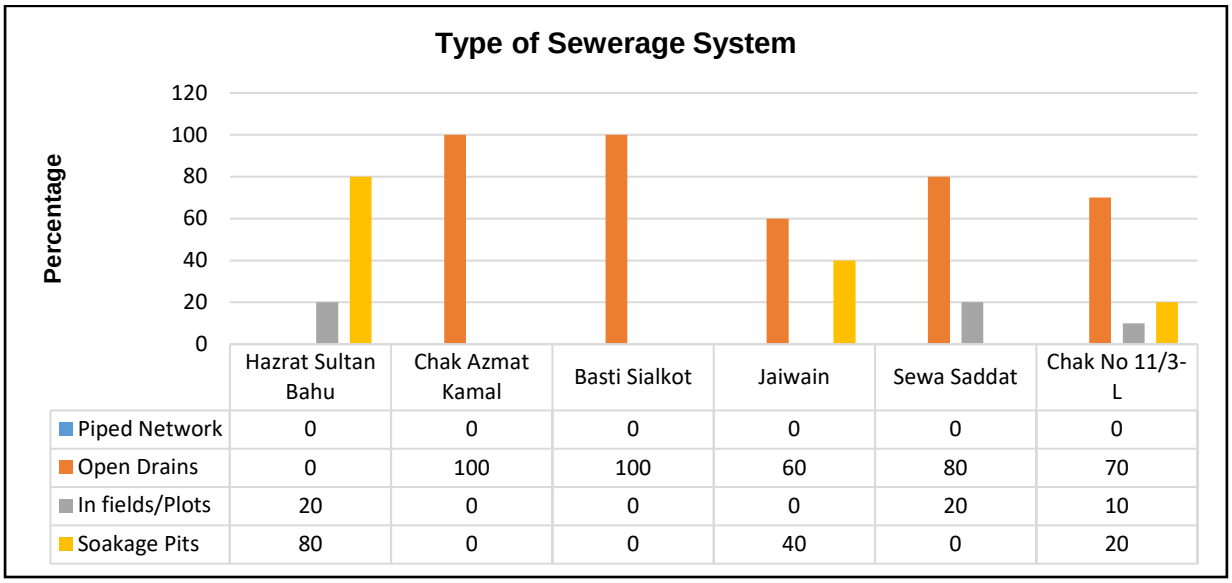


Figure 4.52: Type of Sewerage System

Q. 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 Dilbar, there the availability of Community Bin is reported.

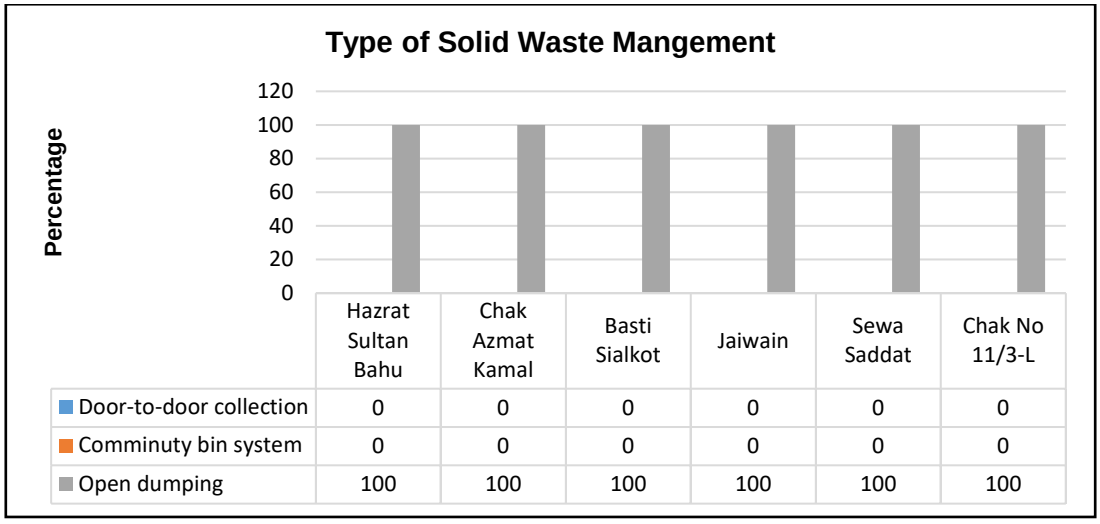


Figure 4.53: Type of Solid Waste Management System

V. 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 Basti Sialkot ensure that there is hospital, but due to low maintenance and lack of staff. The hospital is now use for ceremonies like marriage and death. While majority of the female concerns to Garh Maha Raja. 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.

4.8 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 area. The literacy rate of females in Ahmadpur Sial is exceptional from the rest. The trend of education consultation can be seen in almost all of the settlements. Except Chak Azmat Kamal and Hazrat Sultan Bahu where the most of female population are illiterate.

- 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.

- 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 any household management, and in agriculture or business affairs. The authority of decision making in any aspect belongs to the patriarchal part of the community.

- Most of the women reported that area is totally safe for women. Females feels secure in mobility as the community lives together with peace and harmony and the people are like family to each other.

- Majority of the women in their households are satisfied with the water quality. Rest of the female population share negative concerns that the water is yellow and cause various disease.

- 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.

- Female 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. The consultation process was carried out in accordance with the World Bank Guidelines on public consultation. A series of consultation sessions were carried out with stakeholders (Govt. departments, farmers, teachers, businessman, women's etc.) of Mouza Jaiwan, Chak No. 2/2L, Sial Kot, Gudara, Dauluana Sharqi, Fatehpur Pirti, Hazrat Sultan Bahu, Sewa Sadaat,

Chak No. 3/3R and Chak No. 11/3L 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, Farmers and Gender.

Institutional Stakeholders

Livestock Department, Agriculture Department, Dar-ul-Aman, EPD and District Headquarter Hospital DHQ.

5.5 Information Dissemination

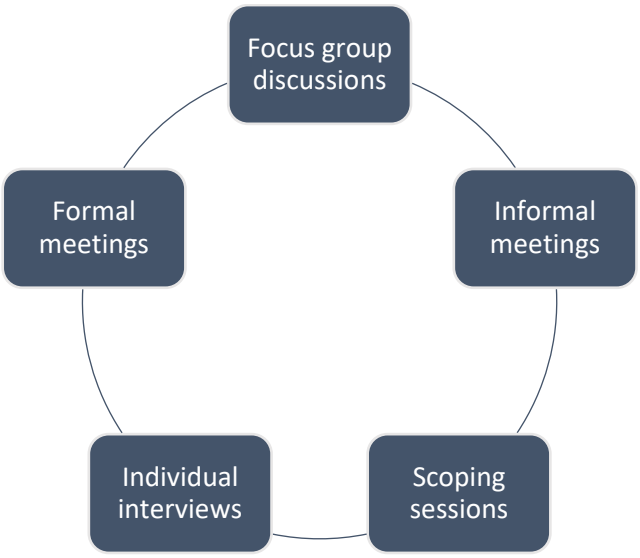
Following information was discussed and disclosed to the stakeholders during the consultation meetings:

- 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	Chak No. 2/2L	14-03-2023 10:00 am to 11:30 am	Dera Muhammad Arif, Chak No. 2/2L	21 Participants
2	Jaiwan (Basti Haveli Jaiwan)	14-03-2023 12:30 pm to 01:35 pm	Dera Ali Abbas, Basti Haveli Jaiwan	21 Participants
3	Gudara	15-03-2023 11:00 am to 12:30 pm	Rab Nawaz Shop, Gudara	13 Participants
4	Fatehpur Pirti	15-03-2023 01:15 pm to 02:15 pm	Dera Tajamal Khan, Fatehpur Pirti	16 Participants
5	Sial Kot	15-03-2023 03:00 pm to 04:00 pm	Dera Chaudhry Azam, Sial Kot	17 Participants
6	Hazrat Sultan Bahu (Basti Tahir Sultan)	16-03-2023 12:00 pm to 01:00 pm	Dera Tahir Sultan, Basti Tahir Sultan	07 Participants

Sr. No.	Name of Village	Date / Time	Venue (Place / Institution)	No. of Participants
7	Chak No. 11/3L	16-03-2023 02:30 pm to 03:00 pm	Zulfiqar Haidar petroleum, Chak 11/3L	11 Participants
8	Sewa Sadaat	16-03-2023 04:00 pm to 04:45 pm	Dera Munawar Ali, Sewa Sadaat	04 Participants
Gender Consultations				
9	Hazrat Sultan Bahu	19-04-2023 10:35 pm to 11:45 pm	Iqbal Nadeem House, Hazrat Sultan Bahu	25 Participants
10	Chak No. 11/3L	19-04-2023 12:00 pm to 01:45 pm	Health Care Center, Chak No. 11/3L	30 Participants
11	Sial Kot	19-04-2023 02:30 pm to 03:10 pm	Abdul Ghafoor House, Sial Kot	18 Participants
12	Gudara	19-04-2023 03:30 pm to 04:00 pm	Qadir Baskh Tangari House, Gudara	04 Participants
13	Sewa Sadaat	20-04-2023 09:30 am to 10:00 am	Syed Akbar Ali Shah House, Sewa Sadaat	15 Participants
14	Jaiwan	20-04-2023 10:30 pm to 12:00 pm	Manzoor Husain House, Jaiwan	12 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	24-05-2023	Agriculture Department	Mr. Tanveer Akbar (Assistant Director)	Mr. Zeeshan Abbas (Jr. Engineer) Mr. Abdul Manan (Sr. Engineer) Mr. Qasim Raza (Tehsil Manager) Mr. Habib (BCC Officer)
2	24-05-2023	Dar-ul-Aman	Mrs. Sumra Rubab (Superintendent)	Mr. Zeeshan Abbas (Jr. Engineer) Mr. Abdul Manan (Sr. Engineer) Mr. Qasim Raza (Tehsil Manager) Mr. Habib (BCC Officer)
3	24-05-2023	Livestock Department	Dr. Majid Hafeez (Deputy Director)	Mr. Zeeshan Abbas (Jr. Engineer) Mr. Abdul Manan (Sr. Engineer) Mr. Qasim Raza (Tehsil Manager) Mr. Habib (BCC Officer)

Sr. No.	Date	Department	Representatives of Departments	Consultant / Client Team
4	24-05-2023	District Headquarter Hospital DHQ	Mr. Shafique Rehman (Senior Clerk)	Mr. Zeeshan Abbas (Jr. Engineer) Mr. Abdul Manan (Sr. Engineer) Mr. Qasim Raza (Tehsil Manager) Mr. Habib (BCC Officer)
4	24-05-2023	EPD	Mr. Shamim (Assistant Director) Mr. Aslam (Inspector)	Mr. Zeeshan Abbas (Jr. Engineer) Mr. Abdul Manan (Sr. Engineer) Mr. Qasim Raza (Tehsil Manager) Mr. Habib (BCC Officer)

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 Ahmadpur Sial.

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	Respondents raised the concern that 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.

Sr. No	Concerns Raised	Response
2	The water is not drinkable and there are several waterborne diseases in the project area	Waterborne diseases shall be reduced and there will be an improvement in public health with the provision of clean and healthy drinking water.
3	He 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.
4	There are mosques in the village, 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.
5	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.
6	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.
7	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 and public standposts in case of smaller community size.
8	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.
9	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 containers shall be placed at appropriate locations in the villages. PRMSC will collect the solid waste through bins and will transport it to the designated disposal site.
10	The residents of the village are ready to pay the bills for the improved water supply and sanitation services but need some clarity regarding mechanism of bill collection.	All the water connections will be metered and the billing will be based on the water consumption.
11	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.
12	Recreation facilities such as parks and playgrounds should be provided.	Provision of recreation facilities is not the mandate of the proposed project; however,

Sr. No	Concerns Raised	Response
		the concern has been noted and will be reported to the higher authorities.
13	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	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.
2	Women participants of Chak 11/3-L, especially highlights the issue of sewerage system and wanted to resolve it as soon as possible.	The issue will be resolve after the provision of project.
3	Apart from no proper sewerage system, many households don't have open drains and soakage pits available for washroom. So, they have to go in fields/jungle which raise the concerns of women privacy.	Washrooms are not mandate of the proposed project; however, proper sewerage system will be provided in the area, while the local community have to build washrooms for the connection.
4	Females share the suggestion for the provision of Sui gas in local area market as they have to use woods and animals' fesses.	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.
5	Cases of miscarriages, malnourishment and mentally retarred children found in majority of settlements of Ahmadpur Sial.	The issue has been noted and will be reported to the higher authorities.
6	Still birth, preterm delivery cases and typhoid at the time of birth in children, highlighted by many female participants of Hazrat Sultan Bahu.	The issue has been noted and will be reported to the higher authorities.
7	Many participants from Basti Sial Kot, face the issue of conceiving pregnancy and change in hormones in respect of color as blackish.	The issue has been noted and will be reported to the higher authorities.

Sr. No	Concerns Raised	Response
8	Females encounters the lack of Health care facilities for the community even after the availability of land in Chak No 11/3-L.	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.
9	In Basti Sial Kot, females raised concern about the situation of available hospital in community. Due to absence of hospital staff and poor management, the hospital building is being used as for marriage and death ceremonies.	The highlighted concern is not the mandate of the project; however, the issue has been noted and will be reported to the higher authorities.
10	Trend of early age marriage in girls instead of prevailing education is common.	The concerns has been noted and will be reported to the higher authorities.
11	Well educated and well skilled females suggest the provision of schools and Vocational training centers. 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.
12	Provision for schools and madrassas for girls are highlighted from the concerned females.	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
13	One female from Chak No 11/3-L, suggested to provide financial support to convert her local level madrassa to officially a proper madrassa center.	The suggestion has been noted and will be reported to the higher authorities.
14	Female suggested the provision of parks of females only.	Provision of parks is not the mandate of the project; however, the concern 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	**Agriculture Department** Mr. Tanveer Akbar (Assistant Director)	The consultant's team described the project location and proposed activities to the Assistant Director. The apprehensions/ suggestions regarding the project are hereunder; • Presently, wastewater is applied for irrigation which is extremely dangerous for green plants.	All the suggestions/ apprehensions have been noted and the provided information will be incorporated into the design. A wastewater treatment plant is the component of the proposed project and the

Sr. No.	Department	Points of Discussion /Apprehensions	Response
		• The application of wastewater in crops causes: ✓ Abrupt vegetative growth; ✓ Lodging of crops; ✓ Salt accumulation; ✓ Root damage; ✓ Vulnerability to pest attack; ✓ Death of the root zones; ✓ Disturbance to nutrients availability etc. • The practice of applying wastewater should be discontinued for better crop health and yield. • However, the wastewater is beneficial for the crops like sugarcane and fodder. • Major crops in the project area are Sugarcane, Potato, Maize, etc.	treated water will be beneficial for the agricultural land.
2	**Dar-ul-Aman** Mrs. Sumra Rubab (Superintendent)	The consultant's team described the project location and proposed activities and inquired about their apprehensions/ suggestions regarding the project; • GBV cases are handled here • Affected women are protected and given shelter here • Most of the women are referred here by the court or by the Police • Affected women can directly come here for shelter • Dar -ul-Aman is only at district level. • At present there are nine girls in Dar-ul-Aman. • They are provided food and Shelter. • The representative expressed her willingness to provide informative lectures and sessions to the women of project area .	The department is playing a wonderful role in the protection of women. All the roles and acts of the department are highly appreciated. Gender situation analysis and a subsequent Gender Action Plan is a vital part of the project. PRMSC will need the support of Dar ul Aman in conducting training sessions for the women.
3	**Livestock Department** Dr. Majid Hafeez (Deputy Director)	The consultant's team described the project location and proposed activities to Deputy Director and inquired about their apprehensions/ suggestions regarding the project; • Almost all the animals in the region are affected by parasites • The buffaloes in the project are are water-loving animals and need pools of water	The wastewater ponds will not be removed rather they will be filled up with the treated wastewater rather than the untreated sewage. This will be good for animals' health. The animals' dung and other wastewater will not be disposed of in to the fields

Sr. No.	Department	Points of Discussion /Apprehensions	Response
		• If wastewater ponds are removed from the project area this will affect their life cycles • The census data (as of 2017-18) of Livestock of Tehsil Ahmadpur Sial is as follows ➢ 104609 Cows ➢ 77884 Buffalos ➢ 47672 Sheep ➢ 84931 Goat ➢ 119909 Rural Poultry ➢ 155 Camel	thus reducing the chances of diseases in the livestock.
4	**District Headquarter Hospital DHQ** Mr. Shafique Rehman (Senior Clerk)	The consultant's team enquired about the major diseases in the project area, especially water-borne diseases; • Majority people consult to doctor. • Show some serious concern regarding water borne diseases. • Hepatitis of 200 peoples were tested in District Jhang out of which 60 peoples were reported positive. • 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 hospital.	The objective of the proposed project is to provide clean drinking water to all the residents of the selected villages. Waterborne diseases will be reduced after the implementation of this project.
5	**EPD** Mr. Shamim (Assistant Director) Mr. Aslam (Inspector)	• The consultant's team described the project location and proposed activities. The apprehensions/ suggestions regarding the project are hereunder: • An engineered landfill site should be made part of the project component; • The waste minimization practices should be followed.	The landfill is not part of the project rather it will be taken up as a separate project and separate contractor will be hired for this. However, a waste enclosure shall be provided in each village for temporary storage of the waste.

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, aseptic 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, stand posts, 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 aseptic 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, aseptic 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 aseptic tanks/ soakage pits are mostly laid on roads/streets and overhead water tanks, stand posts & 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, aseptic 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, aseptic 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/ aseptic 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. 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/ aseptic 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 Ahmadpur Sial 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 Ten (10) nos. construction camps will be established in all ten villages accommodating approximately 140 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 700 gallons/day for all ten camps during the construction stage and estimated generated wastewater will be about 560 gallons/day for all ten 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 40 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 Ahmadpur Sial 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 Ahmadpur Sial. 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 & aseptic 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 aseptic 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 & aseptic 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 & aseptic 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 & aseptic 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 & aseptic 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 Ten selected villages of Ahmadpur Sial. 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 Ahmadpur Sial.

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 ten 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 ESMP

The main objectives of ESMP 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.

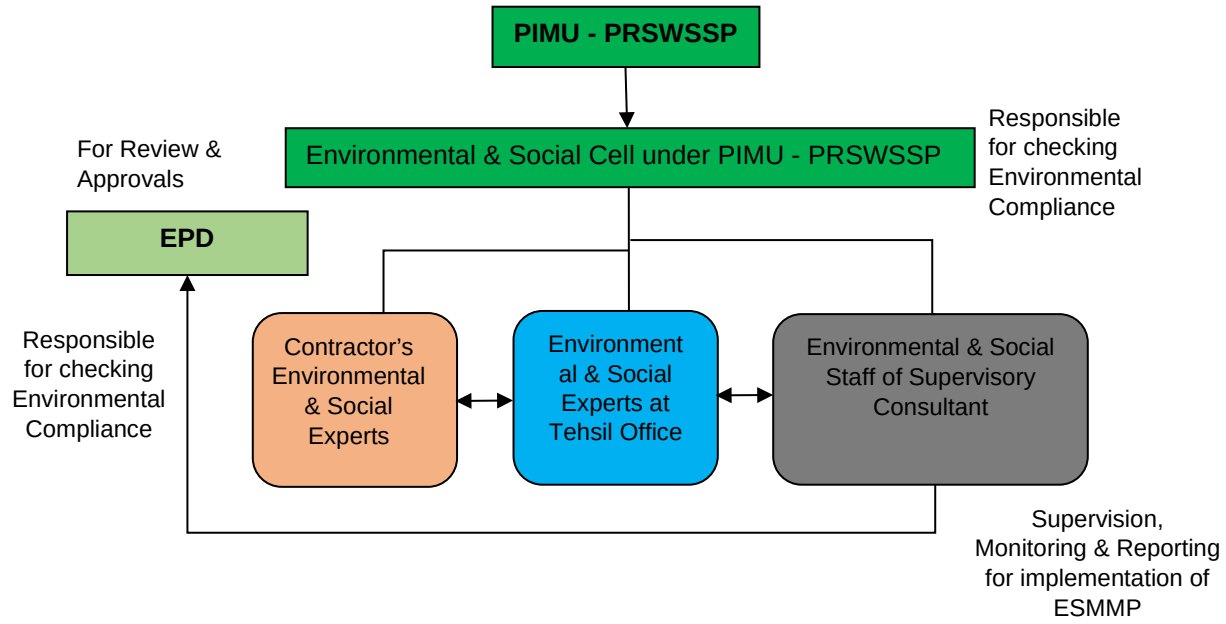


Figure 7.1: Organizational Setup for implementation of ESMMP

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 The World Bank
Quarterly	Contractor	Reviewed by PIMU-Environmental Unit; PRSWSSP	The Engineer, PRMSC and The World Bank
Annual	Contractor	Reviewed by PIMU-Environmental Unit; PRSWSSP	The Engineer, PRMSC and The World Bank
Final	Contractor	Reviewed by PIMU-Environmental Unit; PRSWSSP	The Engineer, PRMSC and The World Bank

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 Ahmadpur Sial 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 ten (10) nos. construction camps will be established in all ten villages accommodating i.e., total 140 workers for all villages.	• The waste generated from the camp site will be disposed of at existing dumping site of the Tehsil Ahmadpur Sial 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	• 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
	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.			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	• 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
	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.						
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	• 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
	moderate negative 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 GAP for PRSWSS has been developed in adherence to World Bank Gender and Development Policy Framework, OP/ BP 4.20. The World Bank recognizes that gender issues are important dimensions of its poverty reduction, economic growth, human well-being, and development effectiveness agenda. 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 Grievance Redressal Mechanism (GRM) will be consistent with the requirements of the World Bank safeguard policies to ensure the mitigation of community concerns, risk management, and maximization of environmental and social benefits. 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 3,788,000/- 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 14,100,000/- 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)	▪ Ensure implementation of World Bank Gender guidelines and policy; ▪ 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 10,441,500 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 37,329,500/-**. 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	3,788,000
2	Training	14,100,000
3	Health & Safety	10,441,500
4	Institutional Strengthening (Intermittent Input)	9,000,000
	Grand Total (RS.)	**37,329,500**
	Grand Total in Million (RS.)	**37.32**

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/Central-I/494 Date: 27-01/2023

To,

M/s. National Engineering Services Pakistan (PVT) Ltd
JV M/s. Associate Consulting Engineers ACE Limited
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 CENTRAL-I**

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 Central-I.

2. It was agreed in the meeting that the Consultant shall submit the Feasibility Report, Rough Cost Estimate, ESPM, and PC-I of 32 Nos Revenue Villages as per the following schedule;

Sr. #	Revenue Villages	Feasibility Report I/C Rough Cost Estimate	PC-I I/C ESPM
1	05 Nos. Priority Villages	February 06, 2023	February 06, 2023
2	09 Nos Revenue Villages	February 20, 2023	February 28, 2023
3	09 Nos Revenue Villages	March 13, 2023	March 21, 2023
4	09 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.

27/1/23
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, Word Bank.
5. The Tehsil Manager, PRMSC.

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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.

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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.



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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

TEST REPORT

Ref. #: PGG/LAB/2023-1907/AA

Issue date: 1-Apr-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
Site Location: Ahmad Pur Sial
Nature of Monitoring: Ambient Air
Monitoring By: Pak Green Laboratories
Monitoring Location: Hawali Jeewan
Monitoring Coordinates: N 30°877147" E 71°921494"
Name of Sampling Person: Mr. Adil
Monitoring Instrument: AQMS
Monitoring Duration: 24 hours
Monitoring Date: 14-Mar-23 to 15-Mar-23

Result:

Sr. No.	Time	CO	NO	NO_2	SO_2	PM10	PM2.5	SPM	O_3
		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
1.	12:15 AM	0.760	0.85	10.54	29.32				
2.	1:15 AM	0.818	1.03	11.23	30.17				
3.	2:15 AM	0.910	0.60	13.66	30.89				
4.	3:15 AM	1.174	0.75	17.58	33.75				
5.	4:15 AM	1.335	0.53	13.38	26.46				
6.	5:15 AM	1.416	0.64	15.48	25.40				
7.	6:15 AM	1.105	0.54	11.76	20.15				
8.	7:15 AM	1.312	0.73	13.42	21.40				
9.	8:15 AM	1.531	0.85	12.01	23.81				
10.	9:15 AM	1.082	0.44	7.93	31.34				
11.	10:15 AM	1.278	0.41	8.11	29.46				
12.	11:15 AM	0.726	0.53	8.52	27.26				
13.	12:15 PM	0.875	0.60	8.76	32.95				
14.	1:15 PM	0.703	0.90	9.31	33.88	142.9	33.7	402	61.9
15.	2:15 PM	0.565	0.94	11.36	30.09				
16.	3:15 PM	0.622	0.67	14.23	30.91				
17.	4:15 PM	0.714	1.00	16.48	34.52				
18.	5:15 PM	1.048	1.07	18.34	27.79				
19.	6:15 PM	1.220	0.31	8.48	29.46				
20.	7:15 PM	1.312	0.69	7.96	31.07				
21.	8:15 PM	0.588	0.85	5.06	32.77				
22.	9:15 PM	0.645	0.60	6.92	30.44				
23.	10:15 PM	0.760	0.69	6.59	27.97				
24.	11:15 PM	0.967	0.79	6.92	28.42				
Average (24 Hours)		0.978	0.71	11.00	29.16				
PEQS		5 8hours	40 24hours	80 24hours	120 24hours	150 24hours	35 24hours	500 24hours	130 1 hour

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

Ref. #: PGG/LAB/2023-1907/AA

Issue date: 1-Apr-23

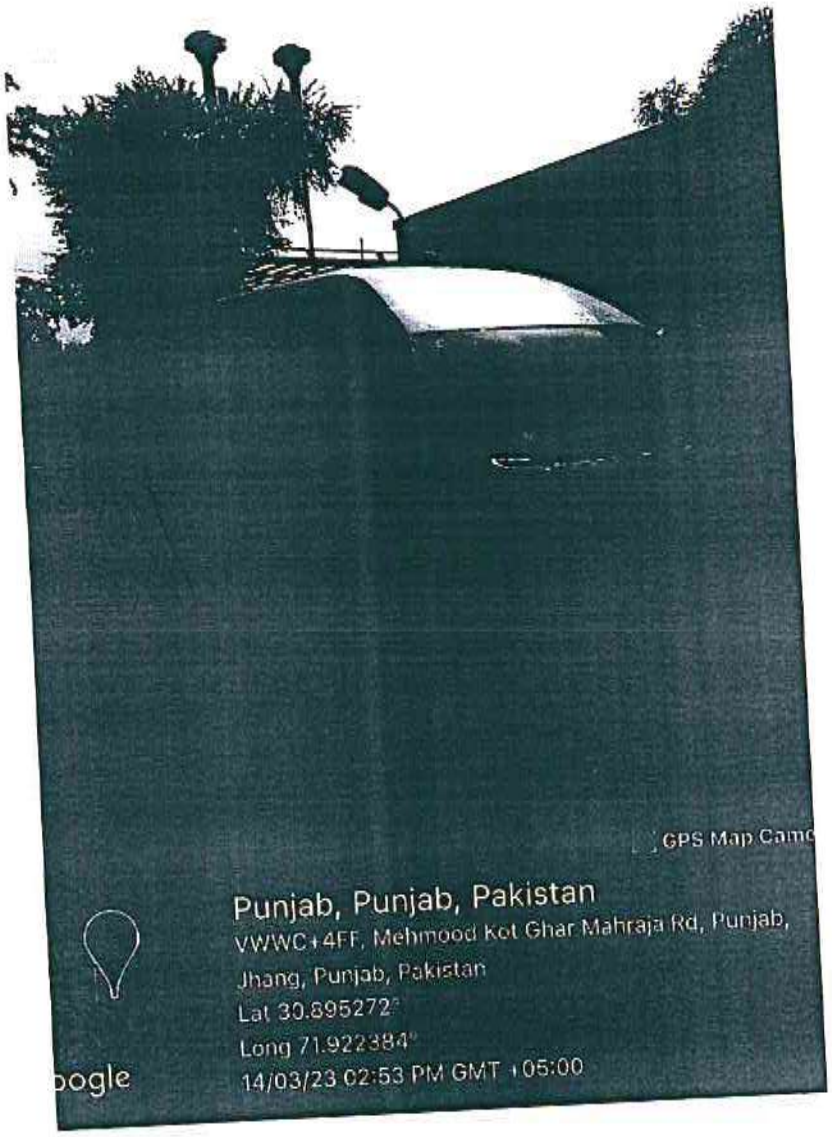
PEQS: Punjab Environmental Quality Standards
Remarks: All parameters are in compliance with PEQS Limits.
Terms & Conditions:

- Analysis was conducted on the request of proponent for his own use or PEQS compliance.
- Report cannot be used regarding compliance of any complaint, EPO or any other court case.
- This report should be reproduced pas 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

Field Analyst	Chief Analyst	Laboratory Incharge

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


GPS Map Came
Punjab, Punjab, Pakistan
VWWC+4FF, Mehmood Kot Ghar Mahraja Rd, Punjab,
Jhang, Punjab, Pakistan
Lat 30.895272°
Long 71.922384°
14/03/23 02:53 PM GMT +05:00
oogle

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

TEST REPORT

Ref#: PGG/LAB/2023-1886/DW

Date: 01-Apr-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	**Ahmedpur Sial,**

Sample Description:

Nature of sample	Drinking water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Chak Azmat Kamal Gudara 40.ft N 30° 88' 2615" E 71° 85'843"
Sample source	Hand Pump
Sample Code	DW-597
Date of sampling	14-Mar-23

Summary of Test Result:

Physical Parameters	Partially Compliance
Biological Parameters	Compliance
Chemical Parameters	Compliance
Remarks: Parameter 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 Pakistan

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

EPA Certified

Ref#: PGG/LAB/2023-1886/DW

Date: 01-Apr-23

Physical Parameters Analysis Results:

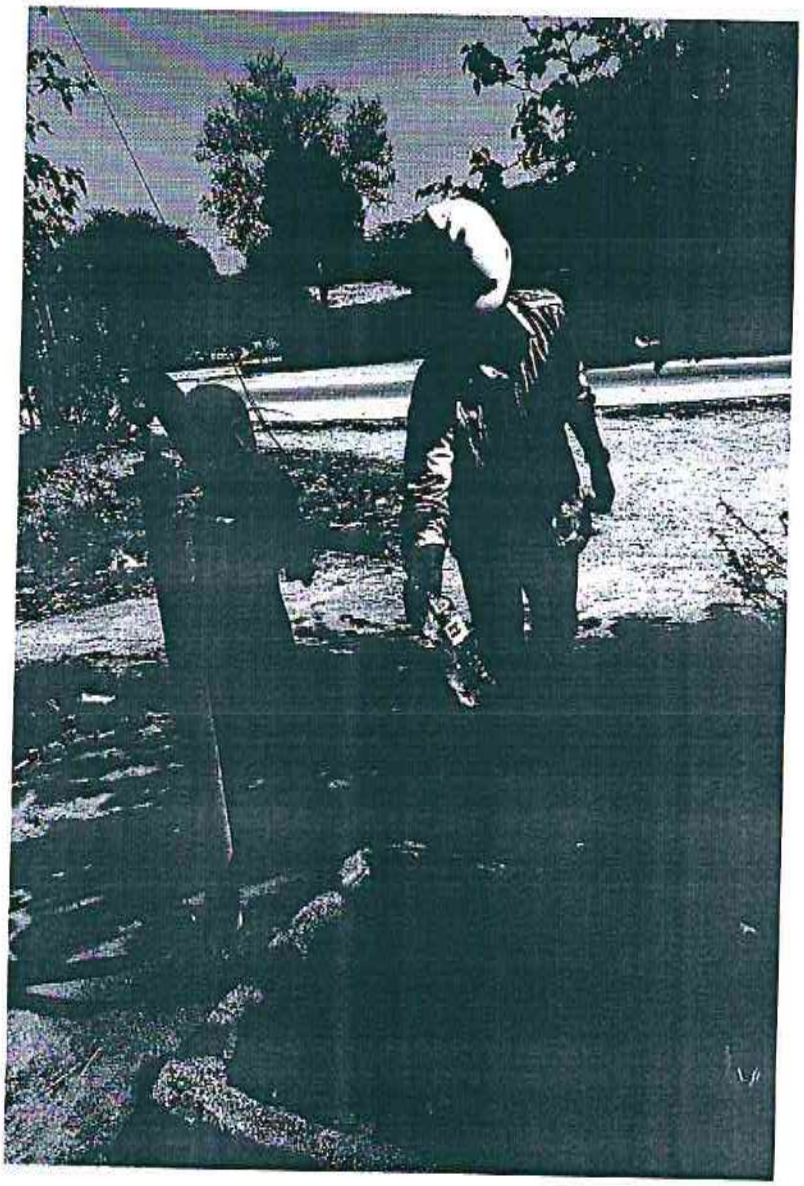
Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.663 at 23.1°C	APHA-4500-H^+ B
2.	Color	TCU	≤15	≤15	0.000	APHA-2120 B
3.	Taste	-	-	Non-Objectionable	Non-Objectionable	APHA-2160 C
4.	Odor	-	-	Non-Objectionable	Non-Objectionable	APHA-2150 B
5.	Turbidity	NTU	5	5	0.26	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	1350*	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	200	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	100	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	0.9	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	0.459	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	0.140	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/2023-01886/DW

Date: 01-Apr-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	0.1670	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	358.4868	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	34.980	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	Nil	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	Nil	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

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

TEST REPORT

Ref#: PGG/LAB/2023-1887/DW

Date: 01-Apr-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	**Ahmedpur Sial**

Sample Description:

Nature of sample	Drinking water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Sialkot 40ft N 30° 89.9554" E 71° 59.8032"
Sample source	Hand Pump
Sample Code	DW-598
Date of sampling	14-Mar-23

Summary of Test Result:

Physical Parameters	Compliance
Biological Parameters	Compliance
Chemical Parameters	Compliance
Remarks: All Parameters are in compliance with PEQS & WHO Standards.	

- 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

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd

ISO/IEC 17025:2017 Accreditated Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

Doc.#: PGG/IMS/FF/063 | Rev. Date: 27-Jan-22 | Rev. # 01

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

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Ref#: PGG/LAB/2023-1887/DW

Date: 01-Apr-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.688 at 23.1°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	830	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	180	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	0.0035	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	0.6	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	0.0930	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	0.152	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	0.012	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 LAB 180 17025

PAK-EPA

Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +9242-35441444 Cell: 0303-444233

EPA Certified

Ref#: PGG/LAB/2023-1887/DW

Date: 01-Apr-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	0.0090	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	178.5985	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	8.9781	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	BDL	APHA-3111 B

Biological Parameters Analysis Results:

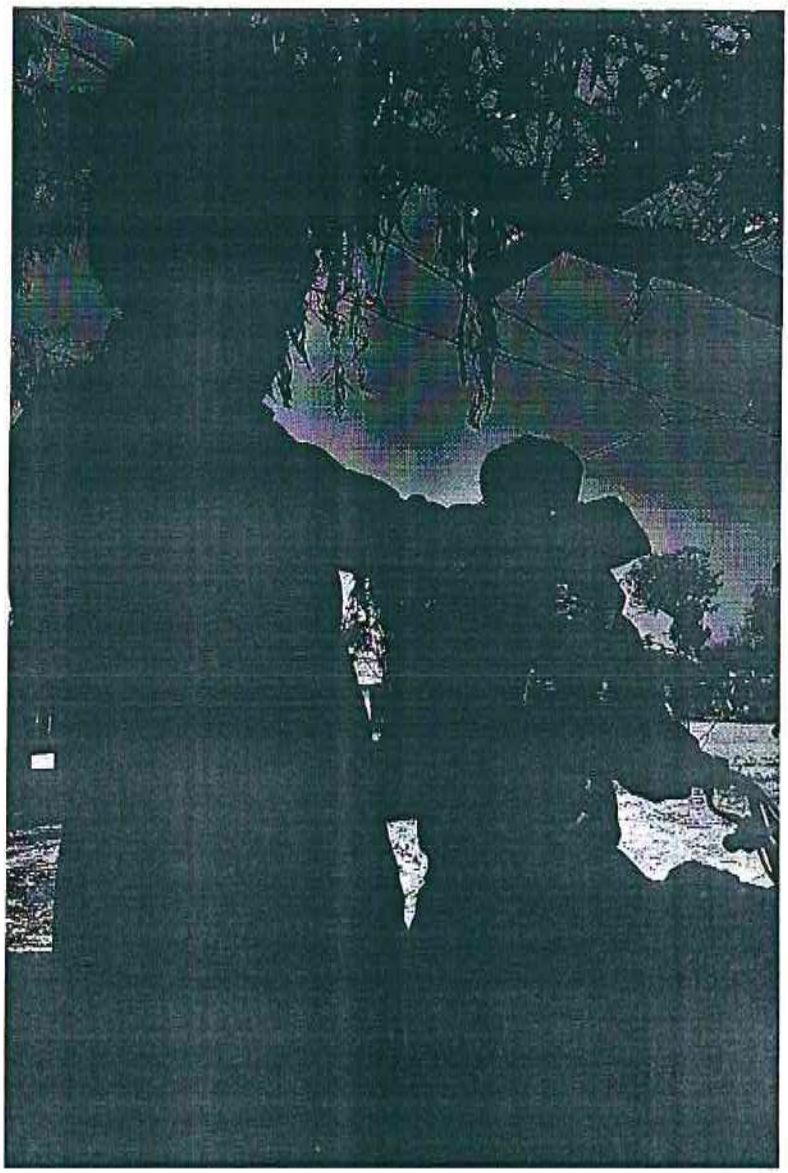
Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	Nil	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	Nil	APHA-9221 E
3.	Fecal Coliform	-	Must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



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

TEST REPORT

Ref#: PGG/LAB/2023-1888/DW

Date: 01-Apr-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	**Ahmed Pur Sial**

Sample Description:

Nature of sample	Drinking water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Dalona Samri jalalabad 35ft N 30° 95' 91.43" E 71° 90'36.38"
Sample source	Hand Pump
Sample Code	DW-599
Date of sampling	14-Mar-23

Summary of Test Result:

Physical Parameters	Partially Compliance
Biological Parameters	Compliance
Chemical Parameters	Compliance
Remarks: Parameters with * are exceeding with PEQS LImits.	

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- 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 Pakistan National Accreditation Council LAB 180 17025

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.

ISO/IEC 17025:2017 Accreditated Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

Doc.#: PGG/IMS/FF/063 | Rev. Date: 27-Jan-22 | Rev. # 01

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Ref#: PGG/LAB/2023-1888/DW

Date: 01-Apr-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.373 at 22.4°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	0.40	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	1160*	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	420	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	120	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	0.9	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	0.1986	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	0.348	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	0.084	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 LAB 180 17025

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Ref#: PGG/LAB/2023-1888/DW

Date: 01-Apr-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	0.0435	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	185.2783	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	13.9635	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	Nil	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	Nil	APHA-9221 F

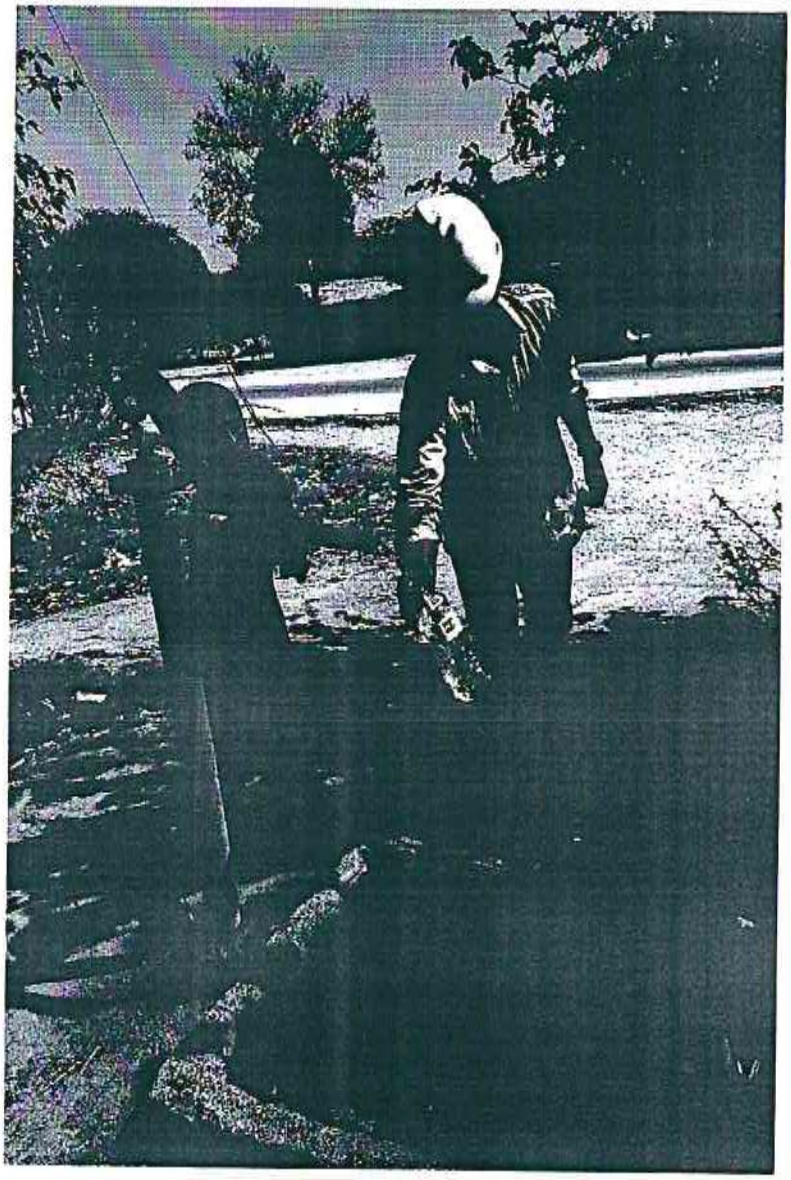
.....End of Report.....

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

PNAC Pakistan National Accreditation Council LAB 180 17025

PAK-EPA



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

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TEST REPORT

Ref#: PGG/LAB/2023-1889/DW **Date:** 01-Apr-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	**Ahmed Pur Sial.**

Sample Description:

Nature of sample	Drinking water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Fathe Pur pritti 35ft N 31° 00362" E 72° 921507"
Sample source	Tubewell
Sample Code	DW-600
Date of sampling	14-Mar-23

Summary of Test Result:

Physical Parameters	Compliance
Biological Parameters	Compliance
Chemical Parameters	Compliance
Remarks: All Parameters are in compliance with PEQS & WHO Standards.	

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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

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Ref#: PGG/LAB/2023-1889/DW

Date: 01-Apr-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.754 at 22.1°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	630	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	330	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	0.0207	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	0.5	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	0.4206	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/2023-1889/DW

Date: 01-Apr-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	0.0081	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	58.5810	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	6.7871	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	Nil	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	Nil	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

PNAC Pakistan National Accreditation Council LAB 180 17025

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TEST REPORT

Ref#: PGG/LAB/2023-1890/DW

Date: 01-Apr-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	**Ahmed Pur Sial**

Sample Description:

Nature of sample	Drinking water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Hawali Jeewan 40ft N 30° 896869" E 71° 921507 "
Sample source	Motor Pump 45 Ft
Sample Code	DW-601
Date of sampling	14-Mar-23

Summary of Test Result:

Physical Parameters	Partially Compliance
Biological Parameters	Partially Compliance
Chemical Parameters	Compliance
Remarks: Parameter 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/2023-1890/DW

Date: 01-Apr-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.704 at 23.2°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	38.0*	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	290	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	0.0016	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	0.3392	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	0.095	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	0.010	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/2023-1890/DW

Date: 01-Apr-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	0.5233	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	170.6488	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	7.3173	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	3.0324	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	35.6*	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	Nil	APHA-9221 F

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

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

TEST REPORT

Ref#: PGG/LAB/2023-1891/DW

Date: 01-Apr-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	**Ahmed Pur Sial**

Sample Description:

Nature of sample	Drinking water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	2/2L 60 Ft N 30°892127" E 71° 899457"
Sample source	Motor Pump
Sample Code	DW-602
Date of sampling	14-Mar-23

Summary of Test Result:

Physical Parameters	Compliance
Biological Parameters	Partially Compliance
Chemical Parameters	Compliance
Remarks: Parameter 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/2023-1891/DW

Date: 01-Apr-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.691 at 24.1°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	0.42	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	780	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	330	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	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 Pakistan

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Ref#: PGG/LAB/2023-1891/DW

Date: 01-Apr-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	BDL	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	111.4316	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	8.1821	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	95.2*	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	Nil	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/2023-1892/DW

Date: 01-Apr-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	**Ahmed Pur Sial**

Sample Description:

Nature of sample	Drinking water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Hazrat Sultan Bahu 35ft N 30° 818505' " E 71° 864834"
Sample source	Hand Pump
Sample Code	DW-604
Date of sampling	14-Mar-23

Summary of Test Result:

Physical Parameters	Partially Compliance
Biological Parameters	Partially Compliance
Chemical Parameters	Compliance
Remarks: Parameter with * are exceeding with PEQS Limits.	

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- 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 Pakistan

PNAC LAB 180 17025

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

EPA Certified

Ref#: PGG/LAB/2023-1892/DW

Date: 01-Apr-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.771 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	0.35	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	1140*	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	370	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	115	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	0.2984	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	0.390	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	0.140	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/2023-01892/DW

Date: 01-Apr-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	0.2850	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	200.9460	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	8.3409	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	78.5*	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	Nil	APHA-9221 F

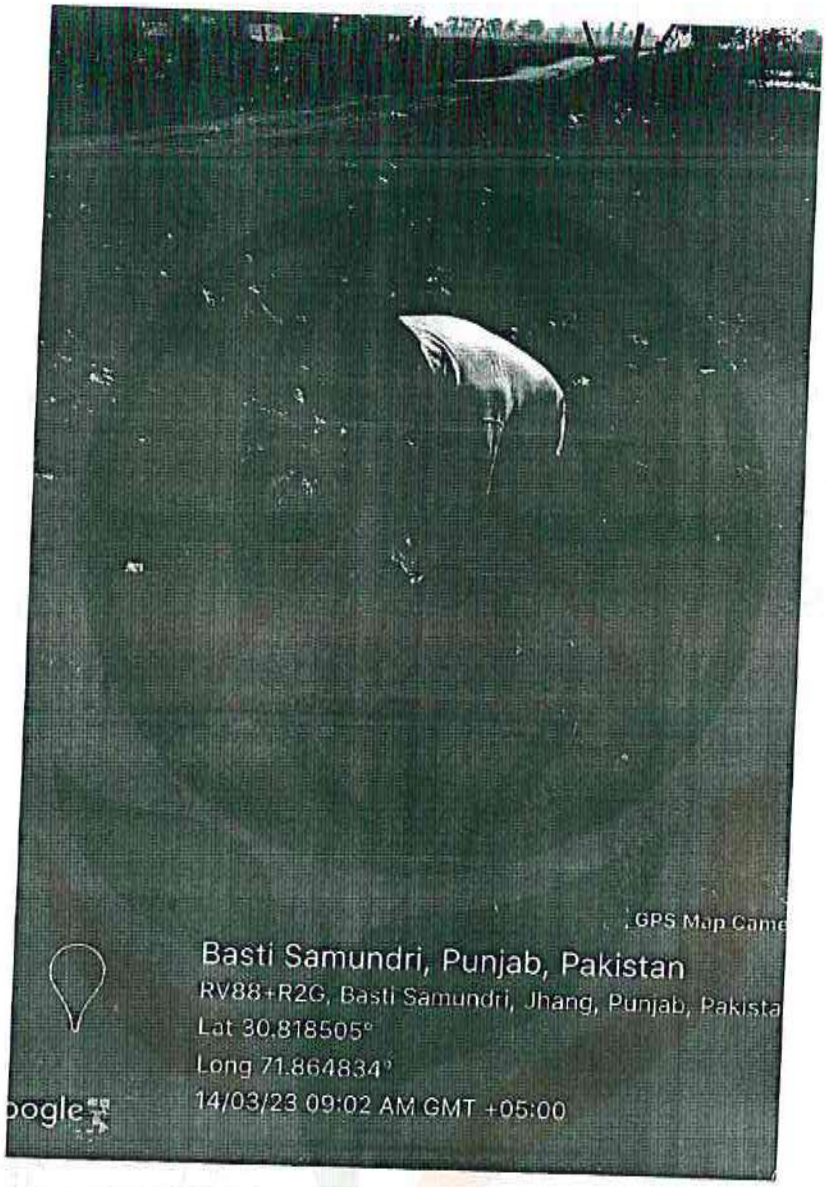
.....End of Report.....

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

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

TEST REPORT

Ref#: PGG/LAB/2023-1894/DW **Date:** 01-Apr-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	**Ahmed Pur Sial**

Sample Description:

Nature of sample	Drinking water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Sewa Sadad 40ft N 30° 817217" E 71° 843001"
Sample source	Hand Pump
Sample Code	DW-605
Date of sampling	14-Mar-23

Summary of Test Result:

Physical Parameters	Partially Compliance
Biological Parameters	Partially Compliance
Chemical Parameters	Compliance
Remarks: Parameter 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 RAZA ULLAH	IFTIKHAR AHMED
Lab Analyst	Chief Analyst	Laboratory Incharge

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

PNAC LAB 180 17025

Ref#: PGG/LAB/2023-1894/DW

Date: 01-Apr-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	pH	-	-	6.5-8.5	7.743 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	9.92*	APHA-2130 B
6.	Total dissolved Solids (TDS)	mg/L	1000	<1000	910	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Hardness	mg/L	-	<500	220	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	75	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	0.4	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	0.0379	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	0.108	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	0.025	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/2023-1894/DW

Date: 01-Apr-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	0.0691	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	186.6950	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	8.7302	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	BDL	APHA-3111 B

Biological Parameters Analysis Results:

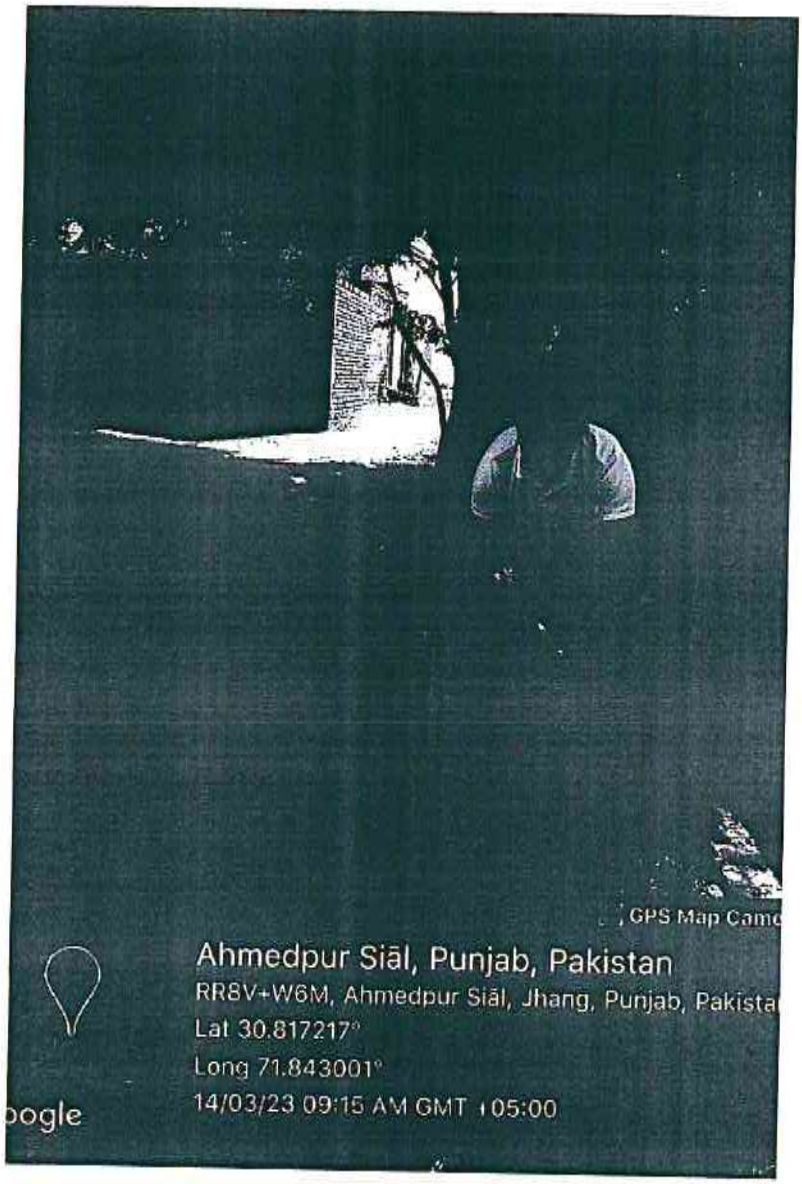
Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method / Technique
1.	Total Coli-form	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	35.6*	APHA-9221 D
2.	E Coli	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	Nil	APHA-9221 E
3.	Fecal Coliform	-	Must not be detected in 100 ml sample	Must not be detected in 100 ml sample	Nil	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

PNAC Pakistan National Accreditation Council LAB 180 17025


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Long 71.843001°
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TEST REPORT

Ref#: PGG/LAB/2023-1895/DW

Date: 01-Apr-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	**Ahmed Pur Sial**

Sample Description:

Nature of sample	Drinking water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	3/3 R N 30° 778969" E 71° 729408"
Sample source	TubeWell
Sample Code	DW-607
Date of sampling	14-Mar-23

Summary of Test Result:

Physical Parameters	Compliance
Biological Parameters	Compliance
Chemical Parameters	Partially Compliance
Remarks: All Parameters are in compliance with PEQS Limits except Chromium.	

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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/2023-1895/DW

Date: 01-Apr-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method/Technique
1.	pH	-	-	6.5-8.5	7.773 at 24.1°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	900	APHA-2540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Results	Method/Technique
1.	Total Hardness	mg/L	-	<500	230	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	0.0230	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	80	APHA-4500-Cl B
9.	Chromium (Cr)	mg/L	0.05	≤0.05	0.0614*	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	0.0570	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	0.136	APHA-4500-NO_3^{-1} E
17.	Nitrite	mg/L	0.02	≤3	0.014	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/2023-1895/DW **Date:** 01-Apr-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	0.0090	APHA-3111 B
21.	Phenolic Compound (As Phenol)	mg/L	0.002	-	BDL	APHA-5530 D
22.	Sodium (Na)^	mg/L	200	-	194.5860	APHA-3111 B
23.	Potassium (K)^	mg/L	200	-	9.5224	APHA-3111 B
24.	Total Iron (Fe)^	mg/L	-	-	BDL	APHA-3111 B

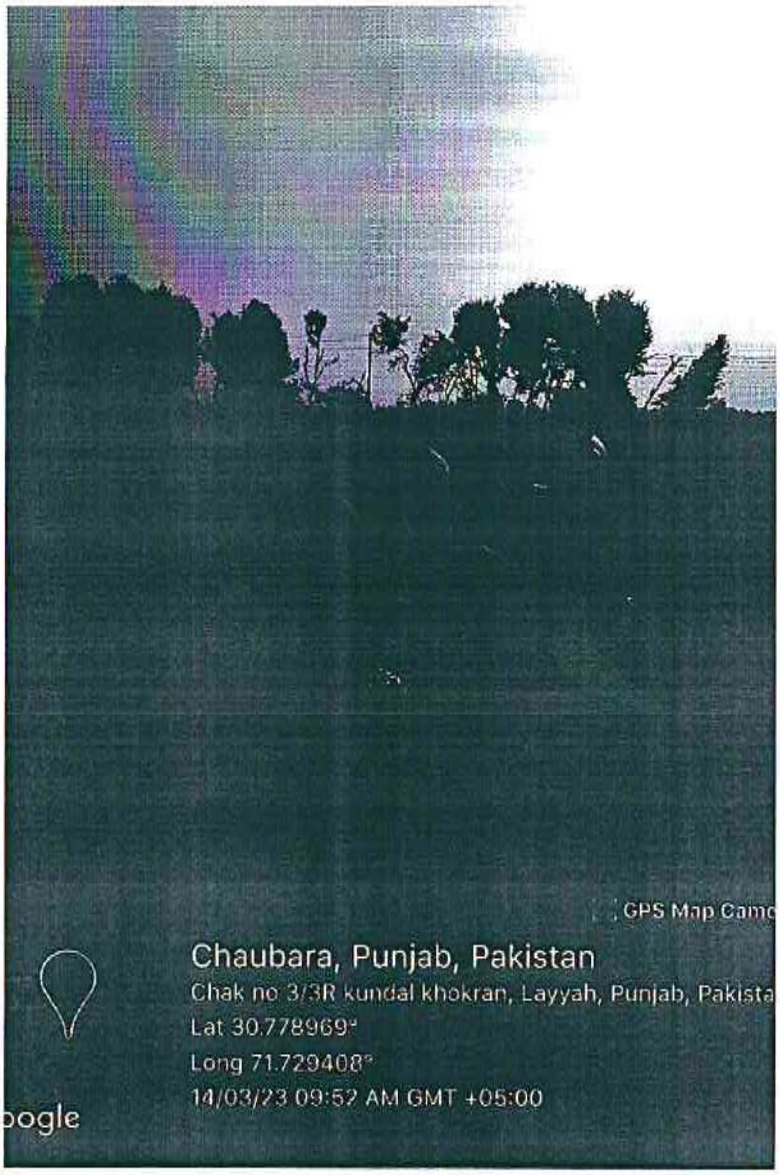
Biological Parameters Analysis Results:

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	Nil	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	Nil	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


GPS Map Camo
Chaubara, Punjab, Pakistan
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Long 71.729408°
14/03/23 09:52 AM GMT +05:00
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EPA Certified

TEST REPORT

Ref. #: PGG/LAB/2023-1908/NL

Issue date: 1-Apr-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
Site Location:	Ahmedpur Sial,
Nature of Monitoring:	Noise Level
Monitoring Location:	Hawali Jeewan
Monitoring Coordinates:	N 30°877147" E 71°921494"
Name of Sampling Person:	Mr. Adil
Monitoring By:	Pak Green Laboratory
Monitoring Time:	Real Time
Monitoring Instrument:	Noise Meter Landtek SL-5868P
Monitoring Date:	14-Mar-23 to 15-Mar-23

Results:

Sr. No.	Day Time	Equivalent Noise dB (A)
1.	5:15 AM	64.6
2.	6:15 AM	65.4
3.	7:15 AM	64.7
4.	8:15 AM	64.3
5.	9:15 AM	64.3
6.	10:15 AM	64.6
7.	11:15 AM	66.6
8.	12:15 PM	65.3
9.	1:15 PM	66.6
10.	2:15 PM	67.3
11.	3:15 PM	67.6
12.	4:15 PM	66.2
Average		**65.6**

Sr. No.	Night Time	Equivalent Noise dB (A)
13.	5:15 PM	54.9
14.	6:15 PM	53.9
15.	7:15 PM	56.9
16.	8:15 PM	50.3
17.	9:15 PM	53.6
18.	10:15 PM	55.5
19.	11:15 PM	53.4
20.	12:15 AM	55.1
21.	1:15 AM	56.9
22.	2:15 AM	55.2
23.	3:15 AM	60.9
24.	4:15 AM	50.6
Average		**54.8**

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

PNAC LAB 180 17025

PAK-EPA

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

Ref. #: PGG/LAB/2023-1908/NL

Issue date: 1-Apr-23

PEQS: Punjab Environmental Quality Standards

Sr. No.	Category of area/Zone	Units	Day Time	Night Time
1.	Commercial Area (C)	dB (A) Leq	75	65

Terms & Conditions:

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  The report is not valid for any negotiations

Field Analyst	Chief Analyst	Laboratory Incharge

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

TEST REPORT

Ref #: PGG/LAB/2023-01892/WW

Date: 01-Apr-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	**Ahmed Pur Sial**

Sample Description:

Nature of sample	Waste water
Sampling By	Pak Green Enviro Engineering & Laboratories Pvt. Ltd.
Station Name & Location	Hawali Jeewan N 30°877147" E 71°921494"
Sample source	Final Drain
Sample Code	WW-603
Date of sampling	**14-Mar-23**

Summary of Test Result:

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

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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

PNAC LAB 180 17025

Ref #: PGG/LAB/2023-001892/WW

Date: 01-Apr-23

Physical Parameters Analysis Results:

Sr. No.	Parameters	Unit	PEQS	Results	Method / Technique
1.	Temperature	°C	-	23.9	APHA-2550 B
2.	pH	-	6.5-8.5	7.645 at 23.9°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	158*	APHA-5210 D
2.	Chemical Oxygen Demand (COD) ^	mg/L	150	256*	APHA-5220 B
3.	Total Suspended Solids (TSS) ^	mg/L	200	450*	APHA-2540 D
4.	Total Dissolved Solids (TDS) ^	mg/L	3500	1460	APHA-2540 C
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	190	APHA-4500-Cl B
8.	Fluoride (F^{1-})	mg/L	≤1.5	0.6	APHA-4500-F-C
9.	An Ionic detergent as MBAs	mg/L	20	0.846	APHA 5540 C

Chemical Parameters Analysis Results:

Sr. No.	Parameters	Unit	PEQS	Results	Method / Technique
10.	Sulphate (SO_4^{2-}) ^	mg/L	600	165	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	24.8	APHA-4500NH_3 C
13.	Cadmium	mg/L	0.01	BDL	APHA-3111 B
14.	Chromium (Cr)	mg/L	≤0.05	BDL	APHA-3500-Cr B
15.	Copper (Cu)	mg/L	2	0.0380	APHA-3111 B

PNAC LAB 180 17025

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

EPA Certified

Ref #: PGG/LAB/2023-01892/WW

Date: 01-Apr-23

Sr. No.	Parameters	Unit	PEQS	Results	Method / Technique
16.	Lead (Pb)	mg/L	≤0.005	0.1068*	APHA-3111 B
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	0.2021	APHA-3111 B
22.	Arsenic	µg/L	≤50	0.0243	APHA-3114 B
23.	Barium (Ba)	mg/L	0.7	BDL	APHA-3111 D
24.	Total Iron (Fe)^	mg/L	8.0	10.2569*	APHA-3111 B
25.	Manganese (Mn^{2+})	mg/L	≤0.5	0.7065*	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	0.1691	-
29	Sodium	mg/L	-	259.1793	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 Limit**

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

PNAC LAB 180 17025

Annex-III

Environmental Sensitive Receptors



Govt.Elementary School



Mosque



Jamia Masjid Jafria



Imam Bargah



Masjid



Imam Bargah



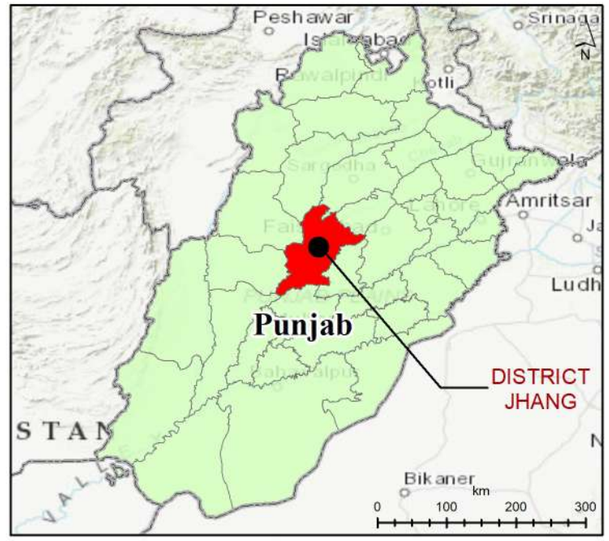
Masjid



Imam Bargah



Al-Abbas Homeopathic





LEGEND:

- Environmental Sensitive Receptors
- Canal / Minor / Distributary

BASTI JAIWAN

2L-Disty

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 CENTRAL-I	**ENVIRONMENTAL SENSITIVE RECEPTORS MAP BASTI JAIWAN, TEHSIL AHMADPUR SIAL, CLUSTER CENTRAL-I**	Meters 0 112.5 225 450 — 1:6,000



Govt.Girls Model Insaf ElementarySchool



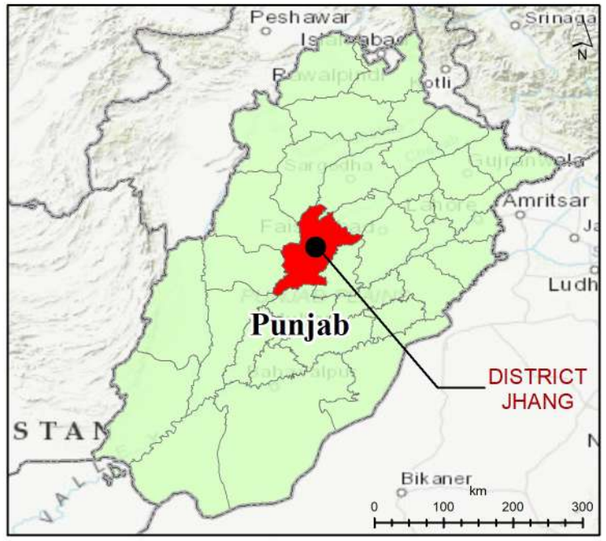
Govt.Boys Model Insaf ElementarySchool



Masjid



Masjid





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 CENTRAL-I	**ENVIRONMENTAL SENSITIVE RECEPTORS MAP CHAK NO 2/2L, TEHSIL AHMADPUR SIAL, CLUSTER CENTRAL-I**	Meters 0 75 150 300 — 1:4,000



Govt.Boys ElementarySchool



Jamia Masjid Siddique Akbar



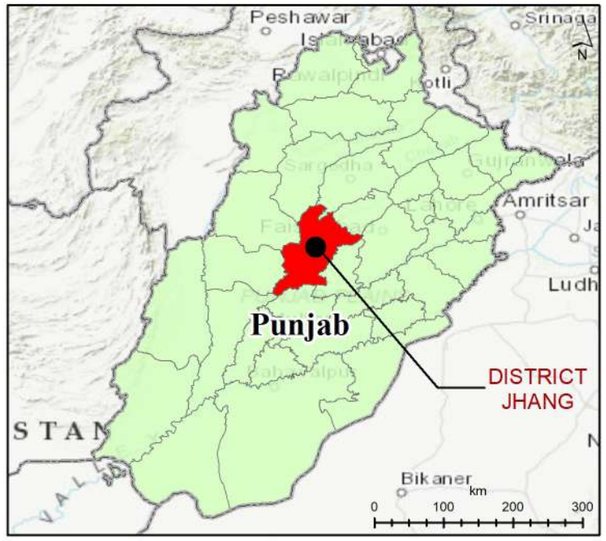
Masjid (Ahl-e-Tashie)



Graveyard



Masjid





LEGEND:

Environmental Sensitive Receptors

Canal / Minor / Distributary

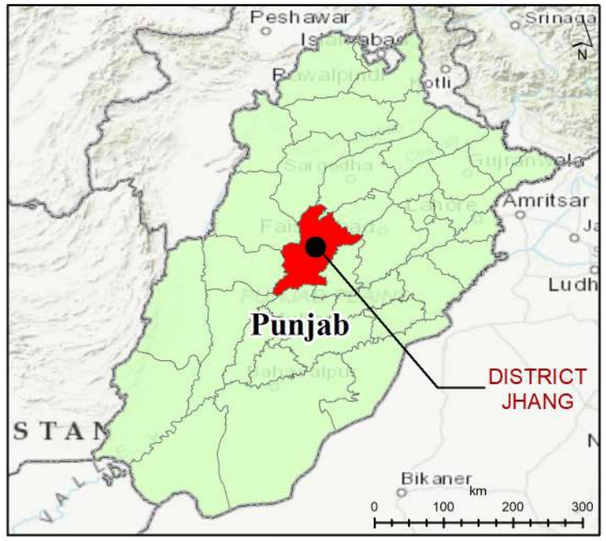
CLIENT:	CONSULTANT:	PROJECT:	MAP TITLE:	SCALE:
PUNJAB RURAL MUNICIPAL SERVICES COMPANY (PRMSC)	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE:- NESPAK HOUSE 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CONSULTANCY SERVICES FOR ENGINEERING DESIGN & CONSTRUCTION SUPERVISION PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT, PILOT PHASE, CLUSTER CENTRAL-I	**ENVIRONMENTAL SENSITIVE RECEPTORS MAP BASTI SIALKOT, TEHSIL AHMADPUR SIAL, CLUSTER CENTRAL-I**	Meters 0 95 190 380 — 1:5,000



Masjid Bilal Razvi



Superior Model School





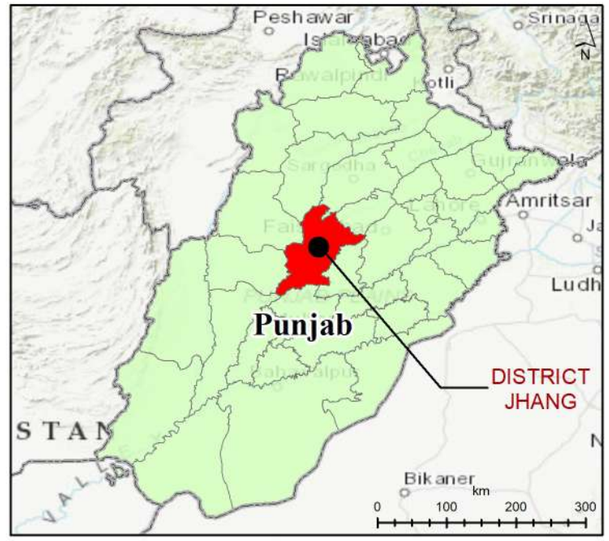
LEGEND:

- 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 CENTRAL-I	**ENVIRONMENTAL SENSITIVE RECEPTORS MAP GUDARA, TEHSIL AHMADPUR SIAL, CLUSTER CENTRAL-I**	Meters 0 55 110 220 — 1:3,000



Madrassa

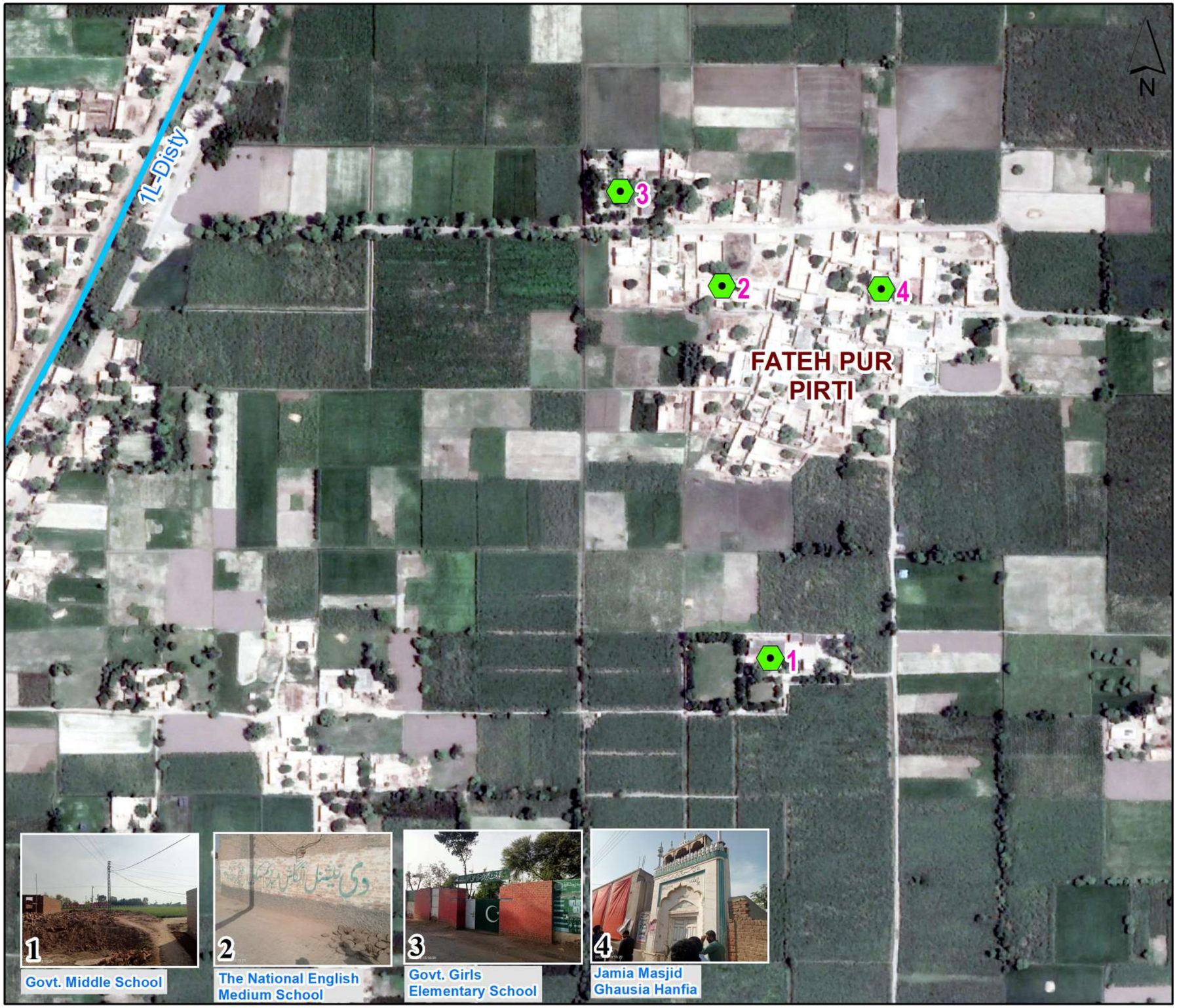


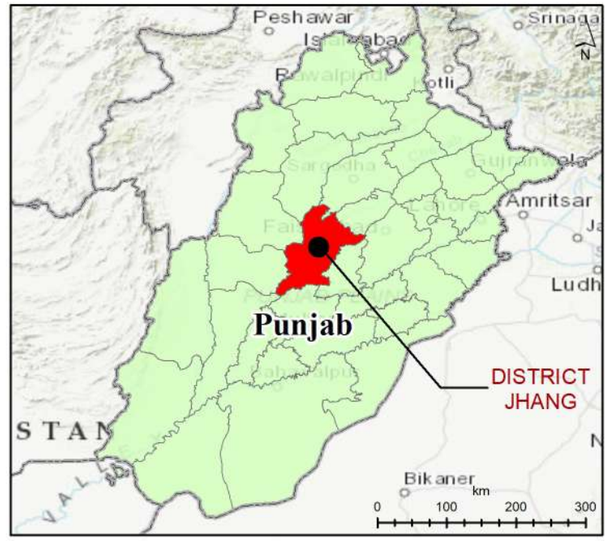


LEGEND:

- 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 CENTRAL-I	**ENVIRONMENTAL SENSITIVE RECEPTORS MAP DOLUANA SHARQI, TEHSIL AHMADPUR SIAL, CLUSTER CENTRAL-I**	Meters 0 45 90 180 — 1:2,500







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 CENTRAL-I	**ENVIRONMENTAL SENSITIVE RECEPTORS MAP FATEH PUR PIRTI, TEHSIL AHMADPUR SIAL, CLUSTER CENTRAL-I**	Meters 0 55 110 220 — 1:3,000

BASTI GHULAM

BASTI HAZRAT SULTAN BAHU

BASTI ARRAY WALI

BASTI RARHI

1

Decent School System

2

Masjid

3

Darbar Hazrat Sultan Bahu

4

Darbar Baba Gaman Shah

5

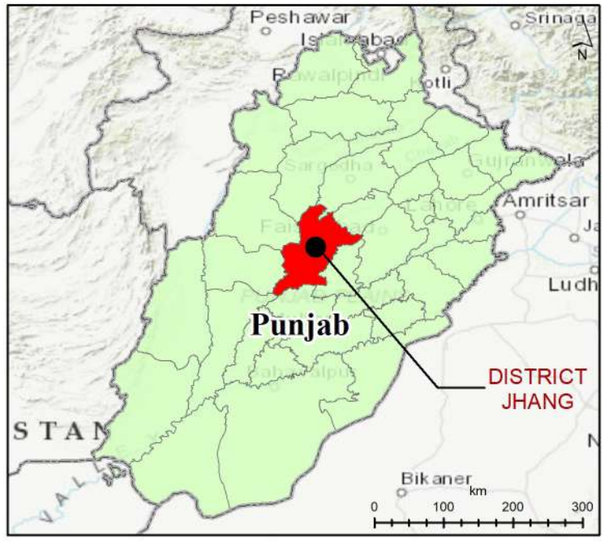
Masjid

6

Health House

7

Graveyard





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 CENTRAL-I

MAP TITLE:

ENVIRONMENTAL SENSITIVE RECEPTORS MAP SULTAN BAHU, TEHSIL AHMADPUR SIAL, CLUSTER CENTRAL-I

SCALE:

Meters 0 130 260 520

1:7,000



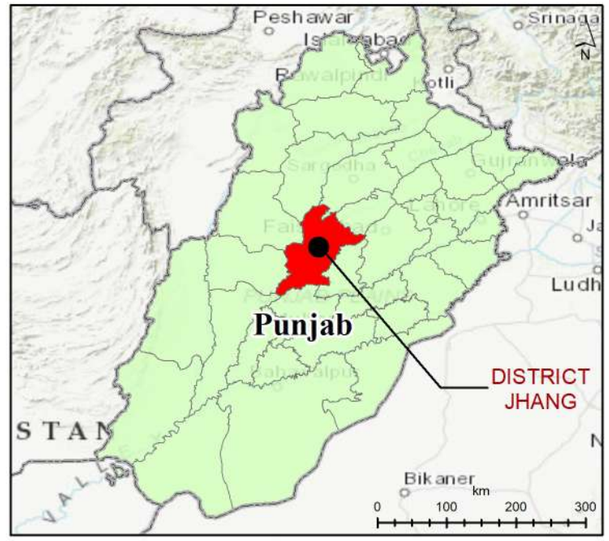
Govt. Model Girls Elementary School



Govt.Insaf Model Elementary School



Masjid





LEGEND:

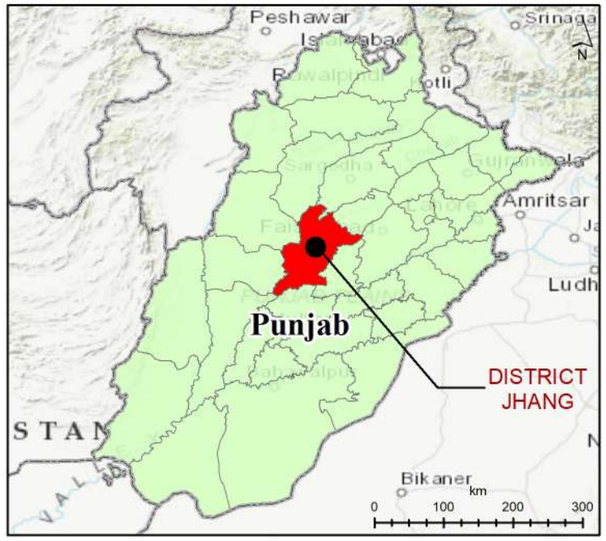
- Environmental Sensitive Receptors
- Canal / Minor / Distributary

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 CENTRAL-I	**MAP TITLE:** ENVIRONMENTAL SENSITIVE RECEPTORS MAP SEWA SADAT, TEHSIL AHMADPUR SIAL, CLUSTER CENTRAL-I	**SCALE:** Meters 0 95 190 380 — 1:5,000



Masjid Bilal

CHAK NO. 3/3R





LEGEND:

- Environmental Sensitive Receptors
- Canal / Minor / Distributary

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 CENTRAL-I

MAP TITLE:

ENVIRONMENTAL SENSITIVE RECEPTORS MAP CHAK NO. 3/3R, TEHSIL AHMADPUR SIAL, CLUSTER CENTRAL-I

SCALE:

Meters
0 75 150 300

1:4,000

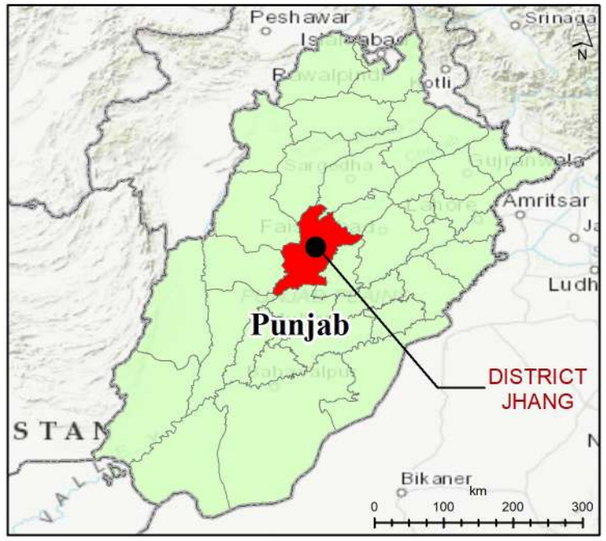


1

Govt. Boys Elementary School

CHAK NO. 11/3L

1





LEGEND:

- Environmental Sensitive Receptors
- Canal / Minor / Distributary

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 CENTRAL-I

MAP TITLE:

ENVIRONMENTAL SENSITIVE RECEPTORS MAP CHAK NO. 11/3L, TEHSIL AHMADPUR SIAL, CLUSTER CENTRAL-I

SCALE:

Meters
0 75 150 300

1:4,000

Annex-IV

Socio-Economic Survey Tool

Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS)

Name	Zeeshan Jaffary	Date	14-03-2022
Settlement	Chak No 2/2-L	UC	Mahmood Kot
Tehsil	Ahmadpur Sial	District	Jhang

Name of Respondant: Asad Abbas Contact: 03014909468 Age: 24

Gender: Male ✓ Female

Marital Status: Married Unmarried ✓

Caste: Arain Mother Language: Siraiki Religion: Islam

Qualification

Illetrate		Primary		Middle		Matric	
Intermediate		Graduation	✓	Above			

Profession: Teacher at Private School

Source of income? Teaching

Average monthly income (PKR)? 20,0004-

<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? 15

Ownership status of house?	Owned	✓	Rented		Squatters		
Type of construction of house?	Katchá		Pacca	✓	Semi-pacca		

Available facilities?

Electricity	✓	Sui Gas	X	Sewerage	X	Water Supply	X
Telephone	X	Solid Waste	X	Roads	✓	Public Transport	X
Rescue	✓	Health	X	School	✓	College	X
Madrassa	X	Graveyard	X	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. Heavy metals & Phosphorus

Type of sewerage system?

Piped network [ ] Open drains [ ] In fields/ plots [✓] Others [ ]

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? Ghaib Maha raja Distance 1.0 km

Health expenditure? 5000

Landholding No land lord House [ ] Agriculture [ ] Commercial [ ]

Major crops

Wheat [ ] Cotton [ ] Sugarcane [ ] Fodder [ ] Vegetable [ ]

Maize [ ] Fruits [ ] Others [ ]

Source 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? 200 - 300

Pressing needs? Health care facility, Sewerage System, roads, Soiling.

Signature of Interviewer.

Annex-V

Gender Survey Tool

Punjab Rural Sustainable Water Supply & Sanitation Project (PRSWSS)

Name	Daweria	Date	19-04-2023
Settlement	Chak No 11/3-L	UC	Rapoori -75
Tehsil	Jhang	District	Ahmadpur Sial.

Name of Respondant	Saima			Contact	0320-9081256	Age	23.
Gender		Male		Female	✓		
Marital Status		Married	✓	Unmarried			
Caste	Bhatti	Mother Language	Siraiki			Relegion	Islam

Qualification

Illetrate		Primary		Middle		Matric	✓
Intermediate		Graduation		Above		Alma Course	

Profession: House wife (Quran Teacher)

Source of income? Nothing

Average monthly income (PKR)?

<15,000		15,001-25,000		25,0001-35,000	
35,0001-50,000		>50,000			

Average monthly savings (PKR)?

Type of family system? Joint: | Nuclear: ✓

No. of family members? 4

Ownership status of house?	Owned	✓	Rented		Squatters		
Type of construction of house?	Katcha	✓	Pacca		Semi-pacca		

Available facilities?

Electricity	✓	Sui Gas	✗	Sewerage	✗	Water Supply	✗
Telephone	✗	Solid Waste	✗	Roads	✗	Public Transport	✓
Rescue	✗	Health	✓	School	✓	College	✗
Madrassa	✓	Graveyard	✓	Mosque	✓		

Source of water in locality?

Piped Network		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 [ ]

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 [✓] Typhoid

Health facility visited? Garh More Distance 15 Km

Health expenditure? 3000

Landholding No Landlord. 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? Sewerage System, Education facility, Madrassa provision, Sui Gas provision, Health Care facility.

Signature of Interviewer.

NESPAK

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? 02

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	

without income

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?

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	✓	Cooking	✓
Cleaning house	✓	Any other	✓	→ Teaching children			

What is the knowledge level of the adolescent girls on menstrual hygiene? What type of sanitary material do they use during menstruation cycle?

→ Home made clothe pad

Aware about maintaince of hygines

Do you want to learn some skills for earning your livelihood? Yes [✓] No [ ]

If yes, what type of skills? Vocational Training Centre, Beautician Courses.

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 [ ]

What are pressing needs of women in the projected area? Project team ~~will~~ should help to initiate an official registered Madarsas for the community children. She can be teacher and can perform administrative work.

Annex-VI

Public Consultation Form

PRMSC

NESPAK

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED NESPAK)

Punjab Rural Sustainable Water Supply & Sanitation Project

(PRSWSS)

STAKEHOLDERS CONSULTATION

Sr. No. 5. Date: 15.3.23

Name of Facilitator: Tajamal Khan Location: Fateh Pur Peeti

Venue: Tajamal Khan Dera

Points to be discussed:

- Introduction of the project
- Description of various components of the project, its activities and impacts
- The stakeholder's involvement and their roles and responsibilities
- Assessment of gaps in existing services and target services
- Urgency and severity of present problems and issues in project area
- Concerns and Apprehensions of the local public representatives regarding the projects' impacts
- Measures to safeguards the interests of people
- Needs, priorities and reactions of the local public

1. **Concerns/ Apprehensions Raised**

- Water turns pale
- No health facility
- Open drain
- < 100 HHs.
- Yellow water after being exposed in air
- No health care facility go to garh maha raja.

2. **Points of Agreement:**

- N/LD involved.

PRMSC

NESPAK

3. **List of Participants:**

Sr. No.	Name	Cell No.	Signatures
1	ظفر عباس خان	0307-7696049	ظفر عباس خان
2	فدا حسین	0301-6504872	
3	مصنف خان	0301-6327571	Musanif
4	رفاقت حسین	0302-7679414	Rafi
5	آفتاب اکبر	0302-2032181	Akb
6	خیر بخش	"	Akbar Bakhsh
7	اللہ دتہ	0307-1035235	
8	محمد نواب	"	محمد نواب
9	محمد اسماعیل	0305-1492175	محمد اسماعیل
10	محمد نواز	"	
11	ضیاء الحق اختر	0302-5237650	ضیاء اختر
12	جاوید عباس	0307-1906090	جاوید عباس
13	میر حسن	03038270068	
14	غلام حسین	3067616366	
15	قیصر عباس	03007501989	
16	غلام حسین	03013093102	
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PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Jaweria

Public Consultation

A. Name of Facilitator: Iqbal Nadeem Date: 19-04-23
10:35 — 11:45

B. Site Location:

Sub-village _____ Village/Town Sultan Haq Bahu

Union Council _____ Tehsil & District ADS

Venue: Iqbal nadeem 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

→ flood effected area.
→ water is sweet
→ BP+ gastro intestinal + Hepalites + malaria + Breathing issue + Anemia → in females
→ No hospital facility
people go to Garh maharja.
→ No washrooms people go fields. → waste waters
→ Open dumping
→ Soackag pits
→ No maddrassa for children.
→ culture of marriage of female instead of education.

C) SUGGESTIONS DURING CONSULTATION SESSIONS

D) PARTICIPANTS

Sr.#	Name	Mobile No.	Signature
1	Naseem.		
2	Fatima	0308-9265088	Fatima
3	Rida.	0345501892	Rida
4	Abda Parveen		
5	Shaheen.		
6	Ranwal	0318-2371623	Kanwal.
7	Ralsoom		
8	Amna		
9	Aziah Parveen		
10	Nadia Hafeez	0308-1040580	Nadia Hafeez.
11	Irshad	0303-	
12	Fozia		

Sr.#	Name	Mobile No.	Signature
13	Zarina	03013083380	
14	Ama Sahiba	0302-4626193	
15	Mehwish		
16	Patbani	0303-495639	
17	Sumaira Mai		
18	Zubair Mai	0306-0960219	
19	Abda Mai	0301-1081202	
20	Shaziq Humaira	03000-42[illegible]98	
21	~~Hu~~ Abda perveen	03240560266	
22	Ruksana		
23	Shazia		
24	Manzoba Mai	03049344101	
25	Razia	0307-0960486	
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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED NESPAK)

Punjab Rural Sustainable Water Supply & Sanitation Project

(PRSWSS)

STAKEHOLDERS CONSULTATION

Sr. No. 6 Date: 16.3.23

Name of Facilitator: Sahibzada Ghulam Sultan Location: Basti Tahir Sultan (A.P.S)

Venue: Dera Tahir Sultan

0321- 9876666

Points to be discussed:

- Introduction of the project
- Description of various components of the project, its activities and impacts
- The stakeholder's involvement and their roles and responsibilities
- Assessment of gaps in existing services and target services
- Urgency and severity of present problems and issues in project area
- Concerns and Apprehensions of the local public representatives regarding the projects' impacts
- Measures to safeguards the interests of people
- Needs, priorities and reactions of the local public

1. **Concerns/ Apprehensions Raised**

- Algae / fungus on filters.
- 28-30 ft Glow available.
- Taste & odour issues.
- Open drains / undersized.
- Hepatitis issues
- Land is property of Tahir Sultan

2. **Points of Agreement:**

- VID agreed.

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3. List of Participants:

Sr. No.	Name	Cell No.	Signatures
1	Ghalib Sultan	0321-987-6665	غالب سلطان
2	Ameen		امین
3	Naveed		
4	Habib		حبیب
5	Ali		محمد علی
6	Rehmat		
7	Haji Asghar Akhtar	0302-3722130	Asghar Akhtar
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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED NESPAK)

Punjab Rural Sustainable Water Supply & Sanitation Project

(PRSWSS)

STAKEHOLDERS CONSULTATION

Sr. No. Zeeshan Date: 16.3.23

Name of Facilitator: (Location: Chak 11/3L

Venue:

Points to be discussed:

- Introduction of the project
- Description of various components of the project, its activities and impacts
- The stakeholder's involvement and their roles and responsibilities
- Assessment of gaps in existing services and target services
- Urgency and severity of present problems and issues in project area
- Concerns and Apprehensions of the local public representatives regarding the projects' impacts
- Measures to safeguards the interests of people
- Needs, priorities and reactions of the local public

1. **Concerns/ Apprehensions Raised**

- G/w 45 ft.
- Taste changes — Water turns pale
- No sewerage system
- Ww disposal in fields.
- Poor water supply
- No Sewerage System
- Education facility should be given.
- Soiling & Health facility.

2. **Points of Agreement:**

- Agreed to pay bills.
- State land.

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3. **List of Participants:**

Sr. No.	Name	Cell No.	Signatures
1	غلام حسین ولد غلام حیدر	03007479512	غلام حسین
2	محمد اختر ولد حافظ احمد نواز	0308-8347911	محمد اختر
3	محمد افضل ولد حاجی فضل حسین	0301-6050863	
4	محمد شعیب ولد فضل خان نوح	0301-1790786	محمد شعیب
5	محمد آصف ولد محمد شفیع	0304-9809987	
6	عبداللطیف ولد محمد شفیع وسیک	03068956959	عبداللطیف
7	محمد ظفر ولد لشکر اعظم	03	
8	فضل حیات ولد محمد جمال دین	0300-3283193	Hayat Khizar
9	حاجی ممتاز ولد فضل حسین عالی	0300-7303604	ممتاز حسین
10	محمد انس ولد محمد اسماعیل عالو	0309-0324554	Anas
11	احمد نواز سیانہ ولد بھاگوں	0321-2643965	احمد نواز
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PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT
Jaiveria
(PRSWSS)
Public Consultation

A. Name of Facilitator: Gulshan Zahra Date: 19-04-23
12:00 : 1:45

B. Site Location:

Sub-village _____ Village/Town ~~H/3R~~ 11/3L

Union Council _____ Tehsil & District APS.

Venue: Health Care Centre

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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

→ Allergy + Hepatitis C + Malaria + Typhoid. Kidney stone.
→ Vary and Khan → Croutment no dispency. (land available).
→ High schools girls
→ Sui gas provision.
→ Yellowish + Soapy + heavy + oily water
→ Dispencary & provision or any other health care facility.
→ Absence of washrooms.
→ No Sui gas
→ Sewerage System is available → piped network but clogged.

C) SUGGESTIONS DURING CONSULTATION SESSIONS

D) PARTICIPANTS

Sr.#	Name	Mobile No.	Signature
1	Kaneez Fatima		
2	Farzana	0301 4602228	
3	Parveen	0306 6019845	
4	Kousar Bibi		
5	Khalid parveen	03000 425218	
6	Zahida parveen		
7	Lubna	0300 7868276	
8	Shehnaz Mai		شہناز مائی
9	Khulsa Bibi		کلثوم بی بی
10	Farzana Kousar	0301 5716713	فرزانہ کوثر
11	Gulshan Bibi	0301 7324280	گلشن
12	Fiza Mai		

Sr.#	Name	Mobile No.	Signature
13	Gulshan Zahra	0309-9817267	
14	Sharifa	0308 6344064	
15	Zulaida Mai	0300 5808985	
16	Irshad Akhtar	0322 9807343	ارشاد اختر
17	Iqbal Mai		
18	Nagina Mai		
19	Shazia Parveen	0307 2126340	
20	Zulaida Khanam	0302 6521104	زلیدہ خانم
21	Nazia Bibi	0300 6502456	
22	Sania Zahra	0306 3985786	ثانیہ زہرا
23	Tasleem Bibi		
24	Mehmona Akhter	0301 4701929	
25	Safiya Bibi		
26	Naseem Mai		
27	Azmat Zahra	0304 5422040	AZmat
28	Afsha Batool	0306 1787572	Afsha
29	Raneez		
30	Khurshid Bibi		
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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED NESPAK)

Punjab Rural Sustainable Water Supply & Sanitation Project

(PRSWSS)

STAKEHOLDERS CONSULTATION

Sr. No. _____ Date: 16.3.23

Name of Facilitator: Munawar Ali Location: Sewa Gadaat

Venue: Dera Munawar Ali

Points to be discussed:

- Introduction of the project
- Description of various components of the project, its activities and impacts
- The stakeholder's involvement and their roles and responsibilities
- Assessment of gaps in existing services and target services
- Urgency and severity of present problems and issues in project area
- Concerns and Apprehensions of the local public representatives regarding the projects' impacts
- Measures to safeguards the interests of people
- Needs, priorities and reactions of the local public

1. **Concerns/ Apprehensions Raised**

- No health facility
- View in fields.
→ Open dumping
→ People are laboure ~~or~~ agricultur ~~er~~ laboure
→ Hepatitis commonly found.
→ Mostly peoples are willing to pay Tariff
→ Handpumps & Borehules for Domestic and drinking purposes.

2. **Points of Agreement:**

VID

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3. **List of Participants:**

Sr. No.	Name	Cell No.	Signatures
1	Syed Kosar Ali	0307-6967137	سید کوثر
2	Syed Aqeel		
3	Ghulam Hussain	0301-4971975	غلام حسین
4	Munawar Ali	0302-8965600	منور علی
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Sr. No.	Name	Cell No.	Signatures
27	Ghulam Hussain	0307 - 6967137	
28	Syed Kosar Ali	0301 - 4971975	
29	Munawar Ali	0302 - 8965660	
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PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: ~~A Zaffar~~ Zafar Ali Shah Date: 20-04-23
9:30 - 10:00

B. Site Location:

Sub-village _____ Village/Town Sewa Sadaat-

Union Council _____ Tehsil & District APS

Venue: Syed Aktar Ali Shah 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

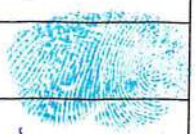
B) MAJOR CONCERNS/ ISSUES RAISED BY THE PARTICIPANTS

→ No Sewerage System
→ Common diseases as gastrointestinal, Malaria + cough and allergy.
→ Open dumping → cause Malaria Diarrhea.
→ Open drains mostly.
→ No health facility → only go to garh maharaja.
→ Malnurished children.
→ Majority females are house maids by profession.

C) **SUGGESTIONS DURING CONSULTATION SESSIONS**

D) **PARTICIPANTS**

Sr.#	Name	Mobile No.	Signature
1 ☆	Munazza Batool	0307 5560440	Munazza
2	Khurshid fatima.		
3	Saira Batool		
4	Zakariya Bibi		
5	Kurshand Batool.		
6	Samina Mai.		
7	Toqeer Fatima		
8	Zareen Fatima		
9	Muqadas Batool		Muqadas batool
10	Assiya		آسیہ بتول
11	Kaneez Fatima		
12	Kiran Batool		کرن بتول

Sr.#	Name	Mobile No.	Signature
13	Iqbal Fatima		
14	Amina Batool		
15	Zakia Batool		
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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED NESPAK)

Punjab Rural Sustainable Water Supply & Sanitation Project

(PRSWSS)

STAKEHOLDERS CONSULTATION

Sr. No. 1 Date: 14.3.22

Name of Facilitator: Sajid Ali Location: 2/21 (A.185)

Venue: Mr. Arif Dera

Points to be discussed:

- Introduction of the project
- Description of various components of the project, its activities and impacts
- The stakeholder's involvement and their roles and responsibilities
- Assessment of gaps in existing services and target services
- Urgency and severity of present problems and issues in project area
- Concerns and Apprehensions of the local public representatives regarding the projects' impacts
- Measures to safeguards the interests of people
- Needs, priorities and reactions of the local public

1. **Concerns/ Apprehensions Raised**

- No health facility
- Water 40-50 ft
- Health issues ; hepatitis
- No sui gas.
- Old hand pump didn't work.
- Kidney stones patients.
- waste water in cultivated fields.
- Health care facility → go to garh maha raja because of absence of any health care facility in village.

2. **Points of Agreement:**

- Ready to pay bills.
- Ready to cooperate.
- Ready to donate land for stand post

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3. **List of Participants:**

Sr. No.	Name	Cell No.	Signatures
1	Ali Raza	0306-7292132	
2	Manzar Abbas	0301-7059870	
3	M. Nawaz		
4	M. Jaffar		
5	Asad Abbas	03014909698	
6	Sabir Ali	03017220751	
7	M. Arif	03078740610	
8	Gulzar Hussain	0304-7926260	
9	Ghulam Jaffar	0301-7229210	
10	Fiaz Shair	0307-7509498	
11	M. Javaid	0	
12	M. Safdar	0300-7508652	
13	M. Iqbal	03084934754	
14	Tariq Shehzad	03059314920	
15	Tahir Abbas	03023787210	
16	Ansar Abbas	0306-6374360	
17	M. Ramzan	0306-6021415	
18	Jaffar Iqbal		
19	Mukhtar Hussain	0303-9836004	
20	M. Azam	0323-8097540	
21	Rahim Bakhsh		
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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED NESPAK)

Punjab Rural Sustainable Water Supply & Sanitation Project

(PRSWSS)

STAKEHOLDERS CONSULTATION

Sr. No. 2. Date: 14.3.23

Name of Facilitator: Kafeel. Location: Jaiwan (Haveli)

Venue: Dera Ali Abbas

Points to be discussed:

- Introduction of the project
- Description of various components of the project, its activities and impacts
- The stakeholder's involvement and their roles and responsibilities
- Assessment of gaps in existing services and target services
- Urgency and severity of present problems and issues in project area
- Concerns and Apprehensions of the local public representatives regarding the projects' impacts
- Measures to safeguards the interests of people
- Needs, priorities and reactions of the local public

1. **Concerns/ Apprehensions Raised**

- Water turns pale.
- No sewerage system
- Water not fit for drinking
- majority of Hepatitis & Kidney disease patients
- All population go to garh maha raja for medical facility.

→ No Solid wastage management → Open dumping.
→ hand pumps for water Supply.

2. **Points of Agreement:**

- land donated on voluntarily basis.

3. **List of Participants:**

Sr. No.	Name	Cell No.	Signatures
1	Ansar Abbas	0301-2992 14	
2	ANSAR Abbas	0306-8433258	
3	MUREED ABBAS	0301004555	MUREED ABBAS
4	Mushaid Abbas	0300-4250 63	Mushaid Abbas
5	Mushaid Abbas	0305-7876553	
6	M. Ashraf	0301-5082061	
7	M. Imran	0307-1478359	
8	M. Aslam	0306-0365642	
9	Raiz Hussain	0321-4020521	
10	Farhas Abbas Shah	0302-7808091	
11	M. Ramzan	0307-0008956	
12	Zafar Abbas	0305-1694948	
13	Javaid Iqbal	0326-2097331	
14	Shan Abbas	0306-6709417	
15	Ghulam Ali	0304-1699314	
16	Talaib Hussain	0307-7286097	
17	Sher Ali	0326-7394255	
18	Aajab Ali	[redacted]	
19	Syed Aliabbas Shah Bazmi	0314-3154044	
20		0324-6103379	
21		03004719443	
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PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Munazza Mai

Date: 20-04-23
10:30

B. Site Location:

Sub-village _____ Village/Town Taiwan.

Union Council _____ Tehsil & District APS

Venue: Manzoor Husain

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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

→ Yellow after Sometime
→ Allergy + Diarrhea + Malaria + Kidney stone +
→ Hormones + Malnutrients.
→ Medicine → garh maharaja + nearby clinic.
→ Sewerage System → soakage pit.
→ Boys + girls → Elementary school.
→ Still birth cases about 20%
→ mentally retarted. children.
→ Can't conceive
→ presence of domestic violence but not reported as stated by any candidate.

C) **SUGGESTIONS DURING CONSULTATION SESSIONS**

→ High school.
→ Seiverage Provision
→ UTC
→ Solid wastage managment
→ Hospital + Lady Dr.

D) **PARTICIPANTS**

Sr.#	Name	Mobile No.	Signature
1	Salma		
2	Anila		
3	Naseem Akhtar		
4	Riffat Batool.		
5	Najma		
6	Sadia		
7	Naseem		
8 ✱	Rimsha		
9	Raneez Fatima		
10 ✱	Munazza	0308-7058204	
11	Saira.		
12	Nadia Batool.		

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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED NESPAK)

Punjab Rural Sustainable Water Supply & Sanitation Project

(PRSWSS)

STAKEHOLDERS CONSULTATION

Sr. No. 3 Date: 15.3.23

Name of Facilitator: Ch. Azam Location: Basti Sialkot

Venue: Dera Ch. Azam UC: Godara

Points to be discussed:

- Introduction of the project
- Description of various components of the project, its activities and impacts
- The stakeholder's involvement and their roles and responsibilities
- Assessment of gaps in existing services and target services
- Urgency and severity of present problems and issues in project area
- Concerns and Apprehensions of the local public representatives regarding the projects' impacts
- Measures to safeguards the interests of people
- Needs, priorities and reactions of the local public

1. **Concerns/ Apprehensions Raised**

- 20 ft - Bad taste - Odor - Changes color.
- Sewerage in fields. - Open dumping.
- No health facility.
- State land available for water tank.

2. **Points of Agreement:**

- WCD for STP/ solid waste.
- Ready to pay the bills.

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3. **List of Participants:**

Sr. No.	Name	Cell No.	Signatures
1	Ch. Azam Din Jatt	0306-9416132	
2	Ch. Ali sher Jatt	0345-2146384	
3	Abdul Ghaffar	0301-3961991	
4	Dur Muhammad Shah	0301-7228752	
5	Liaqat Ali Gazar	0300 6518920	
6	Ch Aslam Arain	0300-6754319	
7	M. Yousaf	0301-8040455	
8	M. Akhtar Baloch	03021513865	
9			
10	imRan Laghari	0308-6508216	
11	Muhammad Hussain	0306-7920686	
12	Muzafar Ali	0303-6374191	
13	Ch Tariq Jatt	0309-8371843	
14	M. USMAN Nawazish	0300-5288181	
15	Malik Zahoor Ahmed	11	
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17	M. Jafar Ali	0301-6394164	
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19	M. Arif Sial	0306-6015423	
20	M. Hashim Khokar	0308-5855099	
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PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: Muhammad Umar Date: 19-04-23 2:30 –

B. Site Location:

Sub-village _____ Village/Town Basti Sial Kot

Union Council _____ Tehsil & District _____

Venue: Abdul Gafoor 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

→ gastro + Diarrhea + Allergy + Malaria + Typhoid majority of the disease.
→ Open drains & Open dumpings.
→ contaminated + Brackish water
→ Malnurshed + Mentally retarded children cases.
→ Social conflict araise due to Open drains and bloody streets after rain.
→ Only 10% of household have washrooms rest go to field to have to go neighbours.
→ Hepatitis A+B+C.

C) **SUGGESTIONS DURING CONSULTATION SESSIONS**

D) **PARTICIPANTS**

Sr.#	Name	Mobile No.	Signature
1 ✱	Nimra Gafoor	0325-3514879 MSc.	
2	Shazia Parveen	0300-9704490	
3	Ramal Mai		
4	Naseem Akhtar		
5	Rousar Parveen		
6	Najma "		
7 ✱	Amna	0302-4239752 husbands	Amna
8	Sidra	0314-4599922	Sidra
9	Misbah	0302-8707977	Misbah
10	Asma	–	Asma
11	Sumiya.		sumiaya
12	Nusrat Bano		

Sr.#	Name	Mobile No.	Signature
13	Samina Mai	0308-5018244	
14	Wahida Kousar	0301-3963494	وحیدہ کوثر
15	Tanveer Bibi	0341-7875366	
16	Sonia Mai		
17	Aasma Bibi	0324-1056474	عاصمہ بی بی
18	Sumera Liaqat	0301-6061180	سمیرا لیاقت
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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED NESPAK)

Punjab Rural Sustainable Water Supply & Sanitation Project

(PRSWSS)

STAKEHOLDERS CONSULTATION

Sr. No. 4. Date: 16.3.23

Name of Facilitator: Rab Nawaz Location: Chak Azmat Kamal

Venue: Shop of Rab Nawaz.

Points to be discussed:

- Introduction of the project
- Description of various components of the project, its activities and impacts
- The stakeholder's involvement and their roles and responsibilities
- Assessment of gaps in existing services and target services
- Urgency and severity of present problems and issues in project area
- Concerns and Apprehensions of the local public representatives regarding the projects' impacts
- Measures to safeguards the interests of people
- Needs, priorities and reactions of the local public

1. **Concerns/ Apprehensions Raised**

- No sewerage system
- Open drains
- Water is not good
- 645 feet

2. **Points of Agreement:**

- Land will be donated for stand-post on voluntary basis.

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3. List of Participants:

Sr. No.	Name	Cell No.	Signatures
1	سید زوار حسین شاہ	0303-8187725	
2			
3	رضوانہ ناصر		
4			
5	ڈاکٹر محمد ابراہیم عباسی	0301-2690422	
6			
7	صابر علی بلوچ	0300-3394659	صابر علی
8			
9	محمد ناصر علی ناصری	03027455049	محمد ناج
10			
11	خادم حسین ناصری		
12			
13	محمد حسین عباسی	0307-7345819	بخش محمد
14			
15	غلام عباس ناصری	0306-9162659	غلام عباس
16			
17	قیصر عباس ناصری	036	قیصر عباس
18			
19	محمد عابد حسین بھٹی	03039005587	
20			
21	محمد اشرف ناصری		محمد اشرف
22			
23	عابد عباس ناصری		عابد عباس
24			
25	منیر احمد عباسی		منیر احمد
26			

PUNJAB RURAL SUSTAINABLE WATER SUPPLY & SANITATION PROJECT (PRSWSS)

Public Consultation

A. Name of Facilitator: _____ Date: 19-04-23

3:30 - 3:42

B. Site Location:

Sub-village _____ Village/Town Chak Azmat Kamal. (Gudasa)

Union Council _____ Tehsil & District ABB

Venue: Qadir Bakh Tangari 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

→ Ratio of female house maids as present

→ have handpumps → 60% } → in every household.
Borehole → 40%

→ Ratchy houses.

→ Water is sweet.

→ Poor sewerage System.

C) SUGGESTIONS DURING CONSULTATION SESSIONS

D) PARTICIPANTS

Sr.#	Name	Mobile No.	Signature
1	Shehnaz		شہناز
2	Iqbal Mai		اقبال مائی
3	Tasleem Mai		تسلیم
4	AAsma Mai		عاصمہ مائی
5			
6			
7			
8			
9			
10			
11			
12			

Annex-VII

Photolog

Public Consultation Photolog	
	
	
	
Public Consultation at Sewa Sadaat	





Public Consultation at Gudara









Public Consultation at Jaiwan









Public Consultation at Basti Sial Kot









Public Consultation Chak No 2/2-L









Public Consultation at Chak No 3/3-R













Public Consultation at Fatehpur Pirti

Gender Consultation













Gender Consultation at Basti Sial Kot









Gender Consultation Chak No 11/3-L









Gender Consultation at Hazrat Sultan Bahu





Gender Consultation at Jaiwan









Gender Consultation at Sewa Sadaat

Departmental Meetings









Meeting at PRMSC Office, Ahmadpur Sial





Meeting at District Environment Office, Jhang





Meeting at Livestock Department, Jhang





Meeting at Agriculture Department, Jhang



Meeting at Dar-ul-Aman, Jhang



Meeting at DC Office, Jhang

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 140 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	7 toilets
Up to 40 employees	1 urinal	4 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: Central – I”.

[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 Ahmadpur Sial, District Jhang.

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.

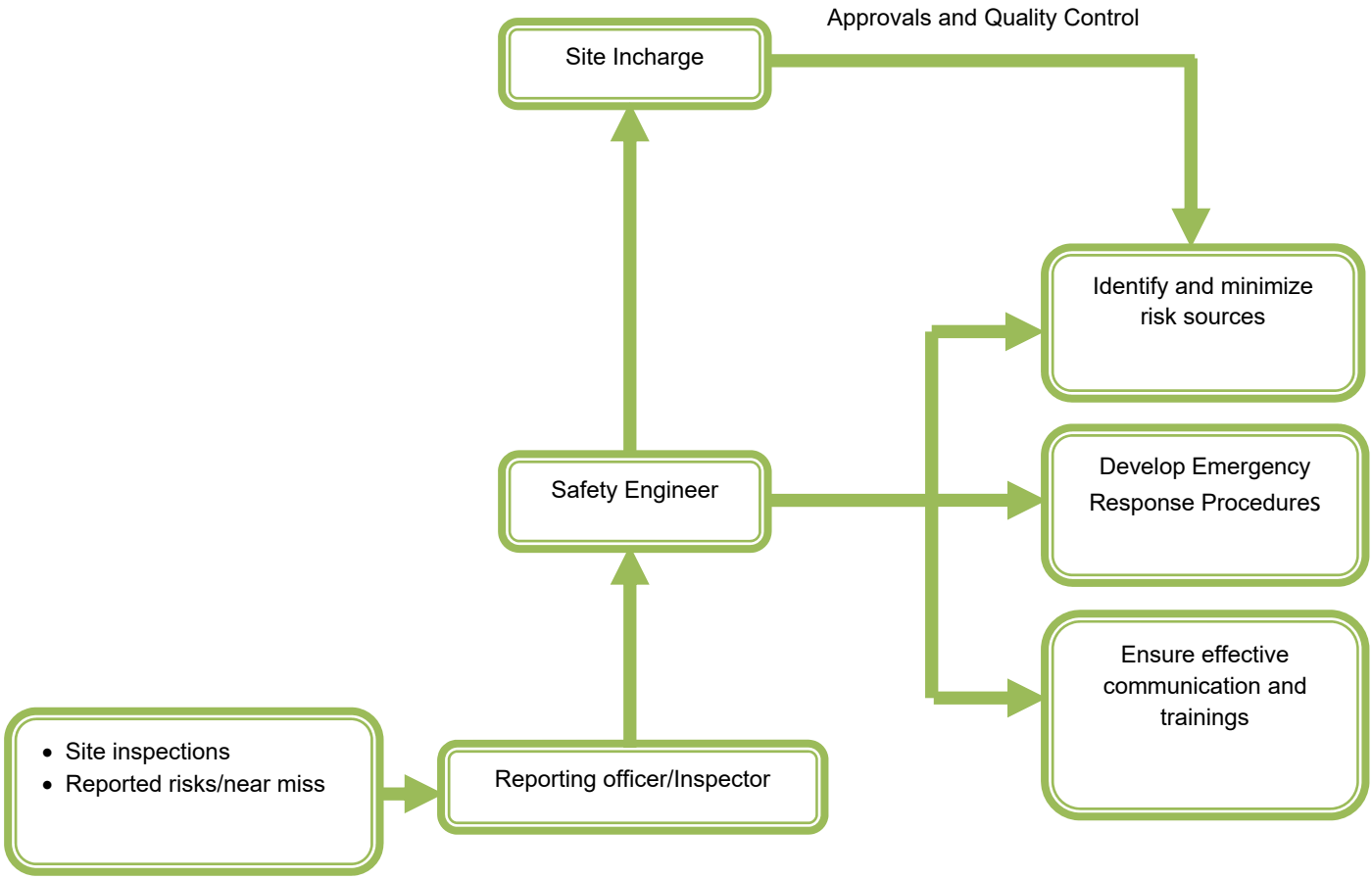
B. Safety Engineer

- 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	Ahmadpur Sial (047)
1	Edhi Ambulance	115
2	Emergency Police	15
3	Ahmadpur Sial Police Station	047-7550510
4	Rescue Service	1122
5	Rescue Fire Brigade Station	047-5340020-26
6	THQ Hospital Ahmadpur Sial	047-5340551
7	Red Cresent	047-7627193

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.