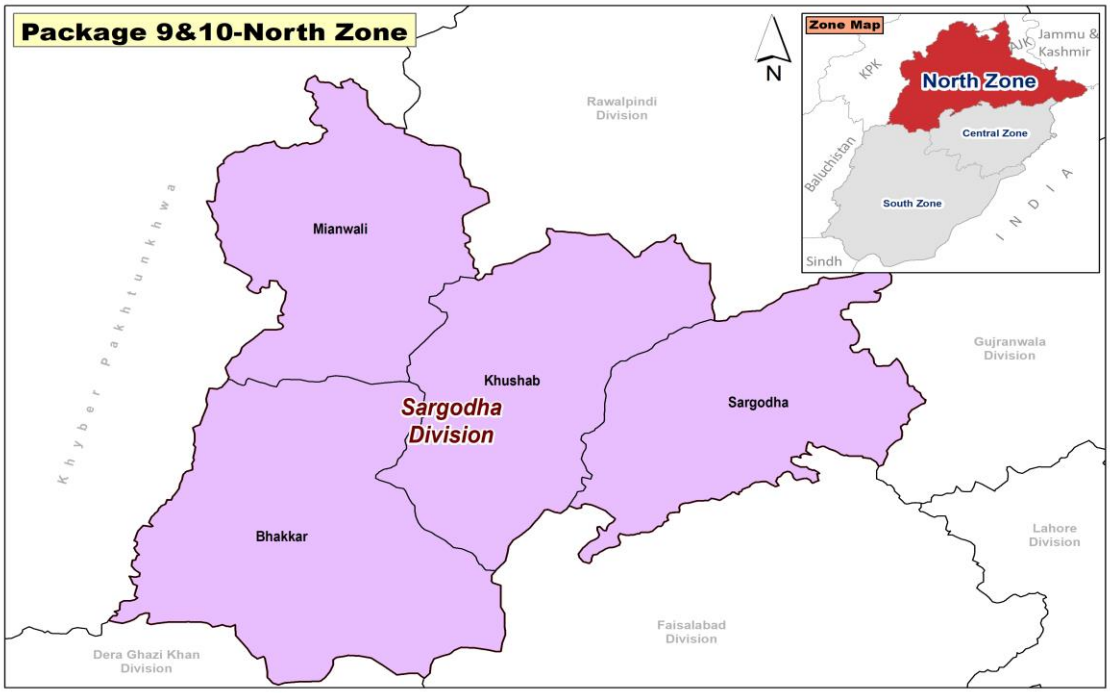
PUNJAB AAB-E-PAK AUTHORITY
GOVERNMENT OF PUNJAB

Provision of Clean Drinking Water by
Punjab Aab-e-Pak Authority (Phase-I)
NORTH ZONE



Environment Impact Assessment
(EIA) REPORT -Sargodha Division
(PACKAGE 09 & 10) May-2023

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EXECUTIVE SUMMARY

This executive summary presents and overview of the main findings of Environmental Impact Assessment (EIA) Report for the "Supply Construction, Installation of Water Filtration Plants in Sargodha Division Phase - I (Package 9 & 10)".The EIA for the proposed project is conducted by Jers Consultancy Pvt Ltd. The proponent of the project is Punjab Aab-e-Pak Authority. Environment Impact Assessment (EIA) Study of aforesaid project has been conducted to accord Environment Approval / NOC from Environmental Protection Agency (EPA) under Punjab Environmental Protection Act, 1997 (Amended 2017) and IEE & EIA regulation, 2000 (Amended 2022). The process for conducting environmental Assessments and the results of EIA Study are described in detail in this documents.

As per directions of Punjab Environmental Protection Act 1997 (Amended 2017), IEE and EIA Regulations, 2000 (Amended 2022) the instant project of "Supply Construction, Installation of Water Filtration Plants in Sargodha Division Phase -I (Package 9 & 10)" falls under Category F (Water Supply Schemes and Treatment Plants). It requires an EIA Study. Thus, an EIA Study has been conducted and report has been prepared for duly submission in EPA to accord Environmental Approval/ NOC.

The main purpose of the EIA study is to ensure that:

- Any major adverse impact on the environment (physical and ecological) during different stages viz. pre-construction, construction and operation are identified.
- Negative impacts, if any, are appropriately addressed and adequate mitigation measures are suggested for incorporation in the design, construction procedures and operations of project.
- Assess the existing environmental and socio economic conditions at and around the project site, particularly identify any environmental and social sensitivity areas.
- Propose appropriate mitigation and monitoring measures that can be incorporated into the design of the proposed activities to minimize any damaging effects or lasting adverse consequences identified by the assessment body.

- To provide opportunity to the public for smooth implementation of the suggested mitigation measures and their environment in the context of sustainable development.

Safe drinking-water, is vital to human health and well-being. Safe water is not only a prerequisite to health, but contributes to livelihoods, and helps to create resilient communities living in healthy environments. Drinking unsafe water impairs health through illnesses such as diarrhea. Chemical contamination of water continues to pose a health burden, whether natural in origin such as arsenic and fluoride, or anthropogenic such as nitrate.

In the first phase of the project, it has been intended to serve about 4.7 Million people of the targeted areas of the Punjab province falling in designated Central, North and South Zones of the Punjab. Successful implementation of this project will result in provision of contamination free potable water to underserved areas in Punjab and consequently eliminate water-borne diseases to improve public health. The purpose of the project is to provide potable water to the inhabitants of the Punjab complying with prescribed standards. That may include multiple solutions which may be adopted as per local solution depending upon the source and quality of water, area and urgency for providing potable water, difficulty faced by the residents to fetch clean drinking water which may include water disinfection options.

In view of this situation, the Government of the Punjab, through the Punjab Aab-e-Pak Authority, start a project titled “Supply Construction, Installation of Water Filtration Plants in Sargodha Division Phase -I (Package 9 & 10)”.

This report encompasses screening of potential Environmental impacts of the project and the proposed mitigation measures in order to eliminate or reduce the negative impacts to an acceptable level, describes the institutional requirements and provides an Environmental Management and Monitoring Plan. The EIA is based on the information collected through review of previous reports available with Punjab Aab-e-Pak Authority and the other public sector agencies and Consultants survey in this regard. Overall, the proposed project is an environmental improvement project aimed to facilitate sustainable urban development in Sargodha Division, but some negative Environmental and Social impacts may emerge, if proper mitigation measures for the said project are not adopted.

Salient Features of the Project

Project Name	"Supply Construction, Installation of Water Filtration Plants in Sargodha Division Phase I (Package 9 & 10)"
Location	Sargodha Division, Pakistan
Proponent Name	Punjab Aab-e-Pak Authority
Cost for installation of filtration plants in Sargodha Division (Package 9 + Package 10)	**339,997,428 + 32,805,919 = 372,803,347 PKR** **= 372.801 Million PKR**
Project Area	Sargodha Division = **26,358 km^2**
Total No of Reverse Osmosis Plants	101
Total No of Pre-filtration Plants	48
Consultant Name	Jers Consultancy Pvt. Ltd
JV Member	Associate in Development (AiD) Pvt.Ltd
Purpose	The government of the Punjab, through the Punjab Aab-e-Pak Authority, has intended to serve about 4.7 Million people of the targeted areas of the Punjab Province falling in designation Central, North and South Zones of the Punjab. Successful implementation of this project will result in provision of contamination free potable water to the underserved areas in Punjab and consequently eliminate water borne diseases to improve public health.
Nature of the Area	Residential, Commercial, and Agricultural areas

The study has taken into consideration all the relevant provincial legislation, followed by the site visits and details of construction and operational activities of the proposed project. The Environmental Impact Assessment is based on simple comparative evaluation approach. Initially, the baseline or profile of the project area was developed by gathering data, records and information on existing physical, ecological and socioeconomic environment. The same data is then projected or modelled for different phases of the project, i.e. design construction and operation stages. The changes expected in the critical environmental aspects for example in the environmental parameters that may be significant were also identified. This led to identification and mitigation of the major impacts, for which corresponding effective mitigation measures are projected. The Environmental Management Plan (EMP) & The Environmental Monitoring Plan, which will be implemented during the construction and operational phases of the project are framed.

Discussions were also held with the primary and secondary stakeholders of the project. They were briefed about the project and their views, concerns and suggestions were recorded. Major areas covered in the impact analysis of the project including, air emissions, wastewater, solid waste, occupational safety, socioeconomic factors and traffic management.

Affected Environment

The affected environment was assessed based on physical, biological and socio-economic attributes of the project's area of influence. The physical attributes include geology & soil, topography, land-use, climate, natural hazards, surface water resources, ground water resources, wastewater quality, ambient air and noise. The biological environment was studied under the headings of flora, fauna and agriculture. The socio-economic environment was assessed under the categories of administrative setup, social characteristics, demographic characteristics of the respondents, religious & ethnic composition of the population, housing pattern & family structure and other socio-economic features. Air, water and noise monitoring was carried out to determine the base line condition of the area.

Major Impacts and Mitigation Measures

Following impacts are likely to occur during constructional and operational phase of aforesaid project:

- **Construction Phase**

  Anticipated impacts associated with the construction & installation phase includes; noise (machine/equipment noise and vehicular noise), air emissions from earthwork, construction machinery, vehicles and soil contamination due to leakage from vehicles or accidents of the construction or transportation vehicles or during on-site refueling, solid waste from construction activities, municipal water and safety of the workers and employment conflicts as the major adverse environmental impacts. Since the project is to be commenced on a reserved area and no human settlement exists within safe radius of selected site, construction related impacts are not expected to extend to the community.

  Mitigation measures recommended to be incorporated into the project include running the machines and vehicles on good quality low-sulfur fuels in good working order ensuring regular maintenance, tuning and servicing, and providing them with emission control devices, such as; mufflers and silencers, etc. Water suppression and covered transportation and storage of the construction materials and slow driving on unpaved roads will control dust emission. Regular testing for leakage detection will also be ensured. Solid waste of construction activities will be used for flooring, while the remaining solid waste will be managed as per practices in the area. For community safety, irrelevant persons will not be allowed inside. Safety of the workers will be ensured by developing SOPs for all jobs, training the workers to follow SOPs, discouraging any careless attitude of workers and providing the workers with, and encouraging them to use PPEs.

- **Operational Phase**

  As it is the project of clean water, it will not create any significant adverse environmental impacts during its operational phase. This phase includes operating of pre-filtration plants and reverse osmosis plants so it will not cause any harmful environmental impact which has to be tackled. This phase intends for safe drinking water supply to under-served rural semi-urban and peri-urban population using localized and customized solutions with regard to source,

treatment technologies and supply options. This phase also intended to promote O&M models with community engagement and participation. So it does not require any mitigation measures. Local awareness among the residents of the aforesaid project must be practiced on regular basis to ensure the successful working of RO & filtration plants.

Proposed Monitoring

During construction, ambient air quality for dust level in particular, vehicle and equipment exhaust, noise level, solid waste management and soil contamination, and community and workers' safety (visual) need to be monitored on regular basis. During operation, ambient air quality for dust level in particular, noise level, solid waste management and soil contamination, and community & workers safety need to be monitored on quarterly basis. Monitoring Plan has been included in this EIA report.

Conclusions & Recommendations

The Environmental Impact Assessment Study contains description of the project, baseline conditions, potential environmental impacts (project specific) and suggested mitigation measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is included in this study. While the objectives of this study have been to describe the projects and its environmental impact, it also identifies adverse environmental factors associated with the aforesaid project. Appropriate mitigation measures as explained in the environmental study should reduce, if not eliminate, these impacts so that these are within the acceptable limits. It is further concluded that all potential environmental concerns associated with the project have been adequately addressed, and no further study is required in this context. The Supply Construction, Installation of Water Filtration Plant in Sargodha Divisions will be beneficial for the residents of the Sargodha Divisions as potable drinking water free of contaminants will be provided to the residents. And it will improve the overall environment and health status of the area. This will have positive potential impacts on the environment. Potential adverse impacts are anticipated to occur at the construction stage which can be mitigated by applying Best Management Practices (BMPs)/Best Engineering Practices (BEPs). EMMP should be the part of the contract document and should be thoroughly implemented.

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List of Abbreviations

AC	Activated Carbon
AOI	Area of Influence
AWWA	American Water Works Association
BAP	Biodiversity Action Plan
BDL	Below detection level
BOD	Bio-chemical Oxygen Demand
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CC	Construction Contractor
dB	Decibel
DCR	District Census Report
DG	Director General
Dia	Diameter
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
Ft	Feet
Fig	Figure
GOP	Government of Pakistan
HSE	Health & Safety Engineer
IEE	Initial Environmental Examination
Km	kilometer
Km/h	kilometer per hour
LGO	Local Government Ordinance
RE	Resident Engineer
RCC	Reinforced Cement Concrete
SDO	Sub Divisional Officer
PEPC	Pakistan Environmental Protection Council
PEQS	Punjab Environmental Quality Standards
PC-1	Planning Commission – 1
PEPA	Punjab Environment Protection Act
PSDWQ	Pakistan Standard Drinking Water Quality
MD	Managing Director
NCS	National Conservation Strategy
NSL	Natural Surface Level
NEAP	National Environmental Action Plan

NOC	No Objection Certificate
^{O}C	Degree Centigrade
OSHA	Occupational Safety and Health Administration
PD	Project Director
P & D	Planning and Development Department
PM	Particulate Matter
PNCS	Pakistan National Conservation Strategy
SC	Supervision Consultant
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
TMA	Town Municipal Administration
TF	Trickling Filters
TOR	Terms of references
UC`s	Union Councils
PAPA	Punjab Aab-e-Pak Authority
PF	Pre-Filtration
RO	Reverse Osmosis
JV	Joint Venture
WHO	World Health Organization

1 INTRODUCTION

1.1 General

For any development project to be initiated in Punjab, it is mandatory to accord Environmental Approval from EPA Punjab under Section-12 of Punjab Environmental Protection (Amendment) Act, by filing an IEE or EIA before EPA Punjab, as may be defined in Review of IEE/EIA Regulations, 2000 (Amended 2022) or recommended by EPA Punjab. This Report represents the Environmental Impact Assessment (EIA) Study for the **"**Supply Construction, Installation of Water Filtration Plants in Sargodha Division Phase I (Package 9 & 10)**"**. For this purpose, the proponent engaged environmental consultants; M/S Jers Consultancy (Pvt) Limited to conduct EIA Study. The purpose of this study is to identify the environmental baseline i.e. physical, biological and socio-economic/cultural conditions and assess all possible impacts arising during the Installation and operation phase of project and to find out appropriate measures for their mitigation, to either eliminate those impacts or to bring them to acceptable level and formulation of Environmental Management Plan (EMP) for implementation of the project in environment friendly manner.

This EIA report is prepared by critical examining environmental factors which might be affected due to installation of said project. The purpose of this study is to analyze impacts associated with Supply Construction, Installation of Water Filtration Plants in Sargodha Division Phase I (Package 9 & 10). This EIA Report provides relevant information, as required under the officially approved format, to help the decision makers i.e. EPA Punjab before issuing for the Environmental Approval / NOC.

1.2 Project Background

In Pakistan, access to safe drinking water is one of the major public health problems, as the country is facing water quality and quantity issues, being documented in various studies. The large proportion of drinking water, almost 70%, comes from ground water aquifers within the country. In Pakistan, water resources, specifically ground water, are under severe threat both in terms of quantity and quality. The ground water is stored in the pores of the soil through the infiltration of surface water. In case, where there is excessive use of groundwater for agricultural and all other purposes, sweet water zones are depleted causing the intrusion of saline/brackish water from saline zones. For provision of safe and healthy drinking water to the residents of Sargodha division,

Government of Pakistan has decided to install RO Plants, Pre-Filtration plants and direct water supply schemes in the mentioned division of Punjab province. This will eliminate the occurrence of excessive health problems such as hepatitis, typhoid, and diarrhea etc. as well as water shortage problems will also be catered and the future water demand of these areas will be meeting due to the aforesaid initiative taken by the Government. Punjab Aab-e-Pak Authority is the responsible authority for the successful implementation of the filtration plants in the Sargodha division.

This report encompasses screening of potential Environmental impacts of the project and the proposed mitigation measures in order to eliminate or reduce the negative impacts to an acceptable level, describes the institutional requirements and provides an Environmental Management and Monitoring Plan. The EIA is based on the information collected through review of previous reports available with PAPA and the other public sector agencies and Consultants survey in this regard. Overall, the proposed project is an environmental improvement project aimed to facilitate sustainable urban development in Sargodha division, but some negative Environmental and Social impacts may emerge, if proper mitigation measures for the said project are not adopted.

1.3 Project Screening and Categorization

As per directions of Punjab Environmental Protection Act 2012, IEE and EIA Regulations, 2000 (Amended 2022) the instant project of **"**Supply Construction, Installation of Water Filtration Plants in Sargodha Division Phase I (Package 9 & 10)**"** falls under Category F (Water Supply Schemes and Treatment Plants). It requires an EIA Study. Thus, an EIA Study has been conducted and report has been prepared for duly submission in EPA to accord Environmental Approval / NOC.

1.4 The Proponent

Punjab Aab-e- Pak Authority is the proponent of the aforesaid project. Punjab Aab-e-Pak Authority (PAPA) was established under act, initially passed by Provincial Assembly in March, 2019 and later on, amended in August, 2019. The main objective for the establishment of this Authority is to provide safe and clean drinking water in 36 districts of Punjab province mainly in rural, semi-urban and peri-urban areas.

1.5 Nature and Size of the Project

In first phase of the project, it has been intended to serve about 4.7 Million people of the targeted areas of the Punjab province falling in designated Central, North and South zones of the Punjab. Successful implementation of this project will result in provision of contamination free potable water to the underserved areas in Punjab and consequently eliminate water-borne diseases to improve public health. The purpose of the project is to provide potable water to the inhabitants of Punjab complying with prescribed standards. That may include multiple solutions which may be adopted as per local situation depending upon the source and quality of water, area and urgency for providing potable water, difficulty faced by the residents to fetch clean drinking water which may include water disinfection options.

The project will provide potable drinking water to the residents living in division of Sargodha. Markaz-e-Aab will be constructed in 149 villages, from where residents can fetch the water for drinking purposes. Water supply schemes / villages in division Sargodha supplied with potable drinking water are summarized below:

Table 1-1: Design Summary of Filtration Plants

Sr. No.	Type of Plant	No. of Plant
Filtration Plants		
1	Reverse Osmosis Plant	101
2	Pre-filtration plant	48
Total		**149**

The total project area which encompasses the villages of Sargodha division under Package 9 & 10 is 26,358 km^2 (1571096 acres).

1.6 Purpose of the EIA Study

The fundamental purpose of the EIA study is to ascertain the possible beneficial and adverse environmental impacts during the project planning and implementation as currently foreseen and propose the applicable mitigation measures to be implemented in order to minimize the negative impacts and preparation of Environmental

Management Plan (EMP) and Monitoring Plan during initial and construction phases of the project. The purpose of this EIA Study is to:

- Assess the existing environmental and socio economic conditions at and around the project site, particularly identify any environmental and social sensitivity areas.
- Identify the likely impacts of the proposed project on the natural and socioeconomic environment, predict and evaluate these quantitatively wherever possible and determine their significance in the light of technical and regulatory concerns, as well as those related to public perceptions.
- Propose appropriate mitigation and monitoring measures that can be incorporated into the design of the proposed activities to minimize any damaging effects or lasting adverse consequences identified by the assessment body.
- To provide assistance to the proponent for planning, designing and implementing the project in a way that would eliminate or minimize the negative impact on the biophysical and socio-economic environment and maximizing the benefits to all parties in the cost-effective manner.
- To provide opportunity to the public for smooth implementation of the suggested mitigation measures and their environment in the context of sustainable development.
- To prepare an EIA report for submission to EPA, Punjab for Environmental Approval (NOC).

1.7 Scope of Study

EIA is fundamentally considered as a planning tool utilized in the decision making by identifying probable consequences on environment due to the project execution. This study covers assessment of physical, biological and socioeconomic impacts of construction and post development phases of the project.

A profound analysis of the project components is made explaining total area of the proposed site, built area, source of power and water consumption, connectivity to the city centre, type of construction & installation materials used, existing conditions of the project area. The land resources such as topography and soil conditions are addressed adequately. Air, Noise, water, biological, waste management, mitigation measures, health and safety plan, energy conservation all are catered for in the study.

1.8 Objectives of EIA Study

The main objective of the EIA study is to highlight anticipated impacts of the proposed project covering environmental, social, occupational health and safety issues and to suggest mitigation measures to eliminate or reduce the foreseen negative impacts to an acceptable level. The specific objectives of the EIA Study are as follows:

- Determine pre-project environment conditions to assess post-project conditions if they have changed for better or worse;
- Document all the environmental impacts likely to occur due to the implementation of the proposed project;
- Determine the social impacts of the proposed project including impacts on individuals, assets, infrastructure, livelihood, public utilities and cultural and religious properties;
- Provide maximum information to the proponent and other stakeholders about the existing environmental conditions and the implications of the proposed project;
- Allow planners to alleviate potential impacts of the proposed project on different environmental conditions such as physical environment, biological environment and socio-economic environment.
- To provide opportunity to the public for understanding the project and its impacts on the community and their environment in the context of sustainable development.
- Aid decision makers to take informed decisions.

1.9 Location of Project

The aforesaid project is located in the Sargodha division. RO plants and Pre-Filtration plants are proposed to be installed in different villages of the said division of Punjab province. The location map of the project area is shown as below:

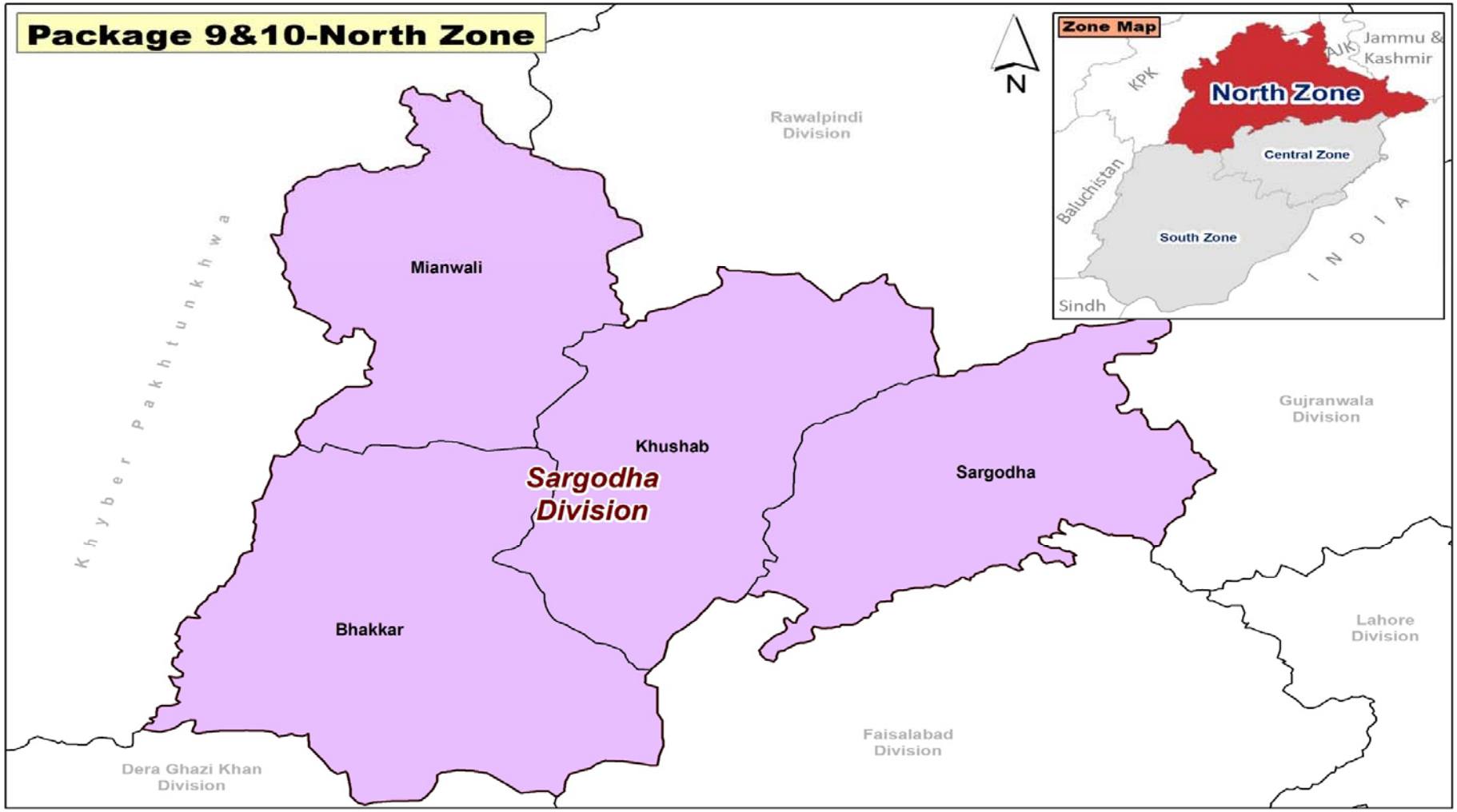


Figure 1-1: Location Map of aforesaid project (Package 9 & 10)

1.10 Consultant`s Details

The proponent has engaged M/s Jers Consultancy (Pvt) Ltd to conduct the EIA Study for the establishment and enhancement of aforesaid project in accordance with Punjab-EPA guidelines. For this purpose, Jers Consultancy (Pvt) Ltd has engaged the group of professionals which comprises of environmental specialists and environmental engineers. The details of the consultants are given below:

Table 1-2: Consultant's Details

Sr. No.	Consultant Details	
1	Consultant	Jers Consultancy (Pvt) Limited
2	Address	24 Civic Center St, Township Commercial Area Lahore
3	Contact No.	042-35113125, 35113124

The JV partners for the aforesaid project is AiD (Associate in Development) Pvt.Ltd. The details of JV partners are given below:

Table 1-3: JV Members Details

Sr. No	Joint Venture Partners	
1	JV Partners	Associate in Development (AiD) Pvt Ltd
2	Address	AiD Executive Center 22, SCHS, Sector E-1/2-3 Markaz, Islamabad, Pakistan
3	Contact No.	051-2304979,051-230497980

1.11 EIA Team

To prepare report of the respective project, the team list of experts is presented as follows:

Table 1-4: Team list of experts

Sr. No.	Name	Position	Qualification	Tasks Assignment
1	Dr.Sajjad Haydar	Chief Environmental Specialist	-PhD. In Environmental Engineering -M.Sc. in	Assign work to the other team members. Participate in the performance of EIA process. Guide and

Sr. No.	Name	Position	Qualification	Tasks Assignment
			Environmental Engineering -B.Sc. in Civil Engineering	steered the team members to evaluate and quantify the impacts and to reach proper mitigation measures. Prepared the EIA report
2	Mudasar Arbi	Sr. Environmental Specialist	-M.Sc. in Environmental Engineering -B.Sc. in Civil Engineering	Conduct literature review/desk studies regarding the environmental impact of the project. Study environmental impacts of the project and suggest mitigation measures to reduce the negative impact. Participated in formation of EIA report in the light of relevant guidelines. Heads public consultation.
3	Tauseef Ahmad	Environmental Engineer	B.Sc. in Environmental Engineering	Conduct field visits to collect base line data related to environment. Participated in formation of EIA report
4	Taha Rahim	Environmental Engineer	B.Sc. in Environmental Engineering	Conduct field visits to collect base line data related to environment. Participated in formation of EIA report
5	M. Babar Ali	Civil Engineer	-M.S.c in Civil Engineering	Conduct site visits and collected data from the project area. Participate in the process of public consultations
6	Athar Siraj	GIS Expert	-MSc Geography -MS Remote Sensing and GIS	Collect satellite images and maps where required for the study. Help the team in finding the location of project components.

1.12 Study Approach

The study is conducted in accordance with Punjab Environmental Protection Act (PEPA), the study is based on both primary and secondary data and information. The primary data includes data collected from field observations and secondary data

includes review of the District Census Reports (DCRs) and relevant information from Government Departments. Discussions were held with stakeholders including government officials, community representatives and a wide range of road users and roadside dwellers near road. The main purpose of this approach was to know the people's perceptions of the project and its environmental impacts.

1.13 Methodology

The following methodology was adopted for carrying out the EIA Study of the proposed project.

1.13.1 Orientation

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

1.13.2 Data Collection and Planning

After 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; determined time schedules and responsibilities for their collection; and indicated the logistics and other supporting needs for the execution of the data acquisition plan.

1.13.3 Data Collection

In this step, primary and secondary data were collected through field observations, environmental monitoring in the field, concerned departments and published materials to establish baseline profile for physical, biological and socio-economic environmental conditions. Following activities were performed for data collection:

- Site Reconnaissance
- Analysis of Maps and Plans
- Literature Review
- Desk Research
- Public Consultation
- Field Observations & Studies

1.14 Components of the Report

This EIA Report has been prepared following the Pakistan Environmental Protection Agency (PEPA) Guidelines for Environmental Assessment. The format of the report consists of the following chapters:

- **Chapter 1: Introduction**

This chapter represents an introduction of the EIA Report. It contains the scope of study and overview of the project. The chapter also includes the project categorization as per PEPA guidelines.

- **Chapter 2: Policy, Legal and Administrative Framework**

This chapter comprises policy, guidelines, statutory obligations and roles of institutions concerning EIA study of the proposed project.

- **Chapter 3: Description of the Project**

In this chapter, salient features of the project are presented. It furnishes information about the location, cost and size of the project, its major components including Geometric Design Standards and its benefits to the public.

- **Chapter 4: Analysis of Alternates**

This chapter provides the analysis and discussion of different possible alternates to the proposed project while considering other practicable strategies that will promote the elimination of negative environmental impacts identified.

- **Chapter 5: Description of the Environment**

It provides an overview of the present environmental baseline of the project area. It discusses physical, biological, socio-Economic and cultural environment. This chapter also consists of the information based on public consultation and information disclosure to them about the project. It comprises of the identification of the main stakeholders, details of scoping sessions and stakeholders' concerns.

- **Chapter 6: Public Consultation**

This chapter provides the important tools for evaluating the social aspects of proposed project as well as the environmental and social assessment process.

- **Chapter 7: Anticipated Environmental Impacts and Mitigation Measures**

This chapter provides the information on the environmental impacts and proposed mitigation measures at pre-construction/design phase, construction phase and operation phase.

- **Chapter 8: Environmental Management & Monitoring Plan**

This chapter describes the measures suggested for executing the environmental management plan (EMP) at the project site. It elaborates the objectives of EMP, role of functionaries and specific implementation responsibilities; environmental management plan (in matrix), environmental monitoring and training plan and its costs.

- **Chapter 9: Conclusions & Recommendations**

This chapter presents the outcomes of the whole study. It explains the identification of the main issues and concerns; proposed mitigation measures, benefits of the project.

2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1 General

This section deals with the relevant policy, legal and administrative framework instituted by the Government of Pakistan for the protection of environment. All the relevant provisions of these policy and legal frameworks have been duly considered in this EIA study. In addition to this, the roles and responsibilities of the proponent as well as the Environmental Protection Agency (EPA), Punjab have been mentioned in this section.

2.2 Policy Framework

The Ministry of Climate Change is the responsible authority for policy making on environmental protection in Pakistan. The proposed project will be financed by Client, which requires compliance to the National Policy and Guidelines, so it is obligatory on the part of the Proponent to follow these for environmental assessment.

2.2.1 National Environmental Policy, 2005

The National Environmental Policy (2005) provides an overarching framework for addressing the environmental issues (particularly pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification etc.) confronting Pakistan. It recognizes the goals and objectives of the Pakistan National Conservation Strategy (PNCS, 1992), National Environmental Action Plans, and other existing environment related national policies, strategies, and action plans. It also provides broad guidelines to the federal government, provincial governments, federally administered territories and local governments to address their environmental concerns and to ensure effective management of their environmental resources.

2.2.2 National Conservative Strategy

Before the approval of NEP, the National Conservation Strategy (NCS) was considered as the Government's primary policy document on national environmental issues. At the moment this strategy just exists as a national conservation program. The NCS identifies 14 core areas including conservation of biodiversity; pollution prevention and abatement; soil and water conservation; and preservation of cultural heritage, and

recommends immediate attention to these core areas in order to preserve the country's environment.

2.2.3 The Biodiversity Action Plan

The Biodiversity Action Plan (BAP), which has been designed to complement the NCS and the proposed provincial conservation strategies, identifies the causes of biodiversity loss in Pakistan and suggests a series of proposals for action to conserve biodiversity in the country. The BAP recognizes that an EIA is used as a tool at a project level to identify environmental effects of a proposed project and to plan for reducing adverse effects. The BAP further stipulates that an EIA needs to be initiated at an early stage of project development and that public participation in the review of potential effects is important.

2.3 Legal Framework

The Government of Pakistan (GOP) has promulgated laws/acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. In addition to this, they have also developed environmental assessment procedures governing developmental projects. Following are the excerpts of these laws and procedures relevant to the proposed project.

2.3.1 Pakistan Environmental Protection Act, 1997 (PEPA-97) Amended 2017

The Act was enacted on December 06, 1997 by repealing the Pakistan Environmental Protection Ordinance (1983). It provides the framework for implementation of the PNCS-1992, establishment of provincial sustainable development funds, protection and conservation of species, conservation of renewable resources, and establishment of Environmental Tribunals, appointment of Environmental Magistrates, Initial Environmental Examination (IEE), and Environmental Impact Assessment (EIA). A copy of PEPA-97 (Amended 2017) is attached as **(Annex-I)**.

Section 12 of the Act stresses the need to carry out environmental assessment study prior to construction or operation of a project.

2.3.2 EPA (Review of IEE and EIA) Regulations, 2000 (Amended 2022)

These regulation provide list of the projects requiring IEE and EIA **(Annex-II)**. They also briefly describe the preparation and review of environmental reports.

2.3.3 Pakistan Environmental Assessment Procedure, 1997

Pakistan Environmental Assessment Procedures (1997) is, in fact, a package which contains the following sets of information relevant to the proposed Project:

a) **Policy and Procedures for Filling, Review and Approval of Environmental Assessment Reports**

It describes environmental policy and administrative procedures to be followed for filing of environmental assessment reports by the proponents and its review and approval by the concerned environmental protection agency/department.

b) **Guidelines for the Preparation and Review of Environmental Reports**

These guidelines are developed to facilitate both the proponents and decision makers to prepare reports (inclusive of all the information contained therein) and carry out their review so as to take informed decisions.

c) **National Environmental Quality Standards, 2000**

The Pakistan Environmental Protection Council first approved these standards in 1993. They were later revised in 1995 and 2000. They furnish information on the permissible limits for discharges of municipal and industrial effluent parameters and industrial gaseous emissions in order to control environmental pollution.

d) **Other Relevant Laws**

- **Land Acquisition Act (1894):** Projects may require government procurement of privately owned land and the displacement of land users. Land may be acquired through:
    1. Expropriation (Compulsory Acquisition)
    2. Voluntary negotiation with the owners for sale of land
    3. Donation from the land owners

  The Land Acquisition Act (1894) deals with the government acquisition of private properties for public purposes including large development projects. There are 55 sections in this Act mainly dealing with area notifications, surveys, acquisition, compensation, apportionment awards, disputes resolution, penalties and exemptions.
- **Canal Drainage Act, 1873:** This Act entails provisions for the prevention of pollution of natural or man-made water bodies.
- **Cutting of trees (Prohibition) Act, 1975:** This Act prohibits cutting or chopping of trees without permission of the Forest Department.

- **Punjab Local Government Ordinance, 2001:** Environmental protection is devolving subject under Punjab Local Government Ordinance (LGO), 2001. Notwithstanding any specific provisions, every local government may perform functions conferred by or under the Punjab Local Government Ordinance, 2001 and in performance of such functions may exercise such powers, which are necessary and appropriate. Until different provisions, rules, regulations or byelaws are made, the local governments may exercise such powers as are specified in the Sixth Schedule of Punjab LGO, 2001. Environmental protection is at serial 48 of the Sixth Schedule.
- **The Punjab Plantation and Maintenance of Trees Act, 1974:** This Act defines rules and regulations for plantation and maintenance of trees in the Province of the Punjab.
- **Punjab Wildlife Act, 1974:** This Act defines rules and regulations for the protection, preservation, conservation and management of wildlife in the Province of the Punjab.
- **The Punjab Soil Reclamation Act, 1952:** This Act defines rules and regulations for the speedy reclamation and improvement of the areas damaged by salinity and water logging (for preventing further damage and for maximizing agricultural production).
- **The West Pakistan Fisheries Ordinance, 1961:** This Ordinance defines rules and regulations for the catching of fishes in Punjab. It provides information about their types and the period (in each year) when taking of the fishes is prohibited.
- **Pakistan Penal Code, 1860:** This Act defines the penalties for violations concerning pollution of air, water bodies and land.
- **The Antiquities Act, 1975:** Archaeological sites and monuments are specifically protected by this Act.

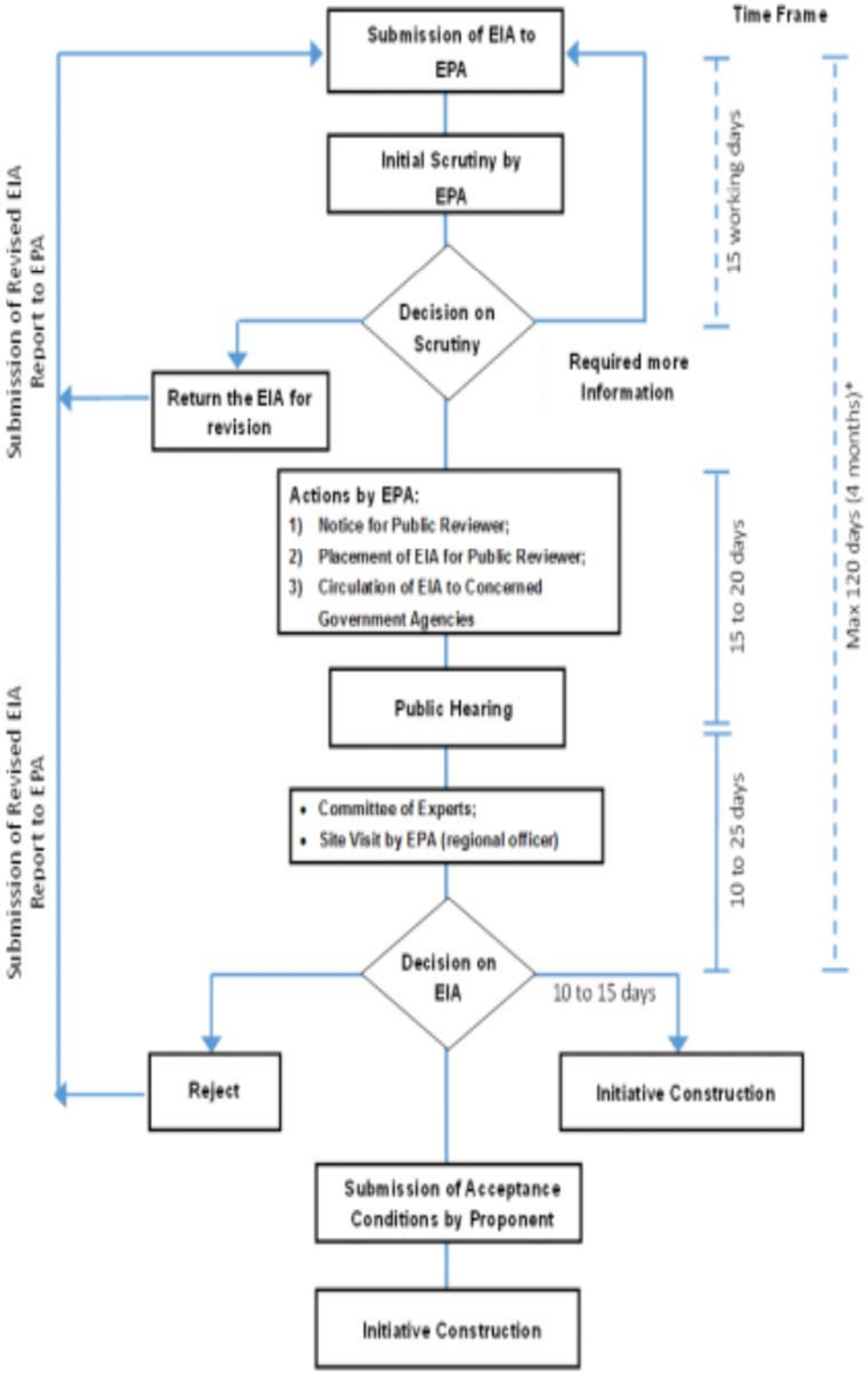


Figure 2-1: EIA Review and Approval Procedure

2.4 Punjab Environmental Quality Standards for Drinking Water

The Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Drinking Water.

Table 2-1: Punjab Environmental Quality Standards for Drinking Water

Properties/Parameters	Standard Values	WHO Standards	Remarks
All water intended for drinking(E. Coli or Thermo-tolerant Coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water entering the distribution system (E.Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water in the distribution system (E.coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Most Asian countries also follow WHO standards

Physical			
Color	≤15 TCU	≤15 TCU	
Taste	Non objectionable/Acceptable	Non objectionable/Acceptable	
Odour	Non objectionable/Acceptable	Non objectionable/Acceptable	
Turbidity	‹ 5 NTU	‹ 5 NTU	
Total hardness as CaCO3	< 500 mg/l	----	
TDS	‹ 1000	‹ 1000	
pH	6.5 – 8.5	6.5 – 8.5	
Chemical			
Essential Inorganic	**mg/Litre**	**mg/Litre**	
Aluminium (Al) mg/1	<0.2	0.2	
Antimony (Sb)	<0.005 (P)	0.02	
Arsenic (As)	< 0.05 (P)	0.01	Standard for Pakistan similar to most Asian developing countries
Barium (Ba)	0.7	0.7	
Boron (B)	0.3	0.3	
Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing countries
Chloride (Cl)	<250	250	
Chromium (Cr)	<0.05	0.05	

Copper (Cu)	2	2	
Toxic Inorganic	**mg/Litre**	**mg/Litre**	
Cyanide (CN)	<0.05	0.07	Standard for Pakistan similar to Asian developing countries
Fluoride (F)*	<1.5	1.5	
Lead (Pb)	<0.05	0.01	Standard for Pakistan similar to most Asian developing countries
Manganese (Mn)	< 0.5	0.5	
Mercury (Hg)	<0.001	0.001	
Nickel (Ni)	<0.02	0.02	
Nitrate (NO3)*	<50	50	
Nitrite (NO2)*	<3 (P)	3	
Selenium (Se)	0.01(P)	0.01	
Residual chlorine	0.2-0.5 at consumer end 0.5-1.5 at source	--	
Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing countries
Organic			
Pesticides mg/L			PSQCA No. 4639-2004, Page No. 4 Table No. 3 Serial

			No. 20- 58 may be consulted.***
Phenolic compounds (as Phenols) mg/L		< 0.002	
Polynuclear aromatic hydrocarbons (as PAH) g/L		0.01 (By GC/MS method)	
Radioactive			
Alpha Emitters bq/L or pCi	0.1	0.1	
Beta emitters	1	1	

2.5 Institutional and Administrative Framework

The proposed project falls under the following Institutional and Administrative Framework.

a) Punjab Aab-e-Pak Authority

Punjab Aab-e-Pak Authority (PAPA) was established under act, initially passed by Provincial Assembly in March, 2019 and later on, amended in August, 2019. The main objective for the establishment of this Authority is to provide safe and clean drinking water in 36 districts of Punjab province mainly in rural, semi-urban and peri-urban areas.

b) Environmental Protection Agency, Punjab

The Pakistan Environmental Protection Agency (Pak-EPA) is meant for the enforcement of environmental laws in Pakistan. They have delegated powers to provincial environmental protection departments/agencies for review, approval and monitoring of environmental assessment projects. As regards the proposed project, the EPA Punjab will be responsible for reviewing the report, issuing Environmental Approval and overall/broad based monitoring of the proposed project activities to ensure compliance with the Environmental Management Plan.

Under the Punjab Local Government Ordinance, 2001, District Officers (Environment) are responsible to deal with environmental issues at the district level.

National Reconstruction Bureau has formulated the following rules of business for district environment offices:

- To regulate motor vehicles subject to the provisions of the Pakistan Environmental Protection Act, 1997 and the rules and regulations made there-under;
- To ensure, guide and assist the proponents of new projects in submission of Initial Environmental Examination (IEE)/ Environmental Impact Assessment (EIA) to the D.G, EPA for approval;
- To ensure implementation of environmental protection and preservation measures in all development projects at the district level and to sensitize government agencies on environmental issues;
- To identify the needs for legislation in various sectors of the environmental matters;
- To provide information and guidance to the public on environment;
- To encourage the formation and working of non-governmental organizations, to prevent and combat pollution and promote sustainable development; and
- To undertake regular monitoring of projects and to submit progress reports to the DG, EPA for publication in the annual Report.

2.6 Environmental Management Framework in Pakistan

The approach taken for the protection of the environment in Pakistan is laid down in the Environmental Conservation Strategy of 1992 and its review in 2000. For specific rules and regulations, “The Environmental Protection Act” was enacted in 1997 and it provides the backbone and framework for environmental legislation in Pakistan. This act establishes the Pakistan Environmental Protection Council, the highest decision-making body in environmental issues, the Pakistan Environmental protection Agency (Pak EPA) and Environmental Tribunals.

The Pakistan Environmental Protection Council (PEPC) shall, among other duties, co-ordinate and approve comprehensive national environmental policies and approve National Environmental Quality Standards.

The act further defines the functions of institutions, providing a broad mandate to for enacting rules, procedures and technical standards in different areas of environmental protection. The Act requires Pak EPA to co-ordinate environmental policies and programs nationally and internationally, initiates legislation, establish surveys, manage

monitoring and auditing schemes and promote research as well as education and awareness in the field of the environment.

The Environmental Protection Act does further require the provincial authorities to establish Provincial Environmental Protection Agencies for carrying out functions delegated to the provinces.

The Government of Pakistan has recently elaborated its further action in-line with the finding of the review of the National Conservation Strategy in the form of the National Environmental Action Plan, NEAP (as approved by PEPC in 2001).

3 PROJECT DESCRIPTION

This section of the study enshrines the details about the project, its components and all the associated works and construction materials intended for utilization during its execution phase. Also, it contains information regarding implementation procedures, construction time and estimated cost of the project. However, all the details furnished in this section are established based on preliminary design report and Construction drawings provided by the Client & Consultant.

3.1 General

This section covers the project comprehensively. It holds salient features including; location, project site layout, objectives, process employed, site alternatives, cost and magnitude of operation and various phases.

This chapter majorly describes in detail the proposed project of supply construction, installation of water filtration plants in Sargodha Divisions Phase I (Package 9 & 10).

3.2 Screening / Type and Category of Project

For the prediction and mitigation of impacts of development at an early stage, it is pre-requisite under the environmental laws to undertake Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Study as the case may be. Based on its nature, size and related impacts, the project under consideration has been categorized for EIA Study as stated in Regulation 03 of Statutory Notification (S.R.O 339(1)/2001). As per the statutory notification of Review of IEE and EIA Regulations, 2000 (Amended 2022) made under Section 12 of Punjab Environmental Protection Act, 1997 (Amended 2017), states;

“No proponent of a project shall commence construction or operation unless he has filed with the Government Agency designated by Federal Environmental Protection Agency or Provincial Environmental Protection Agencies, as the case may be or where the project is likely to cause an adverse environmental effects an Environmental Impact Assessment (EIA) and has obtained from the Government Agency approval in respect thereof.”

The aforesaid project i.e. **“**Supply Construction, Installation of Water Filtration Plants in Sargodha Division Phase I (Package 9 & 10)**”** falls under Category F (Water Supply

Schemes and Treatment Plants). It requires an EIA Study. Thus, an EIA Study has been conducted and report has been prepared for duly submission in EPA to accord Environmental Approval/NOC.

3.3 Project Objectives

The objective of this project is to install PF-plants, RO filtration plants and supply schemes. The objectives under this project are listed below:

- To install water supply schemes, PF plants, RO filtration Plants.
- To provide contamination free potable drinking water in Sargodha Division.
- Improvement in the quality of living of urban residents and reduction of poverty in the low income and slum areas.
- Improvement of urban environmental conditions
- The proposed project is itself a value addition project to the health sector.
- Socio-economic uplift of the project vicinity.
- Creation of new job opportunities and promoting income prospects for those engaged in the allied activities associated with operation of project is considered as indirect objectives of the project.

3.4 Project Location

The aforesaid project is located in the Sargodha division. RO plants and Pre-Filtration plants are proposed to be installed in different villages of the said divisions of Punjab province. The location map of the project area is shown as below:

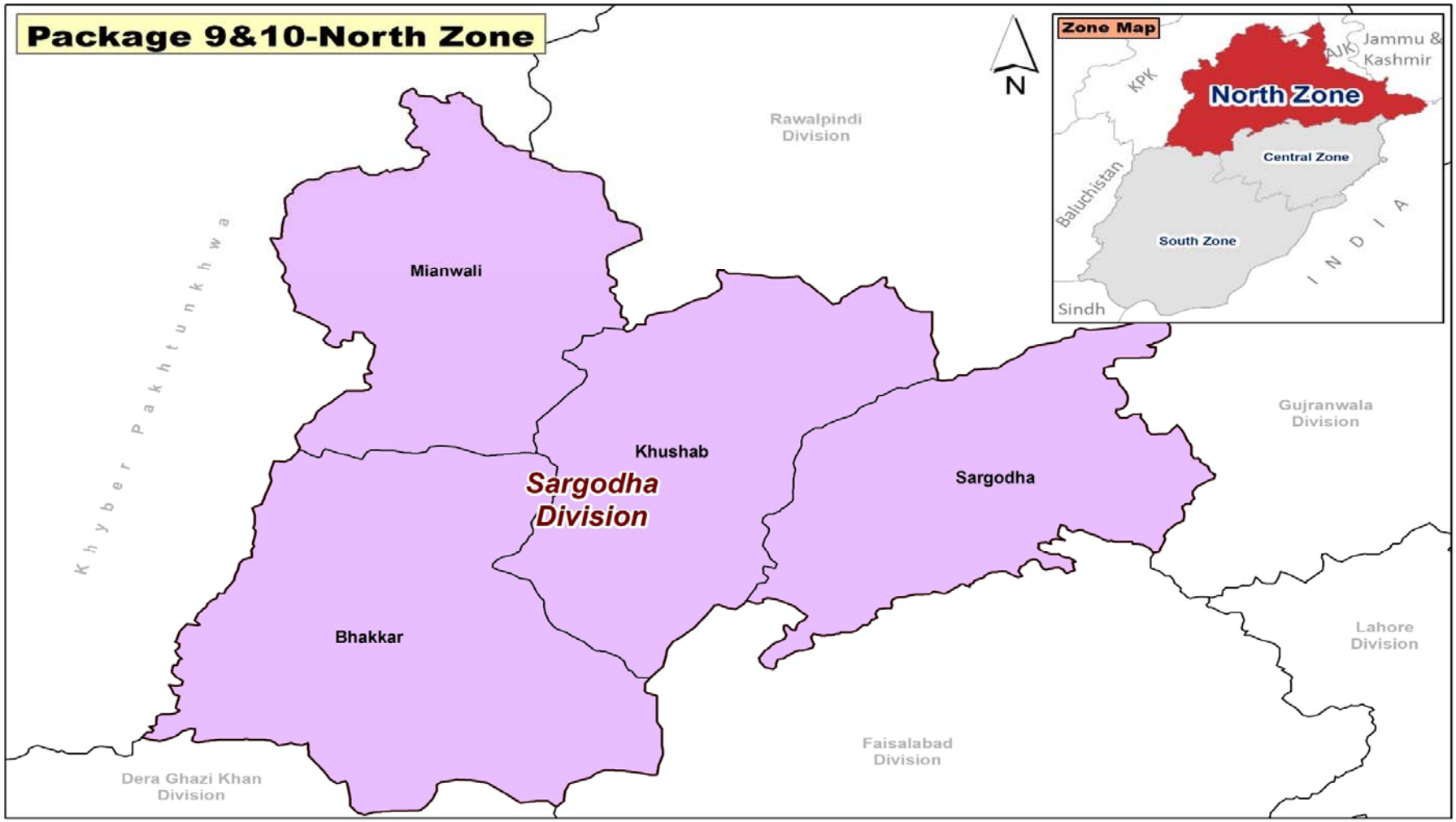


Figure 3-1: Project Area (Package-09 & 10) - North Zone (Sargodha Division), Clean Drinking Water Punjab Aab-e-Pak Authority

The Project area consist of Sargodha Divisions. Detail of each Division is given in table below:

Table 3-1: List of Villages with Coordinates and type of plants being installed in Sargodha Division

Sr #	Name of Scheme		GPS Coordinate		Type of Plant
	Tehsil	Village	Latitude	Longitude	
Package 9					
1	Bhakkar	Khan Pur Shumali	31°12'22.00"N	71°12'38.00"E	S/AC
2	Darya khan	Dagar Yaar Shah Gharbi	31°55'01.00"N	71°12'34.00"E	S/AC
3		Haji Hussain Shah Dagar	31°55'34.00"N	71°15'44.00"E	S/AC
4	Kalur Kot	Bitti	32°56'59.00"N	71°36'40.00"E	S/AC
5		Shaheedan Shumali	32°06'55.00"N	71°42'08.00"E	RO
6	Mankera	Kheuo	31°35'07.00"N	71°45'45.00"E	RO
7		Chamb	31°12'44.00"N	71°40'50.00"E	RO
8		Gohar Wala	31°42'53.00"N	71°34'36.00"E	RO
9		Chak 73 TDA	31°24'41.00"N	71°09'19.00"E	RO
10	Khushab	Chak 46	32°12'48.00"N	72°14'42.00"E	RO
11		Waheer Shumali	32°25'08.00"N	72°17'16.00"E	RO
12		Chussu Wala	32°20'56.00"N	72°00'56.00"E	RO
13		Chak 41	32°13'31.00"N	72°09'28.00"E	RO
14		Chak 52mb	32°14'47.00"N	72°15'33.00"E	S/AC
15		Chak 42 Mb	32°14'26.00"N	72°09'02.00"E	RO
16		Jhuggiyaan	32°24'25.00"N	72°31'12.00"E	RO
17		chak 48mb	32°14'36.00"N	72°12'02.00"E	RO
18		Chak 44 Mb	32°13'17.00"N	72°11'40.00"E	RO
19		Joiya	32°11'53.00"N	72°17'36.00"E	RO
20		Kurpalka	32°14'42.00"N	72°19'09.00"E	RO
21		Chak 43	32°14'16.00"N	72°10'17.00"E	RO

Sr #	Name of Scheme		GPS Coordinate		Type of Plant
	Tehsil	Village	Latitude	Longitude	
22		Butala	32°16'05.00"N	72°08'31.00"E	RO
23		Nalli	32°22'46.00"N	72°19'41.00"E	RO
24		Gaggh Kalaan	32°20'35.00"N	72°26'05.00"E	RO
25		Chak 40MB	32°12'21.00"N	72°09'25.00"E	S/AC
26		Chak 50 Mb	32°13'08.00"N	72°14'51.00"E	RO
27	Noor Pur Thal	Bambool	31°44'06.00"N	71°57'10.00"E	RO
28		Borana Wala	31°39'60.00"N	71°59'33.00"E	RO
29		Shah Hussain	31°34'45.00"N	71°57'32.00"E	RO
30		Maikan	31°47'30.00"N	71°44'32.00"E	S/AC
31		Dadu Wala	31°37'36.00"N	71°54'42.00"E	RO
32	Quaid abad	Chak No#28mb	32°06'42.00"N	71°55'28.00"E	RO
33		Utra Janubi	32°19'16.00"N	71°54'09.00"E	RO
34		Chak 36db	32°14'60.00"N	71°44'47.45"E	RO
35	Essa Khel	Murghan Wala- Pacca Kamar Mushani	32.845425	71.298111	RO
36		Mangalan Wala	32.879536	71.320709	RO
37		Bhat	32.865801	71.35719	RO
38		Dala Mer Wala	32.882896°	71.289858°	S/AC
39		Dhedian Wala	32.881541°	71.268082°	RO
40		Mari Khel- Pacca Kamar Mushani	32.856415	71.31385	RO
41	Mianwali	Kund-1	32°45'49.00"N	71°51'15.00"E	RO
42		Wan Bhachran Shumali	32°25'10.00"N	71°42'28.00"E	RO
43		Noor-Ullah Wala	32°32'51.00"N	71°37'00.00"E	RO
44		Chak No.026/D.B	32°18'48.00"N	71°40'00.00"E	S/AC
45		Dhok Mohd . Khan	32°50'26.00"N	71°46'59.00"E	RO
46	Piplan	Tibbi	32°28'33.00"N	71°34'22.00"E	RO
47		Bala Sharif	32°13'29.00"N	71°40'20.00"E	S/AC
48	Mianwalli	Bani Afghanan	32.94656	71.698226	RO

Sr #	Name of Scheme		GPS Coordinate		Type of Plant
	Tehsil	Village	Latitude	Longitude	
49		Vanjari	32.90287	71.24511	S/AC
50		Ban Mhea- Balo khel	32.513896	71.251681	RO
51	Kot Momin	Chak 22 Nb	32°13'47.00"N	72°51'24.00"E	RO
52		Chak 16nb	32°17'14.00"N	72°47'57.00"E	S/AC
53		Nawab Pur	32°13'49.00"N	72°35'43.00"E	RO
54		Purana Phlervan	32°21'19.00"N	73°00'50.00"E	RO
55		Mateela	32°6'9.00"N	73°57'29.00"E	RO
56		Tiba Murad	32°10'30.00"N	73°01'04.00"E	RO
57		Chak No. 20/Sb	32°09'15.00"N	73°02'43.00"E	S/AC
58	Sahiwal	Bochra Kohna	32°01'00.00"N	72°28'00.00"E	RO
59		Rabana	31°48'37.00"N	72°22'09.00"E	RO
60		Kishkan	32°00'50.00"N	72°17'52.00"E	S/AC
61		Noor E Wala	31°46'16.00"N	72°19'27.00"E	RO
62		Noorewala Colony	31°45'60.00"N	72°19'32.00"E	RO
63		Baran	31°50'11.00"N	72°23'15.00"E	RO
64		Thatti Jalal.	31°47'35.00"N	72°23'13.00"E	RO
65		Dhirowal	32°02'14.00"N	72°19'41.00"E	RO
66		Naoshera Khokhran	31°48'32.00"N	72°24'06.00"E	RO
67	Sargodha	Chak 86_Nb	32°02'16.00"N	72°38'37.00"E	RO
68		Chak No 104 sb Janobi	31°59'59.00"N	72°41'38.00"E	RO
69		Chak No 97 N.B	31°59'52.00"N	72°37'40.00"E	RO
70		Chak No 70 Sb	32°06'09.00"N	72°54'56.00"E	S/AC
71		Chak No 91 Sb	32°03'06.00"N	72°45'15.00"E	S/AC
72		Ck 101 Sb	31°58'12.00"N	72°45'29.00"E	RO
73		Chak No 95 Sb	31°59'50.00"N	72°47'20.00"E	RO
74		Chak 99 S.B	32°00'45.00"N	72°43'26.00"E	RO

Sr #	Name of Scheme		GPS Coordinate		Type of Plant
	Tehsil	Village	Latitude	Longitude	
75		Chak No 142 S.B Samal	31°56'47.00"N	72°40'23.00"E	RO
76		Chak No 51 Nb	32°01'54.00"N	72°43'49.00"E	RO
77		Chak No 56 Nb	32°11'21.00"N	72°39'17.00"E	RO
78		Chak No#76sb	32°04'23.00"N	72°51'21.00"E	RO
79		Chak No 116 N.B	31°55'2.00"N	72°32'34.00"E	RO
80		Chak No 110 S.B Colony	31°55'18.00"N	72°45'30.00"E	RO
81		Chak No 85sb	32°04'02.00"N	72°47'03.00"E	RO
82		Say Dowana	32°02'15.00"N	72°46'15.00"E	RO
83		100 Sb	31°58'03.00"N	72°46'36.00"E	RO
84		Chak 2 Rakh Dharema	32°11'29.00"N	72°35'59.00"E	RO
85		Chak No #94sb	31°59'26.00"N	72°49'05.00"E	RO
86		Chak No 106 S.B	31°55'16.00"N	72°46'45.00"E	RO
87		Chak No 32 Nb	32°05'24.00"N	72°47'28.00"E	RO
88		Chak No 53 Nb	32°10'00.00"N	72°41'43.00"E	RO
89		Chak Asaiyanwala	31°59'52.00"N	72°44'58.00"E	RO
90		Chak No 83 Nb	32°07'22.00"N	72°29'55.00"E	RO
91		Chak#1 Rakh Dharema	32°12'37.00"N	72°34'59.00"E	RO
92		Chak#3 Rakh Dharema	32°11'57.00"N	72°36'18.00"E	RO
93		Chak 102 sb	31°56'20.00"N	72°47'03.00"E	RO
94		Chak No 108 Sb	31°58'55.00"N	72°41'08.00"E	S/AC
95		Chak No 84 N.B	32°04'58.00"N	72°33'50.00"E	RO
96		Chak 40 NB	32.104302°	72.728662°	RO
97		Chak No 49 SB.	32°01'26.00"N	72°41'38.00"E	RO
98		Chak No 72 N.B Shazadia Wala	32°07'01.00"N	72°38'60.00"E	RO
99		Chak#58 Nb	32°13'08.00"N	72°37'30.00"E	RO
100		Godhy Wala	32°02'25.00"N	72°30'43.00"E	RO

Sr #	Name of Scheme		GPS Coordinate		Type of Plant
	Tehsil	Village	Latitude	Longitude	
101	Shah Pur	Jalpanan	32°15'52.00"N	72°30'58.00"E	RO
102		Wegowal	32°21'57.00"N	72°32'09.00"E	RO
103		Jalpana	32°15'52.00"N	72°30'58.00"E	S/AC
104		Sardar Pur	32°12'54.00"N	72°33'01.00"E	RO
105		Chak No 5,4 Jinha Colony	32°11'22.00"N	72°33'07.00"E	RO
106		Hayatpur	32°17'49.00"N	72°38'00.00"E	RO
107		Thati Lami	32°04'06.00"N	72°19'28.00"E	RO
108		Chak Muzafra Abad Colony	32°16'36.00"N	72°20'4.00"E	S/AC
109		Chahaar Shareef	32°20'43.00"N	72°31'13.00"E	RO
110	Sillanwali	Chak No 129s.B	31°53'23.00"N	72°36'24.00"E	RO
111		Chak No 154	31°40'48.00"N	72°19'54.00"E	RO
112		Chak 128sb	31°51'48.00"N	72°38'50.00"E	RO
113		Chak No 138 Sb	31°49'45.00"N	72°33'26.00"E	RO
114		Chak No 50sb	31°49'47.00"N	72°39'52.00"E	RO
115		Chak 89 Nb	32° 1'24.46"N	72°36'38.41"E	RO
116		Chak 133sb	31°50'23.00"N	72°26'25.00"E	RO
117		Chak No 160 Nb	31°37'35.00"N	72°17'31.00"E	S/AC
118		Chak 155 Nb	31°40'08.00"N	72°19'14.00"E	RO
119	Kot Momin	Bhabra	32°13'49.00"N	73°12'52.00"E	S/AC
120		Jalla Makhdum	32°01'16.00"N	73°04'26.00"E	S/AC
121		Chak No 9 Lokri	32°13'38.00"N	72°55'11.00"E	S/AC
122		Chak 9 SB	32°11'53.00"N	72°59'54.00"E	RO
123		Bucha Kalan	32°11'24.00"N	73°08'52.00"E	S/AC
124	Shahpur	Manke walla	32°17'52.00"N	72°39'55.00"E	RO
	Package 10				

Sr #	Name of Scheme		GPS Coordinate		Type of Plant
	Tehsil	Village	Latitude	Longitude	
1	Khushab	R/W/S Sch: Roda	32°04'05.00"N	72°05'57.00"E	Sand / Activated Carbon Filter with Chlorination
2		R/W/S Sch: Panja	32°13'49.00"N	72°03'16.00"E	Sand / Activated Carbon Filter with Chlorination
3		R/W/S Sch: Bola	32°19'32.00"N	72°15'02.00"E	Sand / Activated Carbon Filter with Chlorination
4		R/W/S Sch: Jabbi Shumali	32°23'24.00"N	72°54'44.00"E	Sand / Activated Carbon Filter with Chlorination
5		R/W/S Sch: Nali Shumali	32°29'18.00"N	72°19'30.00"E	Sand / Activated Carbon Filter with additional **Fluoride Filter**

Sr #	Name of Scheme		GPS Coordinate		Type of Plant
	Tehsil	Village	Latitude	Longitude	
6		R/W/S Sch: Katha Saghral	32°30'51.00"N	72°26'28.00"E	Sand / Activated Carbon Filter with additional **Fluoride Filter**
7		R/W/S Sch: Daiwal	32°31'40.00"N	72°32'20.00"E	Sand / Activated Carbon Filter with additional **Fluoride Filter**
8		R/W/S Sch: Nari Sumali	32°28'12.00"N	72°24'35.00"E	Sand / Activated Carbon Filter with additional **Fluoride Filter**
9	Naushera	R/W/S Sch: Padhrar	32°39'14.00"N	72°29'43.00"E	Sand / Activated Carbon Filter with additional **Fluoride Filter**
10	Quaidabad	R/W/S Sch: Okhali Mohla	32°15'17.00"N	71°58'17.00"E	Sand / Activated Carbon Filter with Chlorination

Sr #	Name of Scheme		GPS Coordinate		Type of Plant
	Tehsil	Village	Latitude	Longitude	
11		R/W/S Sch: Gole Wali City	32°29'17.00"N	71°50'46.00"E	Sand / Activated Carbon Filter with additional **Fluoride Filter**
12	Isa Khel	R/W/S Scheme New Wanjari City	32.90287	71.24511	Sand / Activated Carbon Filter with additional **Fluoride Filter**
13		R/W/S Scheme Chapri & Chapri Thal.	32.979646	71.387017	Sand / Activated Carbon Filter with additional **Fluoride Filter**
14	Mianwali	R/W/S Scheme Musa Khel	32.633993	71.744055	Sand / Activated Carbon Filter with Chlorination
15		R/W/S Scheme Wan Bhachran	32.426302	71.684772	Sand / Activated Carbon Filter with Chlorination

Sr #	Name of Scheme		GPS Coordinate		Type of Plant
	Tehsil	Village	Latitude	Longitude	
16		R/W/S Scheme Pai Khel	32°47'16.0 N	71°35'8.0 E	Sand / Activated Carbon Filter with Chlorination
17		R/W/S Scheme Mari Indus New	32.948197	71.563171	Sand / Activated Carbon Filter with Chlorination
18		R/W/S Scheme Parwandi	32.642419	71.745124	Sand / Activated Carbon Filter with additional **Fluoride Filter**
19		R/W/S Scheme Chitta Watta	32.671837	71.666987	Sand / Activated Carbon Filter with Chlorination
20		R/W/S Scheme Rikhi	32.707798	71.796348	Sand / Activated Carbon Filter with Chlorination
21		R/W/S Scheme Swance / Pai Khel Thal.	32.728558	71.628825	Sand / Activated Carbon Filter with Chlorination

Sr #	Name of Scheme		GPS Coordinate		Type of Plant
	Tehsil	Village	Latitude	Longitude	
22	Sargodha	RWSS Mari	32°11'33.00"N	72°41'20.00"E	Sand / Activated Carbon Filter with Chlorination
23		RWSS Dhreema	32°09'21.00"N	72°36'04.00"E	Sand / Activated Carbon Filter with Chlorination
24	Sillanwali	RWSS Shaheenabad	32°55'16.00"N	72°38'06.00"E	Sand / Activated Carbon Filter with Chlorination

The visual representation of some of the proposed site for installation of water supply schemes and filtration plants in Sargodha division is **annexed** in this report.

3.5 Site Description

3.5.1 Land Ownership

Land for all the PF filtration plant, RO filtration plant and water supply scheme will be acquired by client Punjab Aab-e-Pak Authority (PAPA).

3.5.2 Government Approvals

Punjab Aab-e-Pak Authority (PAPA), has applied for environmental approval. They will apply for local government approvals after getting Environmental Approval from EPA.

3.5.3 Land Use on Site

Most of the sites of the filtration plants are rural areas comprising of agricultural lands and land parcels of barren land.

3.6 Vegetation Features

Agricultural crops, bushes and wild grasses are present in the nearby surroundings of project area. During operation phase, green belts will be developed, and it will serve as a useful buffer to contain the menace of pollution from different sources. Various local plants will be grown at the project site in the open areas, and along the boundary. During the said proposed activity, no major loss of vegetation will be observed, and more trees and plants of required species will be grown to enhance the aesthetics of the project vicinity.

3.7 Cost and Magnitude of Proposed Project

Total area for the construction of PF filtration plants, RO filtration plants and water supply scheme is 26,358 km^2. Manpower required for (civil works, electrical, mechanical and instrumental works) during the construction phases is estimated to be 125 – 150 persons during the peak time. The total estimated cost for the aforesaid project is **372.801 Million** PKR.

Budget will be allocated for purchase and maintenance of standardized PPEs for workers and environmental enhancement. Despite these costs, this project was found to be financially feasible in the feasibility report.

3.8 Project Phases / Implementation Schedule

The installation of the filtration plants will be completed in the span of 2 years (24 months). The detailed implementation schedule of the aforesaid project is annexed as **Annex – III** in this report.

3.9 Relocation and Rehabilitation Plan

There exists no human settlement within selected project site to be displaced owing to the commencement of the Proposed Project. No structure of any significance

stands at the site to be relocated or dismantled, no relocation and rehabilitation is required.

3.10 Project Description

The aforesaid Project is “Supply Construction, Installation of Water Filtration Plants in Sargodha Division Phase - I (Package 9 & 10)”.The Government of Punjab through Punjab Aab-e-Pak Authority (PAPA), has intended to serve about 4.7 Million People of the targeted areas of the Punjab Province falling in designation Central, North and South Zones of the Punjab. Successful implementation of this project will result provisions of the contamination free potable drinking water to underserved areas in Punjab especially in Sargodha Division and consequently eliminate water borne diseases to improve public health.

There are very limited water supply facilities available in Rural Areas of Punjab. Pakistan Living Standards Measurement Survey (PLSM) 2018-19 depicts that:

- Overall 18% of households use tap water as main drinking water source.
- In Punjab only 12 % of the households use tap water as main drinking water Source, which is the lowest among all provinces.

In Punjab 69.62 million population lives in rural areas out of which only 14.98 million is served with clean drinking water. Rest 54.64 million is un-served population. So only 21.51% population living in rural areas have access to safe drinking water.

Water sources in Punjab are given as follows:

- Motorized Pump= 44%
- Hand Pump = 23%
- Filtration Plants = 15%
- Tap Water = 12%
- Tanker/ Truck= 4%
- Bottled water = 1%

3.10.1 Need for Aforesaid Project

As mentioned above in Punjab, there is high dependence on ground water, whereas indicators show improvement in accessibility to water, the quality of water still remains problematic. Widespread use of hand pump and pit latrines is responsible for fecal

contamination of the drinking water. This contaminated water is being used for drinking purposes and cooking mostly without any treatment, resulting in water borne diseases. Therefore, there is need to provide safe and clean drinking water as top priority to such areas.

3.10.2 Project Objectives

- The objective of the project is to provide clean drinking water facility based on minimum requirement set by World Health Organization, ensuring provision of potable water to rural households in Punjab.
- To provide sustainable supply of clean drinking water to each and every individual.
- To undertake or engage in such activities as are necessary for sustainable efficient and affordable clean drinking water.
- To conduct surveys, studies and research.
- To devise strategy, plan and actionable parameters for survey of water contamination and for provision of clean drinking water by installation of water filtration and purification plants.
- To reduce, suspend or disconnect the water supply in the event of contravention of the provisions of the Act or the rules or regulations made there under.
- To design, fabricate, construct, install, build, commission, test, operate and maintain schemes and water filtration plants for drinking water.
- To develop an infrastructure as needed to provide drinking water, including setting up of bottling plants, and testing laboratories.
- To safeguard human health including reduction in the mortality rate associated with lack of access of safe drinking water, inadequate sanitation and poor hygiene by improving the quality and access to clean drinking water which shall lead to reduction of water borne diseases.
- To educate and involve the community in the development of filtration plants and water supply schemes to devise suitable arrangements for improving access to clean drinking water.
- To carry out improvements, management, administration, supervision, execution and control of works and projects for providing clean drinking water.
- To devise and develop a model of designing, supervision, monitoring and evaluation of the execution of clean drinking water projects and their quality assurance system.

3.10.3 Purpose of the Aforesaid Project

The government of the Punjab, through the Punjab Aab-e-Pak Authority, has intended to serve about 4.7 Million people of the targeted areas of the Punjab Province falling in designation Central, North and South Zones of the Punjab. Successful implementation of this project will result in provision of contamination free potable water to the underserved areas in Punjab and consequently eliminate water borne diseases to improve public health.

3.10.4 Population / Area details of Different Districts (Package – 9 & 10)

3.10.4.1 Sargodha Division

Sargodha Division is an administrative division of Punjab Province, Pakistan. Sargodha city is the capital of the division. According to the 2017 Census of Pakistan, the total population of division was **8,181,499**. It contains the following districts discussed in Table:

Table 3-2: Detail of District in Sargodha

District	Area (Km^2)	Population
Sargodha District	5,854	3,903,588
Bhakkar District	8,153	1,650,518
Mianwali District	5,840	1,546,094
Khushab District	6,511	1,281,299
Total	**26,358**	**8,381,499**

District Sargodha

Sargodha city is the administrative center of Sargodha District and is also known as the “City of Eagles”. The District lies from 31.50 to 32.50’N and 72.20 to 73.10 18’E. The total area of District is 5,854 km2. According to the 2017 census of Pakistan. Population of the district was 3,903,588. This District consists of 6 tehsils:

- Sargodha
- Sillanwali
- Bhalwal

- Shahpur
- Kot momin
- Sahiwal

The map of Sargodha District is given as follows:

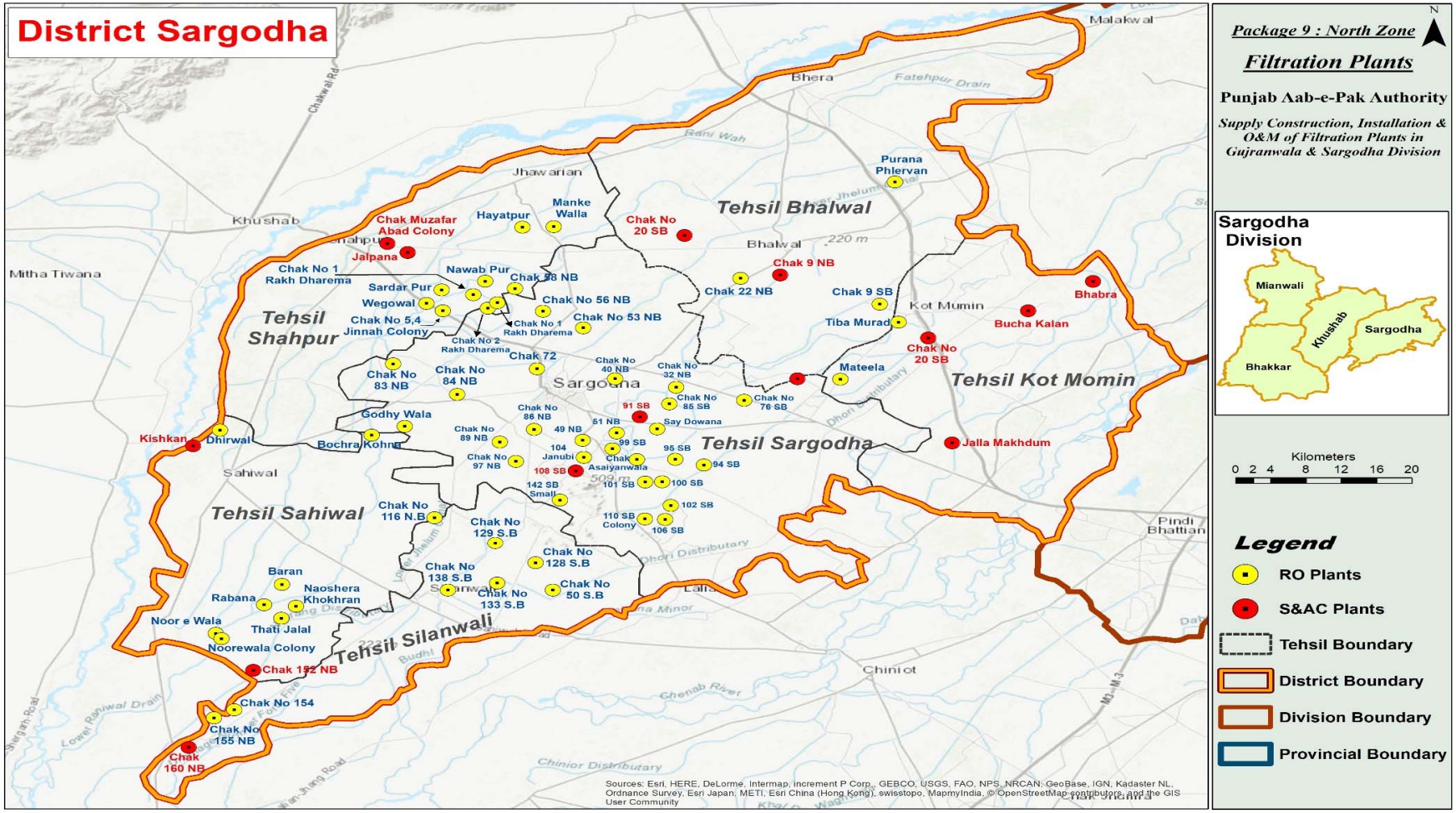


Figure 3-2: Map of Sargodha District

District Bhakkar

Bhakkar is situated on the eastern bank of the river Indus. The district is located between 31.10 to 32.20 N and 70.70 to 72.10 E and has an area of 8,153 km2. According to 2017 census of Pakistan, population of the district was 1,650,518. It is divided into four tehsils that include:

Bhakkar

- Daryan khan
- Kaloorkot
- Mankera

The map of Bhakkar District is given as follows:

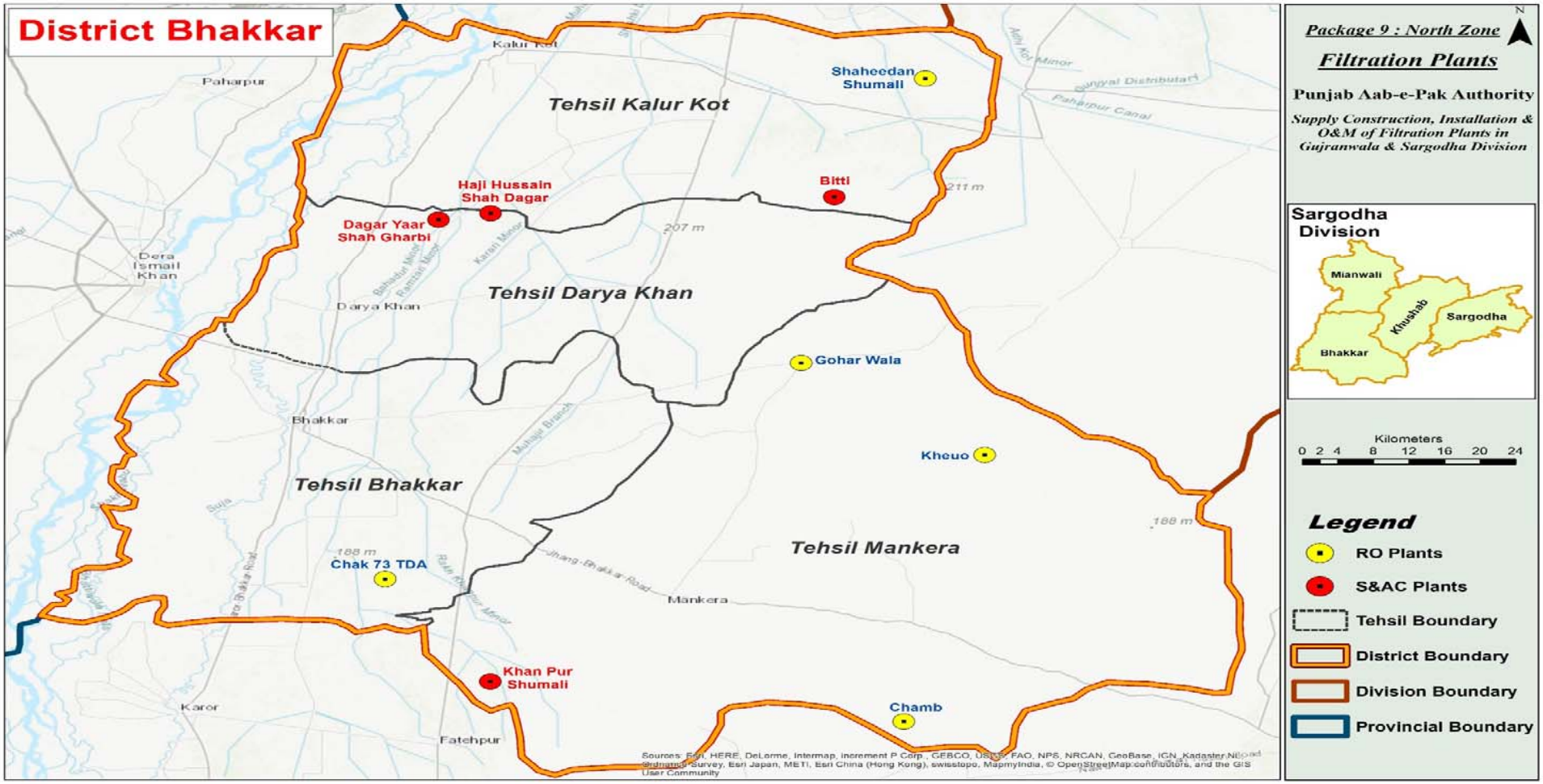


Figure 3-3: map of Bhakkar District

District Mianwali

Mianwali District is located in the north-west corner of the Punjab Province. Mianwali District has an area of 5,840 km2 and is geographically located between 32.1° and 33.2° N. and 71° 1′and 72° E. According to 2017 census of Pakistan, population of the district was 1,546,094. The district has 3 tehsils which include:

- Esa Khel
- Mianwali
- Piplan

The Map of Mianwali District is given as follows:

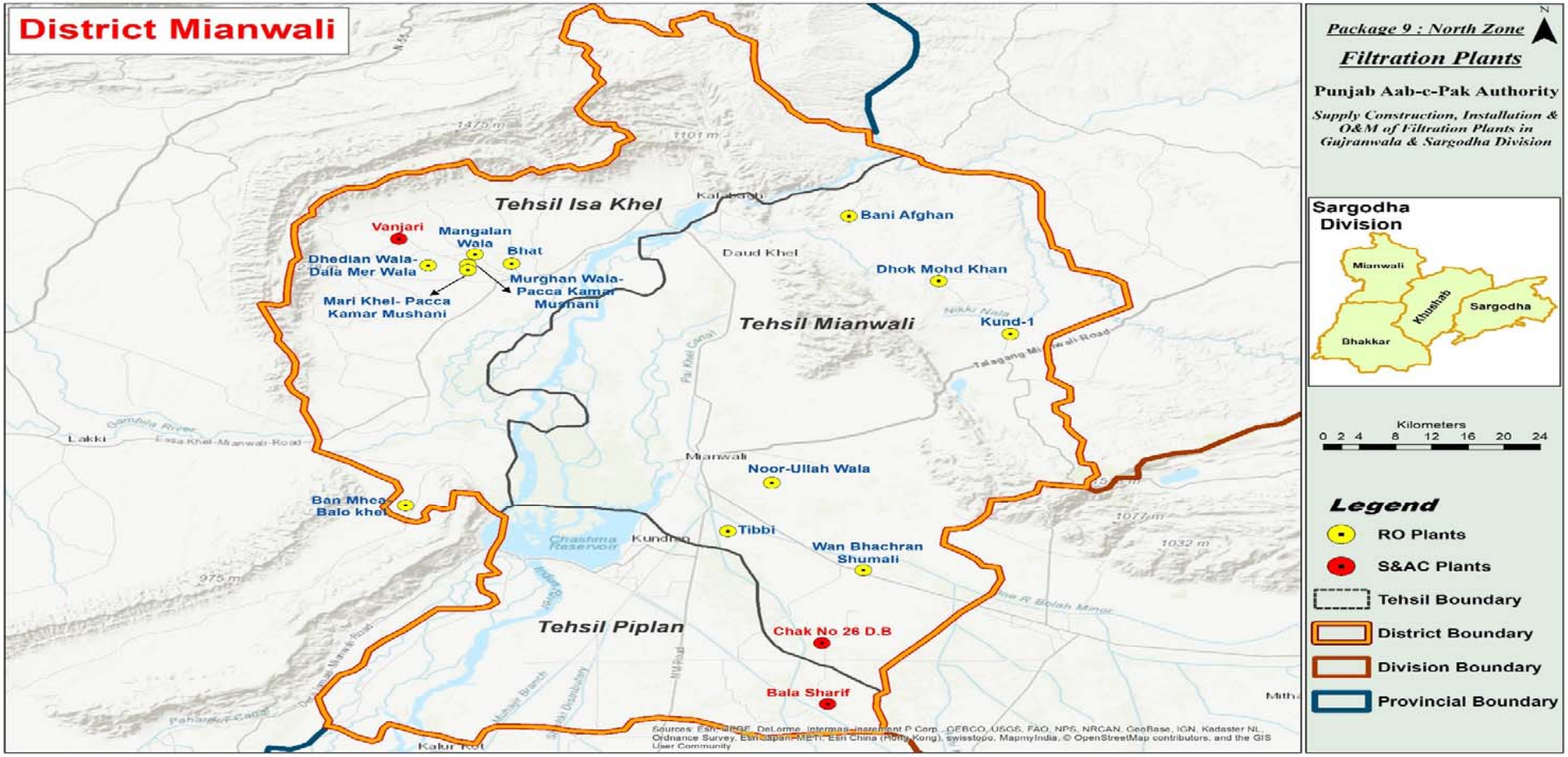


Figure 3-4: Map of Mianwali District

District Khushab

Khushab District is bounded by Chakwal district in the north, Bhakkar in the southwest, Sargodha in the east and Mianwali in the west. The river Jhlelum flows in the east of the district from northeast to southeast. The district lies between latitude 31.40 to 32.70 N and longitude 71.60 to 72.60 E and has an area of 6,511 km2. According to 2017 census of Pakistan, population of the district was 1,281,299. The district consists of three tehsils which are:

- Khushab
- Noorpur Thal
- Quaidabad

The map of District Khushab is given below:

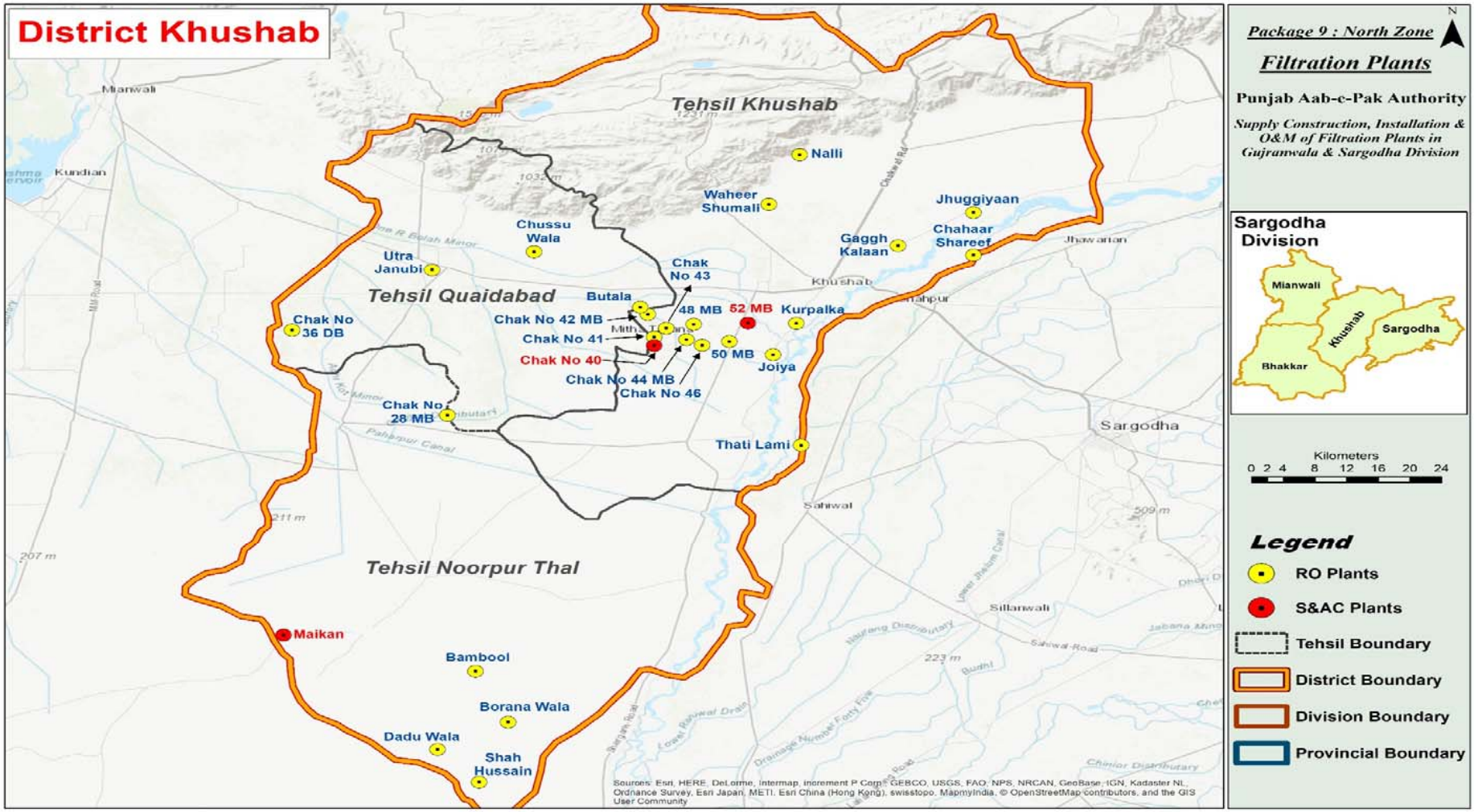


Figure 3-5: Map of Khushab District

3.10.5 Selected technologies

The selected technologies are listed as under:

- Water Supply schemes
- Reverse osmosis filtration plants
- Pre-filtration plants

3.10.5.1 Criteria for Selection of Technology in different Villages

After analysis of the Water quality of ground water, the plant with appropriate treatment technology will be selected and installed at the identified villages.

Table 3-3: Criteria for Selection of Technology

Type of Plant	Criteria
RO Plant	• Groundwater TDS>1000 mg/l • Groundwater TDS>1000 mg/l with other contaminants like Arsenic, Fluoride or Nitrate. • Significant Population
Direct Supply to Markaz-e-Aab	• Sweet water zone, Groundwater TDS<900 mg/l • Other contaminants like Arsenic, Fluoride or Nitrate and Biological Contamination

Plant size will be selected on the basis of the population of the serving area/village. The governing body of PAPA has decided to select villages which have significant population. The short listing of villages has been based on the data from HUD & PHE Department. The areas where there are no existing facilities, having high TDS & contaminants. The areas where there are no existing facilities, having high TDS & contaminants and having significant population have been given priority in each district of Punjab during the first phase of the project. Design Horizon for the filtration plants will be 20 years.

3.10.5.2 Operation time of Filtration Plants

Filtration Plant will be designed for the next 20 years and will be served at the rate of 08 operational hours depending on the everyday water requirement of the village. PAPA may serve more population by increasing operational hours.

3.10.5.3 Design Period of Project Components

3.10.5.3.1 Design Period for Tube-well

Experience reveals that majority of drinking water tube-wells installed in the province, about 15 to 20 years back, are still in satisfactory working condition. For optimal utilization of resources it is advisable to adopt for a design period of 15 years as far as tube-wells are concerned.

3.10.5.3.2 Design period of pumping machinery

The design period of pumping machinery to be provided on the water supply system shall be 10 years, however, repair or replacement of the pumping sets may be necessary after 10 years of operation, or as and when required.

3.10.6 Water Source Selection

3.10.6.1 Ground Water

For communities where water supply scheme is nonfunctional and ground water is sweet but having other contaminations (Arsenic, Fluoride, Nitrate and E-Coli), the option of providing drinking water by pumping groundwater and treating it through Pre-filtration (Sand & Activated Filter) plants will be installed.

3.10.6.2 Installation of Tube-well

Tube-well will be installed on the sites identified by the Client and verified by the Consultants on the basis of water quality analysis and survey. The tube-wells will be designed to meet the Maximum Day Demand of the community they are serving.

3.10.6.3 Capacity of the Tube-well

Tube-wells will be designed to meet maximum daily demand. For site specific water supply solutions i.e. RO, or Package Plants, design capacity of the tube well bore will be as required to meet demand of 2 m3/hr. (2000 L/hr.) for eight working hours.

1. Tube-well Casing

Diameter of the Tube-well casing will be 6 inches. Reason for providing a relatively large diameter is that if during maintenance, a large diameter line shaft pump is required to be installed then a 4 inches (100 mm) diameter housing pipe will easily accommodate it.

2. Filter Casing

Slotted casing will be installed against water yielding formations. Diameter of the PVC strainer will be 3 inches (75 mm) depending upon the capacity and yield of the aquifer. The entrance velocity (velocity of groundwater flowing through the slotted casing slot) will be kept below 0.05 ft/s (0.01524 m/s). Length of the slotted casing will be maximized to reduce drawdown. Open area of the slotted casing will be about 10 percent. Slot size will depend upon grain size distribution of the aquifer material. Normally it will range from 1.0 to 1.5 mm.

3. Housing Pipe

The diameter of housing pipe will be based on the discharge of tube-well.

3.10.7 Water Treatment

3.10.7.1 Plant Capacity

Sand/ Activated Carbon Filter Plants of 2000 liter/hour capacity will be installed.

3.10.7.2 Disinfection Chlorination

Chlorination is the addition of chlorine in the water to kill the bacteria. Chlorination is very widely adopted in all developing countries for treatment of water for public supply. Chlorine is available in gas, liquid or solid form (bleaching powder).

Advantages of Chlorine

- Chlorine is manufactured easily by electrolytes of common salts (NaCl).
- It is powerful oxidant and can penetrate the cell wall of organism and its contents.
- Dosage can be controlled precisely.
- Can be easily detected by simple orthotolidine test.
- It does not form harmful constituents on reaction with organics of inorganics in water.
- Leaves required residue in water to neutralize recontamination later.

Disadvantages of Chlorine

- Taste and odor may be unacceptable to some users.
- Relatively low protection against protozoa.
- Lower disinfection effectiveness in turbid waters so requires clear water to be most effective.
- Must ensure quality control of solution.

- Potential long-term effects of chlorination by-products.

3.10.8 Filtration Plant

Pretreatment shall be provided for removal of suspended chemical impurities. Pretreatment shall also reduce those contaminants that would adversely affect [i.e. reduce] the life of downstream. Following types and capacities of the filtration plants shall be considered.

1. Pre-filtration Plant 2,000 liters/hr
2. Reverse Osmosis Plant 2000 Liter/hr

Pre-Filtration plants will be installed at non-brackish sites where Total Dissolved Solids are below 1000 mg/L and feed water is contaminated with chemical and biological impurities. These plants shall comprise of those processes that shall produce product water as per the WHO standards. These processes can include but not be limited to pre-filtration, Arsenic/ Fluoride/ Nitrate removal filter. An activated carbon filter shall be installed for the removal of taste and odor compounds as well as other organic impurities. Reverse Osmosis plant will be installed where TDS is more than 1000 and less than 5000 mg/l. More details on these processes are given below:

3.10.8.1 Design Criteria

These plants shall be powered grid energy as primary source.

The design methodology for all Pre-Filtration Plants shall be rendered to the Engineer for approval.

3.10.8.2 Pre-filtration / Sand Filter

Pre filtration shall be provided for the removal of the suspended solids / colloids which are present in the water. Pre-filtration will also reduce the load on Reverse Osmosis and protect the membrane from being damaged, thus increasing the membrane life. The silica sand shall conform to AWWA B100, including acid solubility requirement, except as modified or supplemented herein. The specification shall include the following:

- Filter media : Silica Sand
- Vessel material : FRP
- Suspended solid removal : > 20 micron
- Acid solubility : Less than 5 percent
- Specific gravity : 2.60 ≥ 2.65

- Effective size for sand : 0.5 to 0.8 mm
- Uniformity Coefficient : <1.4
- Backwash : Automatic, Time based/ Controller

3.10.8.3 Activated Carbon filtration

The media used in this filter, shall meet the following minimum requirements.

- Raw material : coconut shells
- Bulk density : 440-540 kg/cm³
- Hardness No. : 80
- Iodine No. : 850-1000
- Ash content : 5 %
- Surface area : 900 m²/g
- Certification : NSF

3.10.8.4 Cartridge Filters

Cartridge filter of 05 µm shall be added before the RO unit.

3.10.8.5 FRP Vessels for Sand, Activated Carbon and Chemical Reduction Filtration:

FRP Vessels shall meet the following minimum requirements:

- Material : polyester or vinyl ester
- Maximum Operating Pressure : up to 06 Brag
- Maximum Operating Temperature: 45 °C
- Certification : NSF
- For filtration speed : 5-15 m/h

3.10.8.6 Stainless Steel Skid

The Stainless Steel Skid shall meet but not limited to the following specification:

- Stainless Steel Grade : SS 304
- Minimum Size : As per proposed design

3.10.8.7 Chemical Reduction Filters

These filter(s) shall be installed to treat the specified chemical contamination as according the design parameters found in the feed water. It is observed that feed water may be contaminated with any of the following chemical pollutants:

- Arsenic
- Fluoride
- Nitrate

3.10.8.8 Arsenic removal filters shall be installed with the main plant confronting to the following requirement

- Filter Vessel : FRP
- For filtration speed : 8-10 m/h
- Filter media : Granular Ferric Hydroxide (compliant with
- BS EN 15029:2012 standard / equivalent OR
- Activated Alumina compliant with BS EN
- 13753:2009 standard / equivalent
- Certification : NSF
- Time-clock control programmer : by Controller Time Based system

3.10.8.9 Fluoride removal Filter

The fluoride shall be removed from the water by Activated Alumina or other to meet the product water quality. This shall be used as adsorbent for the removal and shall meet the following minimum requirements.

3.10.8.10 Nitrate Removal Filter

If the feed water contains nitrate and the total dissolved solids are less than 1000 mg/liter, nitrate shall be removed through ion-exchange process. For this purpose, strong base anionic resins shall be used, with the following minimum design parameters.

- Feed water loading rate: < 300 L/ minute. m^3
- Depth of resin bed : > 0.6 m
- Time-clock control programmer : by Controller Time Based system
- Certification : NSF

3.10.8.11 Flow Meter

A variable area flow meter/ Rota meters shall be installed to measure the flow of feed/ permeate water. Flow meter shall be of transparent acrylic material with Stainless Steel float with graduations on them to show proper flow. Flow meter shall be capable of covering the

full range of flow. Glass should be acrylic and capable to deal Maximum flow rate 06 m3/hr. Calibration on the scale should be enable for 0.5 m3/hr minimum.

3.10.8.12 Water Meter

Water meter shall be of multi jet/turbine type with a pulse generator with a maximum frequency of 1pulse/ 10Liters. Body of water meter shall be of Cast iron with threaded connections and a minimum pressure rating of PN10. Water meter shall have a totalizer installed on permeate line.

3.10.8.13 Pressure Gauge

All installed pressure gauges shall be bourdon spring type with Stainless Steel (SS), 304 casing and a minimum diameter of 2.5". All gauges shall be damping fluid filled having back connection and border for easy fitting on the panel.

For addition of various chemicals like acid, anti-scalant, etc.

- Dosing Pumps Qty : As required
- Flow Rate : as required
- Resistance Pressure : as system requirement
- Diaphragm : PTFE-EPDM/ PVDF Composite
- Enclosure : IP65 (NEMA 4X)
- Insulation Class : B
- Electric Connections : 240V/50Hz
- Material: Suction, Injection Valves, Foot Valve etc.

3.10.8.14 Product Water Tank

The Polyethylene water storage tank shall meet but not limited to the following specification:

- Material : Food Grade, Polyethylene
- Ambient Temperature : 45 C
- Wall Thickness : Approx. 4 to 5.0 mm Minimum

3.10.8.15 Filtration Plants

The specification of these plants and their possible components are given in the paragraphs Described here-over.

A. Filtration units using sand filter and activated carbon Filter, Capacity 2000 L/h

Table 3-4: Specifications of Filters

Sand Filter	
Mounting	FRP Vessel Skid
Filtration Rate	15 m/h
Backwash rate	25-35 m / h
Empty Bed Contact Time (EBCT)	03 Minutes Minimum
Backwashing Time	Adjustable by Local Timer
Sand Effective Size	0.5 - 0.8 mm UC 1.4 - 1.7 Height 800 mm minimum SG ≥ 2.630.5 - 0.8
Vessel	FRP
Feed pump	Centrifugal type, eff > 60%
Piping for units	PE or PVC/PPRC/UPVC/HDPE
Activated Carbon Filter	
Filtration Rate	12 m/h
Empty Bed Contact Time (EBCT)	04-05 Minutes
Backwash Rate	40 m/h
Base Material	Coconut shell
Effective Size	1.2 -1.6 mm
Uniformity Coefficient	≤ 1.9
Surface Area	900 m²/g
Bulk density	440-540 kg/m3
Hardness No.	80 min
Ash Content Max 5%	Ash Content Max 5%
Vessel Material	FRP
Clean water storage tank	08 hours of a day Max

3.10.8.16 Granular Ferric Hydroxide for Arsenic Removal

Waterborne arsenic is a major cause of disease and has been found in abundant quantity in many part of the Punjab as identified by water quality analysis and testing. It is the only contaminant that has been shown to be the cause of human cancers following exposure through drinking water. Besides cancer of the skin, lung and bladder and probably liver,

arsenic is responsible for a range of adverse effects, including hyperkeratosis and peripheral vascular disease.

Granular ferric hydroxide is used widely for removal of arsenic removal from drinking water. Arsenic removal shall be done in case necessary as pre-treatment, conforming to the following requirement using granular ferric hydroxide as removal media. Arsenic removal shall be done in case necessary as pre-treatment.

B. Arsenic Removal Filter

Parameters	**Range of Typical Values**
Mounting	FRP Vessel Pad
Media Size	0.32 – 2.0 mm
Grain Density	1.19 g/cm³
Bulk Density	1100 g/l
EBCT	05 min
Absorption Capacity	15 g/kg (GEH)
Backwash speed	20 – 25 m/h (50% expansion)
pH range	7 – 8
Specific Surface Area	250 – 300 m²/g (Dry Weight)
Filter Vessel	FRP
Diameter / height	Minimum 600 mm / 1600 mm
Oxidation of As(III) to As(V)	with Chlorine, ClO_2 / $KMnO_4$
Filter media:	Granular Ferric Hydroxide, (compliant with BS EN 15029:2012 for drinking water treatment) or Activated Alumina (compliant with BS EN 13753 :2009 for drinking water treatment)
Certification	NSF

3.10.8.17 ACTIVATED ALUMINA (AA) ABSORBENT FOR FLUORIDE REMOVAL

High intakes of fluoride can give rise to dental fluorosis, an unsightly brown mottling of teeth, but higher intakes result in skeletal fluorosis, a condition arising from increasing bone density and which can eventually lead to fractures and crippling skeletal deformity.

This is a major cause of morbidity and can manifest itself at a relatively early age with the result that affected individuals cannot work properly and may be economically as well as physically disadvantaged for life. Many factors appear to influence the risk of such adverse effects, including volume of drinking water, nutritional status and, particularly, fluoride intake from other sources.

The fluoride shall be removed from the water by Activated Alumina (AA) or other to meet the Product water quality. This shall be used as adsorbent for the removal and shall meet the following minimum requirements.

Parameters	Range of Typical Values
Mounting	FRP Vessel Pad
Empty Bed Contact Time (EBCT)	5 Min (Minimum)
Fluoride Capacity of AA	8 g /kg
Media Size	0.5 - 3 mm
Grain Density	3.97 g/cm³
Bulk Density	700 kg/m3
Specific Surface Area	300 -350 m²/g (Dry Weight)
Bed Depth	0.9 - 1.85 m
Backwashing	20 m/h for 50 % bed expansion
Backwashing Time	10 -15 Minutes
Vessel Material	Fiber Reinforced Plastic (FRP)
Filter media:	Activated Alumina (compliant with BS EN 13753 :2009 for drinking water treatment)
Process Control	PLC/ Adjustable by Local Timer
Certification	NSF

3.10.9 Reverse Osmosis Plant

Pretreatment shall be provided for removal of suspended solids, turbidity and biological contaminant material. Sand filters followed Flocculation tank of surface water will be used as a pretreatment section of RO plant. Following types and capacities of the filtration plants shall be considered.

a. RO Plant 2,000 liters/hr.

3.10.9.1 Design Criteria

The criteria used for the design of RO plants shall be as follows:

- This type of Reverse Osmosis (RO) plants shall be powered grid energy as prime energy source.
- RO design must be based on feed water with total dissolved solids (TDS) for brackish waters up to 5000ppm
- An allowance should be made (a 50% safety factor) for an increase in TDS in the source water as it is harvested.
- Re-mineralization of RO product water will be carried out by blending an appropriate fraction of pretreated raw water and/or chemicals to bring up the TDS, alkalinity and hardness to an acceptable level for human consumption. The product water shall be consistent with the Prescribed Standards and the WHO Safe Drinking Water.
- The RO plant shall be installed with more than 50% recovery of permeate. The vendor must
- submit the projection/simulation based on complete feed water analysis before installation of
- Plant.
- The Bidder shall take into account the following criteria:
- Reduced energy consumption by using Low energy membranes with standard size of 4” x 40” or 08” x 40”
- Reduced chemical usage
- Increased life span of critical replacements such as membranes and filter parts
- Small foot print area.

3.10.9.2 Equipment

This section covers the reverse osmosis (RO) treatment plant for the Punjab Aab E Pak Project (PAPA). The RO system at designated site shall consist of pretreatment, chemical addition systems (Anti-Scalant), cartridge filtration, RO membranes with pressure vessels, complete with High pressure feed pump, Pretreated filters water from Sand and activated Carbon filters for blending / mixing arrangement passing through UV system, interconnecting piping, valves controls and instrumentation.

The CONTRACTOR shall furnish all labor, materials, equipment and incidentals necessary to fabricate, ship to the site, install, startup, performance test, and demonstration test the RO systems as shown on the Drawings and as specified herein.

The equipment furnished under this specification shall be made and fabricated from new materials. The use of used or refurbished materials is unacceptable.

3.10.9.3 Pre-filtration Pressure Filter

Pre filtration will be done by using multimedia filters for RO Plant.

3.10.9.4 FRP Vessel for Sand & Activated Carbon Filter

FRP vessels will be done by using multimedia filters for RO Plant.

3.10.9.5 Reverse Osmosis Section

The RO sections of the plant include high pressure pump, cartridge filters membrane housings, Reverse Osmosis membranes and instrumentation. This section shall be manufactured by NSF certified OEM manufacturer as per guidelines of the design projections. Plant assembled and tested in Pakistan with all its components assembled at place of manufacture. The pre-treatment and post-treatment arrangements shall be performed by bidder to be tested to ensure compliancy with the main plant.

I. High Section Pump

HP multistage pump centrifugal pump and motor shall be of reputed manufacturers among Europe/ USA/ Germany/ Equivalent and efficiency above 60% are acceptable.

II. Reverse Osmosis Membrane

Proven and reliable high rejection thin film membrane elements shall be selected to give optimum performance. They shall have an operating range of 3-11 PH. They shall be high flow fiberglass wrapped for maximum durability.

- Membrane Type : Spiral wound
- Membrane element Size : 4” x 40” / 08” x 40”
- Maximum Applied Pressure : 250 psi
- Stable Salt rejection : 99%
- pH range, short term cleaning : 1-13
- pH range, continuous operation : 2-11

III. Membrane Vessels

Heavy duty reverse osmosis pressure vessel housings shall be made of fiberglass, tested and certified by the American Society of Mechanical Engineers **(ASME)** and the boiler association of the USA as per ASME's Boiler and Pressure Vessel Code (BPVC):2013. Enamel coated white. Easy membrane removal, inspection, and installation should be allowed.

- Housing Material : PVC/ FRP along with all port connections
- Housing Size : 4" x 40" / 8" x 40"

IV. Reverse Osmosis Control System

The reverse osmosis water filtration plants shall be controlled by a Reverse Osmosis PLC manufactured with US / EU/ Germany/ equivalent microprocessor chip featuring a 2-line X 20- character, alphanumeric backlit LCD or process mimic to display operating conditions, and provides adjustable time delays and set points to accommodate varying field conditions. SCADA system for future.

The controller shall display the permeate TDS/Conductivity, water temperature, and operating hours along with the operating status of the RO unit. Low and high pressure switches, tank levels, and pretreatment equipment shall be monitored through a controller.

Controller shall be providing relay outputs for the RO high pressure pump, inlet solenoid valve,

Membrane flush solenoid valve, and optional relays for permeate divert or remote alarm and auxiliary output.

The treatment plant automation system shall be established with Standard functions of the microprocessor controller for monitoring and/or control of:

- RO high pressure pump motor
- Inlet solenoid valve
- Automatic flush solenoid valve
- Low feed pressure switch
- High pressure pump switch
- RO storage tank level switches
- Permeate TDS/Conductivity
- Water Temperature
- Operating hours

The microprocessor-controlled system shall be used to monitor pressure and level Switches, TDS / Conductivity monitor/controller with programmable Set points must be an integral part of the controller. The controller shall display the system status and sensor and switch input status on an easy to read backlit display. User programmable Set points to be provided for fast and easy adjustment of system parameters.

- Power : 240 VAC -15+10%, 50Hz, 25 Watts
- Enclosure : 8" X 6" X 4" (203mm X 152mm X 102mm) NEMA 4X
- Display : 2 line X 20 character, alphanumeric backlit LCD
  Or Process Mimic Display
- Front Panel : Overlay with LCD window, alarm lamp, 7 key
  Membrane switch, Switch Inputs,
- Dry Contact : Pressure fault, pretreat lockout Permeate Storage Tank full
  Feed Storage Tank empty
- Relay Outputs : RO pump relay 240VAC, Inlet valve relay 240VAC, 5A Flush valve relay 240VAC, 5A, Relays supply same output voltage as board power (240 VAC)
- Regulatory Standards: Reverse Osmosis Controller system shall be new and shall be designed with microprocessor chip manufactured in countries of origin as Europe, USA, Germany/ equivalent only.

V. Frame/Skid:

Stainless steel shall be used for Reverse Osmosis Skid meeting minimum following specification can also be used:

- Stainless steel grade : SS304
- Minimum Size : As per adjustment

VI. Flow Meter

A variable area flow meter/ Rota meters shall be installed to measure the flow of feed/ permeate water. Flow meter shall be of transparent acrylic material with Stainless Steel float with graduations on them to show proper flow. Flow meter shall be capable of covering the full range of flow. Glass should be acrylic and capable to deal

Maximum flow rate 06 m3/hr. Calibration on the scale should be enable for 0.5 m3/hr minimum.

VII. **Water Meter**

Water meter shall be of multi jet/turbine/ Gear type. Body of water meter shall be of Cast iron while wetted part should be bronze/ SS-304 with threaded connections and a minimum pressure rating of PN10.

VIII. **Pressure Gauge**

All installed pressure gauges shall be bourdon spring type with Stainless Steel (SS), 304 casing and a minimum diameter of 2.5"-3". All gauges shall be damping fluid filled having back connection and border for easy fitting on the panel.

IX. Automatic Chemical injection systems with 70-liter tanks:

For addition of various chemicals like acid/ anti-scalant, etc.

- Dosing Pumps Qty : One
- Flow Rate : as required
- Resistance Pressure : as system requirement
- Diaphragm : PTFE-EPDM Composite
- Enclosure : IP65 (NEMA 4X)
- Insulation Class : B
- Electric Connections : 230V/50 Hz
- Material: Suction, Injection Valves, Foot Valve level controller etc.

X. Power Water Tank

- Material : Polyethylene,
- Material Class : Food Grade
- Working Temperature : up to 45C
- Capacity : 2000 Liter (minimum two tanks at each plant) as per plant capacity
- Wall Thickness : Approx. 4.5 to 5.0 mm
- Volume : 2m3 as per plant capacity
- Working Pressure : atmospheric

- Standard : ASTM D1998 – 13

3.10.10 Design of filtration Plant

3.10.10.1 Design Methodology

Pre-filtration treatment and Reverse Osmosis Plants option are proposed for this package on basis of ground water quality. The design process for are described below:

3.10.10.1.1 Design Process of Filtration

Pre-filtration plant is proposed in this package and water source will be ground water present in the area. The total dissolved solids (TDS) of the water supply is less than 900 mg/l, however, there are some contaminants, i.e. bacteria, viruses, Arsenic, Nitrate and fluoride which are present in water above maximum allowable limit, which shall be removed with following methods:

I. **Microbiological Contaminants**

Purification of drinking water containing pathogenic microorganisms requires specific treatment called disinfection. Pakistan Standard for Drinking Water Quality (PSDWQ) maximum allowable limit for microbiological contamination. A number of treatment methods can be adopted for removal/treatment of microbiological contamination but we are using Chlorine as disinfectant.

II. **Bacteriological / Virus Removal by Chlorination**

Chlorination is the process of adding chlorine Cl2 gas or hypochlorite to water. This method is used to kill certain bacteria and other microbes in tap water as chlorine is highly toxic. In particular, chlorination is used to prevent the spread of waterborne diseases such as cholera, dysentery, jaundice, typhoid etc. Chlorine readily combines with chemicals dissolved in water, microorganisms, small animals, plant material, tastes, odors, and colors. These components "use up" chlorine and comprise the chlorine demand of the treatment system. It is important to add sufficient chlorine to the water to meet the chlorine demand and provide residual disinfection. The chlorine that does not combine with other components in the water is free (residual) chlorine, and the breakpoint is the point at which free chlorine is available for continuous disinfection. An ideal system supplies free chlorine at a concentration of 0.3-0.5 ppm.

III. **Fluoride Removal**

High intakes of fluoride can give rise to dental fluorosis, i.e. brown mottling of teeth. Higher intakes result in skeletal fluorosis, a condition arising from increasing bone density and which can eventually lead to fractures and crippling skeletal deformity.

This is a major cause of morbidity and can manifest itself at a relatively early age with the result that

Affected individuals cannot work properly. Many factors influence the risk of such adverse effects, including volume of drinking water, nutritional status and, particularly, fluoride intake from other sources. NSDWQ and WHO has set 1.5 ppm fluoride level for safe drinking water quality.

Activated alumina is widely used to remove fluoride from drinking water. Activated alumina filters can easily reduce fluoride levels from 0.5 ppm to less than 0.1 ppm. Activated alumina, when used as a fluoride filter, can be regenerated by a solution of sodium hydroxide (NaOH), sulfuric acid (H2SO4), or alum [KAl (SO4)2.12H2O].The fluoride uptake capacity (FUC) of activated alumina can be up to 5000 mg/kg.

3.10.10.2 Pre-filtration Plants (Sand & Activated Carbon Filter)

In this treatment scheme pressure sand filter, chlorination and activated carbon filter are used to remove bacteriological, viral or suspended impurities. Function of pressure sand filter is to remove the suspended impurities while activated carbon filter is used to remove color, odor and natural organic matter from the raw water stream. Activated carbon filter is provided after sand filter and acts as an adsorptive medium to remove harmful chlorine disinfection by products that can pose health risk to the users. Treated water from the treatment facility will be pumped to Markaz-e-Aab of respective cluster.

In this scheme pressure sand filter and AC filter are used as pre filtration treatment while fluoride removal filters are optional and site specific filter column will be added as per requirement for chemical contaminant removal.

In treatment scheme pressure sand filter and AC filter are used as pre filtration treatment while fluoride removal filter is optional and site specific filter column will be added as per requirement for chemical contaminant removal. Chlorination is used for removal of microbiological contamination. Additional chlorine will be added if water is pumped to the remote locations instead of standalone or site specific solutions.

The figure below illustrates the process diagram of pre-filtration plants.

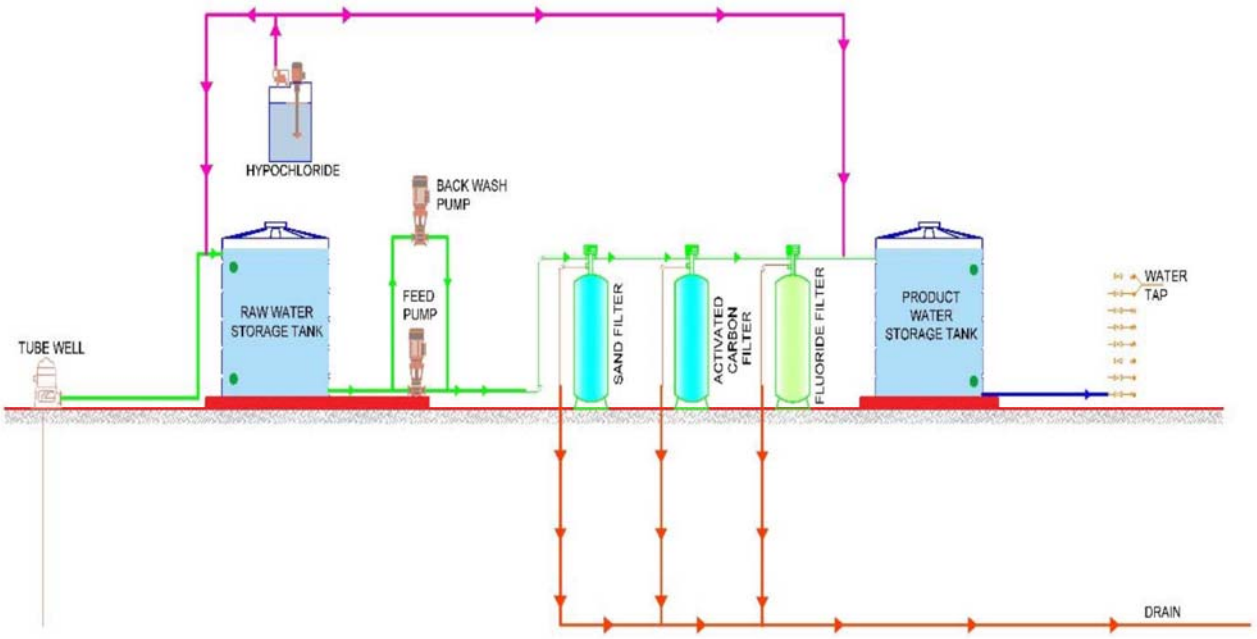


Figure 3-6: Process Flow Diagram of Pre-Filtration Plant

3.10.10.3 Design of Sand / Activated Carbon Filter Plants (Pre-Filtration Plants)

Pre-filtration plants which include both sand filtration (SF) and activated carbon units (AC) are designed in villages where water supply scheme have TDS value less than 900 mg/l. If contaminants like arsenic, fluoride & nitrate exist in water source, additional removal units for these impurities are appended to Pre-filtration Plants. The capacity of the plant will be of 2000 liter/hour. The water source of the plants will be water supply scheme already working in the village. In the village where water supply schemes are nonfunctional, the source of the filtration plant will be ground water.

Design of Pre-Filtration Plant is given in table below:

Table 3-5: Design of Pre-Filtration Plants

Parameters	Values	Units
Flow Rate	2	m3/hr
Plant Operational time	8SS	h/d
Daily Flow Rate	16	m3/day

Parameters	Values	Units
Sand FILTER		
FILTER DESIGN		
Flow Rate	2	m3/hr
Velocity	15	m3/hr. m2
Area of the bed	0.1334	m^2
Dia of the bed	16	Inch
Bed Depth From EBCT	3-5	Min
Volume of the Media	0.09	m^3
BACKWASH		
Backwash flow rate	40	m3/hr. m2
Free Board Area of total	50	%
Total Height of the Vessel	65	Inch
Head Loss During Service Flow		
Service Flow rate	6	GPM/ft2
Pressure Drop	0.29	Psi/ft of bed
Safety Factor	15	%
Pressure Drop through media	1.337	Psi
Sizes		
Dia (say)	16	Inches
Height (say)	65	Inches
ACTIVATED CARBON FILTER		
ACTIVATED CARBON FILTER		
Flow Rate	02	m3/hr
Velocity	12	m3/hr. m2
Area of the bed	**0.167**	**m2**
Dia of the bed	460	mm
Bed Depth From EBCT	3-5	Min
Volume of the Media	0.09	m3
BACKWASH		
Backwash flow rate	40	m3/hr. m2
Free Board Area of total	50	%
Total Height of the Vessel	65	Inches
Head Loss During Service Flow		
Service Flow rate	6	GPM/ft2
Pressure Drop	0.29	Psi/ft of bed
Safety Factor	15	%
Pressure Drop through media	1.337	Psi
Sizes		
Dia (say)	18	Inches
Height (say)	65	Inches

Parameters	Values	Units
Chlorination		
Dosing rate	02 + 03	Ppm
Flow rate of water	2	m3/hr
Consumption of chlorine per liter	.005	ml/liter
Consumption per hour	10	ml/hr
Consumption per day	80	ml/day
Plant flow rate	2	m3/hr
HRT	2	Hr
Volume of Raw water storage	2	m3/hr
Material	HDPE	
Pressure Gauges		
Make		
Origin	EUROPE/USA/GERMAN	
Operating Pressure	0-6 Barg	
Material and dial	SS 304	
Wetted material	Brass	
Lens	Acrylic	
Water Meter (Totalizer)		
Make		
Number		
Origin	EUROPE/USA/GERMAN	
Type of meter	Dial type	
Water Flow Meter		
Make		
Number		
Origin	EUROPE/USA/GERMAN	
Type of meter	Rotameter/ Float type	
Material	Acrylic	
Ball valve		
Make		
Numbers		
Origin	EUROPE/USA/GERMAN	
Material of seat	SS-304/ SS-316 L/UPVC	
Operating Pressure	Up to 17 Barg	
Ambient Temperature	Upto 45°C	
Non returning valve		
Make		
Numbers		
Origin	EUROPE/USA/GERMAN	
Material of seat	SS-304/ SS-316 L/UPVC	
Operating Pressure	Up to 06 Barg	

Parameters	Values	Units
Ambient Temperature	Upto 45°C	
Gate Valve		
Manufacturer		
Numbers		
Make		
Origin	EUROPE/USA/GERMAN	
Material of sheet	SS-304/ SS-316 L/UPVC	
Operating Pressure	Upto 17 Barg	
Ambient Temperature	Upto 45°C	
Level Meter/Float Valve & Switch		
Make		
Number	02	
Origin	EUROPE/USA/GERMAN	
Storage Tanks for Raw and		
Number	01 Raw + 01 Product	
Capacity	2000L each	
Material	PE- Food Grade	

3.10.10.4 Design of Reverse Osmosis Plants

Through water quality surveys it has been investigated that there are many areas in Package-9 where ground water TDS level is more than 1000 ppm. These areas are marked as saline areas. Reverse Osmosis is adopted as a solution for removal of dissolved solids and other impurities from the raw water stream.

Reverse osmosis (RO) is a membrane treatment process used to separate dissolved solutes from water. It includes any pressure-driven membrane that uses preferential diffusion for separation. A typical RO membrane is made of synthetic semi permeable material, which is defined as a material that is permeable to some components in the feed stream and impermeable to targeted solutes and has an overall thickness of less than 1 mm. Water is pumped at high pressure across the surface of the membrane, causing a portion of the water to pass through the membrane, as shown schematically on Fig below: Water passing through the membrane, called permeate, is relatively free of targeted solutes, while the remaining water, called concentrate (also commonly called retinae, reject water, or brine), exits at the far end of the pressure vessel.

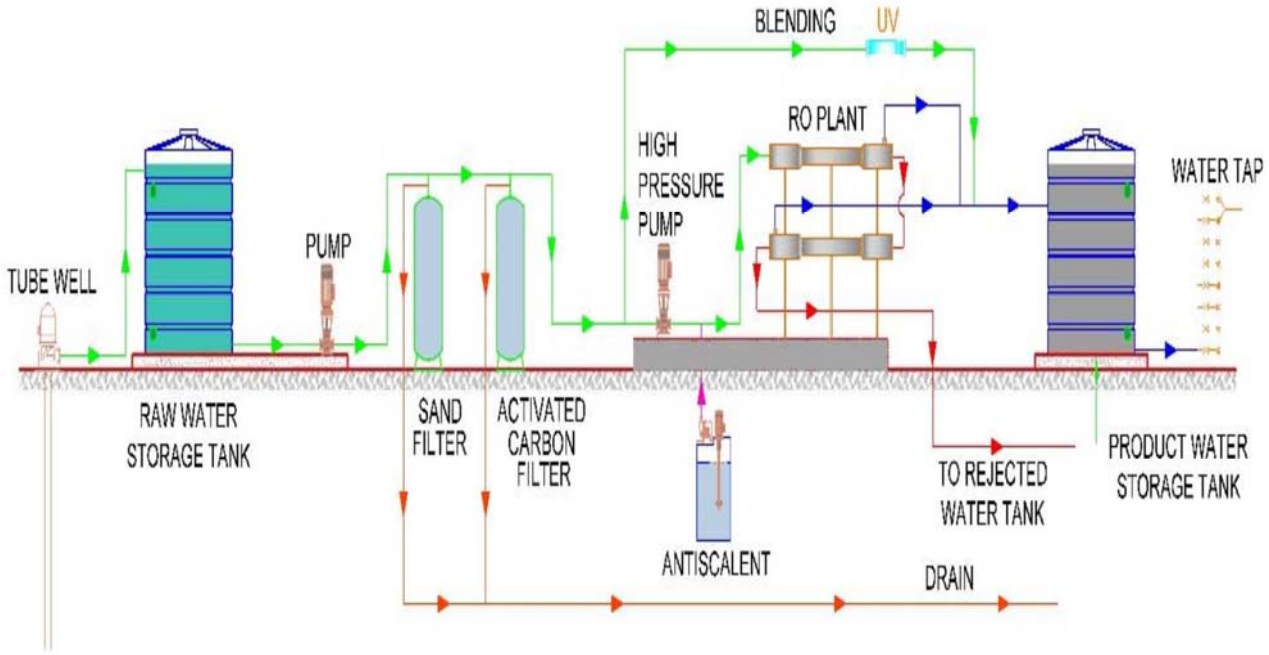


Figure 3-7: Reverse Osmosis Process Flow Diagram

In this scheme, a combination of pressure sand filter and ultrafiltration membrane are used as pretreatment to Reverse Osmosis membrane. Ultrafiltration membrane will not only decrease the load on Reverse Osmosis membrane but it will also provide blending to maintain TDS level in the product water stream.

As RO permeate water contains little amount of minerals which are necessary to maintain human health, and taste, thus re-mineralization is required. Other option is to blend the RO permeate with raw water stream after passing it through the UF membrane. With this option no chemicals for Remineralization are required and we are using this method.

Table 3-6: Design Requirements for Reverse Osmosis filtration Plants

S. No.	Description	Design Requirements
1	**ENERGY SOURCE**	**WAPDA**
2	**PUMPS AND MOTORS**	

S. No.	Description	Design Requirements
2.1	**Bore Pump**	
	Make	
	Numbers	
	Origin	EUROPE/USA/GERMAN/Pakistan or EQUIVALENT
	Pump Type	Submersible
	Impeller material	SS304
	Housing material	As per manufacturer
	Discharge	Required as per the capacity of the plants (4000 LPH)
	Operating Head	Up to 40 m
	Pump efficiency	>60%
	Motor Manufacturer	as selected by plant manufacturer
	Motor Power rating, kw	as selected by plant manufacturer
2.2	**Feed Pump**	
	Make	
	Numbers	01
	Origin	EUROPE/USA/GERMAN/Pakistan or EQUIVALENT
	Pump Type	Vertical/ horizontal Low-Pressure Pump
	Impeller material	SS304
	Housing material	As per manufacturer
	Discharge	Required as per the capacity of the plants (4,000 LPH)
	Operating Head	Up to 06 Barg
	Pump efficiency	>60%
	Motor Manufacturer	as selected by plant manufacturer
	Motor Power rating, kw	as selected by plant manufacturer
2.3	**High Pressure Pump**	
	Make	
	Numbers	01

S. No.	Description	Design Requirements
	Origin	EUROPE/USA/GERMAN/ or EQUIVALENT
	Pump Type	Vertical/ horizontal High-Pressure Pump
	Impeller material	SS304
	Housing material	As per manufacturer
	Discharge	Required as per the capacity of the plants (4,000 LPH)
	Operating Head	Up to 17 Barg
	Pump efficiency	>60%
	Motor Manufacturer	as selected by plant manufacturer
	Motor Power rating, kw	as selected by plant manufacturer
	Motor Temperature class	45°C
3	**PRE-FILTRATION**	
3.1	**Sand Filter**	
	Make	
	Number	01
	Origin	EUROPE/USA/GERMAN or EQUIVALENT
	Material	FRP
	Certification / Stander	NSF
	Service Loading Rate	Max 15 m/hr
	EBCT	Min 03
	Sand Bed height	Min 800mm
	Bed Expansion	40%
	Free Board Area Above Expended Bed	50%
	Back Wash velocity	25-35 m/hr
	Operating Pressure Max	Up to 6 Barg
	Design burst pressure	>40 Barg
3.1.1	**Filter media Sand**	
	Make	
	Material	Quartz Silica Sand

S. No.	Description	Design Requirements
	Origin	EUROPE/USA/GERMAN/PAKISTAN or EQUIVALENT
	Size of Media	0.6 to 0.8 mm
	Cleaning Process	Automatic, through PLC / Time Controller MPV
3.2	**Activated Carbon Filter**	
	Make	
	Number	01
	Origin	EUROPE/USA/GERMAN or EQUIVALENT
	Material	FRP
	Certification / Stander	NSF
	Service Loading Rate	Maximum 12 m/hr
	EBCT	04-05 min (Minimum)
	Sand Bed height	>800mm
	Bed Expansion	40%
	Free Board Area Above Expended Bed	50%
	Back Wash velocity	Maximum 30 m/hr
	Operating Pressure Max	Up to 6 Barg
	Design burst pressure	>40 Barg
3.2.1	**Filter media Carbon**	
	Origin	EUROPE/USA/GERMAN/ASIA or EQUIVALENT
	Certification / Stander	NSF
	Material /Make	Coconut shells
	Iodine No	850 to 1000
	Size of Media	1.2 -1.6 mm
	Surface Area	900m2/g
	Bulk Density	440-540kg/m3
	Hardness No.	80
	Ash Contents	5%
	Height of Gravel	200mm

S. No.	Description	Design Requirements
4	**Dosing Pump**	
	Make	
	Numbers	01 + 01S
	Origin	EUROPE/USA/GERMAN or EQUIVALENT
	Material to be handle	Anti Scalent
	Pump Capacity (Dimensions)	02 to 5 LPH
	Pressure	05-07 barg
	Material	PVDF
	Ambient Temperature	Upto 45°C
5	**Control Panel**	HMI Display 10” with touch screen
	PLC Make	SCADA enabled
	Number	01
	PLC Origin	EUROPE/USA/GERMAN or EQUIVALENT
6	**Pressure Gauges**	
	Make	
	Origin	EUROPE/USA/GERMAN or EQUIVALENT
	Operating Pressure	Up to 17 Barg
	Material and dial	SS 304
	Wetted material	Brass
	Lens	Acrylic
7	**Water Meter (Totalizer)**	
	Make	
	Number	
	Origin	EUROPE/USA/GERMAN or EQUIVALENT
	Type of meter	Dial type
8	**Water Flow Meter**	
	Make	
	Number	
	Origin	EUROPE/USA/GERMAN or EQUIVALENT

S. No.	Description	Design Requirements
	Type of meter	Rotameter/ Float type
	Material	Acrylic
9	**Ball valve**	
	Make	
	Numbers	
	Origin	EUROPE/USA/GERMAN/Pakistan or EQUIVALENT
	Material of seat	SS-304/ SS-316 L/UPVC
	Operating Pressure	17 Barg
	Ambient Temperature	Upto 45°C
10	**Non returning valve**	
	Make	
	Numbers	
	Origin	EUROPE/USA/GERMAN/Pakistan or EQUIVALENT
	Material of seat	SS-304/ SS-316 L/UPVC
	Ambient Temperature	Upto 45°C
11	**Gate Valve**	
	Manufacturer	
	Numbers	
	Make	
	Origin	EUROPE/USA/GERMAN/Pakistan or EQUIVALENT
	Material of seet	SS-304/ SS-316 L/UPVC
	Operating Pressure	17 Barg
	Ambient Temperature	Upto 45°C
12	**Level Meter/FloatValve/ Switch**	
	Make	
	Number	02

S. No.	Description	Design Requirements
	Origin	EUROPE/USA/GERMAN/Pakistan or EQUIVALENT
13	**Membrane Section**	
13.1	**RO Plant Design / Origin**	
	Manufacturer	
	Ambient Temperature	Upto 45°C
	Design Salinity	Upto 5000 mg/L
	Permeate Recovery	>50%
	Country Make	EUROPE/USA/GERMAN or EQUIVALENT
	No. of Stages	Up to 4 / As per projection of manufacturer
	Reverse Osmosis Membranes	Low Energy Poly amide
	No. of Membranes	Up to 08
	Stable Salt Rejection	99%
	Array Installation	1-2 membrane in each/ / As per projection of manufacturer
	Life of RO Membrane	Minimum 03 years
	Pressure Vessels	As per required
	Pressure rating	Up to 17 barg
	Certification	NSF/ANSI
13.2	**Cartridge Filters**	
	Material	Melt Blown PE
	No of filters	As per flow of 04m3/hr
	Size	As per flow of 04m3/hr
14	**Storage Tanks for Raw and Product water**	
	Number	01 Raw + 01 Product
	Capacity	2000L each
	Material	PE- Food Grade
15	**UV Lamps on Blend bypass line**	
	Manufacturer	
	Numbers	

S. No.	Description	Design Requirements
	Make	
	Origin	EUROPE/USA/GERMAN/ or EQUIVALENT
	Material of casing	SS-304/ SS-316 L/UPVC
	Operating Pressure	up to 06 Bar
	Ambient Temperature	Upto 45°C

3.10.10.5 Summary of Design

The project will provide potable water to the people living in Sargodha division. Markaze-Aab will be constructed in 149 villages from where people can fetch the water for drinking purposes. Water supply schemes/Villages in Division Sargodha supplied with drinking water are summarized below:

Table 3-7: Summary of Design

Sr. No.	Type of Plant	No. of Plants
Filtration Plants		
1	Reverse Osmosis Plant	101
2	Pre-Filtration Plants	48

3.11 Required Utilities of aforesaid Project

3.11.1 Construction Camps

Camp sites will be selected keeping in view the availability of adequate area for establishing camp sites, including parking areas for machinery, stores and workshops, access to local markets, and an appropriate distance from sensitive areas in the vicinity. The Camp site has been proposed in the GIS map at the site keeping in view all the contributing factors oriented to environment friendly and workmanship feasibility. The area requirement for construction camps will depend upon the deployed manpower, type and quantity of machinery mobilized. Also, due

consideration will be observed in the selection of the camp area to cause minimum disturbance to the ecological environment.

3.12 Cost Estimate

This section provides the cost estimate of the proposed project. The cost of various components have been taken from Punjab Government MRS of Sargodha Division.

3.12.1 Cost abstract

The cost abstract of the Supply construction, installation of filtration plants package 9 & 10 in Sargodha division is given as under:

Table 3-8: Cost abstract of Package 9 for Sargodha division

Sr. No.	Description	Cost Estimate (Rs.)
Package 9		
1	Supply Construction, Installation of Filtration plants in Sargodha division	339,997,428
2	Contingencies & Petty Charges 2%	6,799,948
3	Green Punjab Charges 1%	3,399,974
4	PRA Charges 5%	16,999,871
5	Resident Charges 1.5%	5,099,961
6	Design Charges 1.5%	5,099,961
7	Media Campaign 0.25%	849,993
8	Electricity Charges for 1 year	63,440,000
9	New Electric Connection Charges	3,475,000
10	O&M charges for 1 Year (including 16% PRA)	54,399,588

	Total Cost (Rs.)	**499,561,724**
	Total Cost in millions	**499.56 PKR**

Table 3-9: Cost Abstract of Package 10 for Sargodha Division

Sr. No.	Description	Cost Estimate (Rs.)
Package 10		
1	Supply Construction, Installation of Filtration plants in Sargodha division	32,805,919
2	Contingencies & Petty Charges 2%	656,118
3	Green Punjab Charges 1%	328,059
4	PRA Charges 5%	1,640,295
5	Resident Charges 1.5%	492,088
6	Design Charges 1.5%	492,088
7	Media Campaign 0.25%	82,014
8	Electricity Charges for 1 year	63,440,000
9	New Electric Connection Charges	3,475,000
10	O&M charges for 1 Year (including 16% PRA)	5,248,947
	Total Cost (Rs.)	**108,660,528**
	Total Cost in millions	**108.66 PKR**

The summary for the Cost analysis for the aforesaid project of installation of filtration plants in the Sargodha Division is attached as **Annexure- IV.**

4 ANALYSIS OF ALTERNATIVES

The discussion and analysis of alternatives in Environmental Impact Assessment (EIA) should consider other practicable strategies that will promote the elimination of negative environmental impacts identified. This section is helpful in consideration of ideal development with minimal environmental disturbance. This report has identified the major environmental impacts noted by scientific experts. The findings of these impacts were utilized to analyze possible options for the final development. The following alternatives have been identified and are discussed in further detail below:

4.1 No Project Option

The “no action” alternative is required to ensure the consideration of the original environment without any development. This is necessary for the decision-makers in considering all possibilities. The development will have a minimal effect on the physical environment. This project is a welcomed initiative by the Government and locals as it aims to focus on economic uplift with guaranteed impact, therefore it will lead to an overall improvement of potable drinking water quality by construction of supply schemes and installation of PF and RO filtration plants in Sargodha Division along with improved aesthetics of the Divisions will lead to improvement in socioeconomic conditions of the said Division and country as well. Therefore, a no project alternative will be a major loss for country.

4.2 Site Alternatives

The aforesaid project area boundary zone wise is ideal from the point of view of compatibility with other land uses within the area. The total project area is also spacious enough to accommodate the proposed facilities and their infrastructures. After, the aforesaid project existing infrastructural facilities will be utilized. Due to existing infra-structure and its strategic location, it is our considered view that the aforesaid project area is ideal and suitable for aforesaid development. Moreover, the proponent is very concerned and conscious about the quality and equally about the environmental protection and resource conservation.

Various sites in each village were assessed before the selection of final Project site. The site selection criteria were based on a number of parameters as indicated below:

- Availability of land
- Availability of water
- Number of users in the area
- Access to WTP
- Environmental Issues
- Social Issues

4.2.1 Availability of Land

The existing land use (agricultural, commercial, barren and residential) and availability of land bear is important for selection of a site. It is envisaged that small piece of land varying to 10 to 15 marlas will be required at each location for construction of housing unit and for erect of water treatment plants and allied facilities. Priority will be given to conduct Project activities on Government lands. But if it is not available then private land will be acquired by;

- Voluntary negotiation with the owners for sale of land
- Donation from the land lord owners who would not have any negative impact on their housing and business activities.

In case of compulsory acquisition and purchase of land; the affected individuals will be compensated immediately for their loss of property or land to avoid any complications in future.

4.2.2 Availability of Water

Availability of required flow of water is of utmost importance. It has been considered while analyzing alternatives that water source is perennial in case of use of surface water which is very rare. However, ground water will be used mostly as it is available in abandoned.

4.2.3 Number of Users in the area

While selecting site for Water Treatment Plants (WTP), it has been highly taken in to consideration that WTP is installed in the areas with a population of at least 2,000 persons. This way, maximum people can utilize the facility.

4.2.4 Access to WTP

Public access to Water Treatment Plant is very important. Availability of approach roads for carriage of construction machinery, construction material etc. is pre-requisite. Each alternative site was therefore ranked according to the availability of access routes for construction and public ease to access clean water. It has been taken into consideration that WTP should be available within a radius of 1 km.

4.2.5 Environmental Issues

Due consideration has to be given to the sensitive issues related to the environment, forest, wet lands, wildlife reserves, agricultural land, etc. while assessing the alternative sites for development of the Water Treatment Plants. No environmentally sensitive site is located in the selected project sites.

4.2.6 Social Issues

Social issues form an important element in the assessment criteria. Different socially sensitive elements like graveyards, mosques, playgrounds, which can create social issues were given due consideration while selecting the sites for WTP.

4.3 Location Alternatives

Location alternatives are not possible by considering the fact of consistent increasing of boundaries of Sargodha Division by process of urban sprawl.

4.4 Technology Alternatives in Terms of Filtration Plants

Pre filtration and Reverse Osmosis (RO) technologies have been nominated by Punjab Aab-e-Pak Authority (PAPA). UF & RO both are used for treatment of water. UF is used to provide disinfection to sweet water sources. UF will not work alone but in combination with pre- treatments, determined by what contamination need to be removed from water source. RO is used to remove salts from brackish source waters.

According to WHO "Guidelines for Drinking Water Quality" palatability of water with Total Dissolve solids (TS) less than about 600 mg/l is generally considered to be good but increasingly unpalatable at TDS levels greater than about 1000 mg/l. The design of Pre filtration (PF) and Reverse Osmosis Treatment System (RO) is based on existing raw water quality and desired drinking water quality in the districts of Sargodha division.

RO plant is an effective treatment system for long term successful operation of Brackish Water. It will be provided in the areas where Total Dissolve Solids is greater than 1,000 mg/l (TDS> 1000mg/l). With proper operation and maintenance; RO system can reach a life of up to five years. Another benefit of RO treatment is that there is no need for additional treatment facilities in case of presence of metals.

PF system in combination with other treatment facilities will be used in case where Total Dissolve Solids level in groundwater is less than 1,000 mg/l (TDS< 1000 mg/l). UF system is also effective in reducing organics, pathogens and disinfectant by products to desired levels. It also improves Odour and taste of the water.

Other treatment facilities will be used with PF in case of the presence of metals such as Fluoride, Iron, Manganese, Nitrite and Nitrate. Such metals will be removed by oxidation. In case of presence of Arsenic, chemical treatment (coagulation) will be done.

4.4.1 Conclusion

Both PF and RO has compact footprint that would fit into less operating area with simple and practical design for operation and maintenance. Both treatment facilities are effective, sustainable and economically viable. Hence these are best options available.

4.5 Energy Alternatives

The following three energy sources have been considered for the project:

- Solar Energy
- Power from WAPDA
- Standby Generator

4.5.1 Solar Energy

Solar energy facility if installed separately for each plant. Installation of solar facility with each will not only reduce the overall electric load on the National Grid but it will also lessen the burden on the village peoples who are paying for electric bill and making such schemes successful. Solar energy is considered as primary source of power for plants with approximately 2 to 4 hours battery backup. Each plant will be operated for maximum eight hours while it is assumed that plant shall be run for at least six hours on solar system power.

4.5.2 Power from WAPDA / Grid

For plants power from grid is considered as secondary source of energy. Plant will run maximum two hours on Grid.

4.5.3 Standby Generators

Power supply from generator is an easily and readily available source. In case of grid failure generators will be standby source of energy.

5 DESCRIPTION OF THE ENVIRONMENT

5.1 General

An environmental baseline study is intended to establish a data base against which potential impacts can be predicted and managed later. The existing environmental conditions around the proposed project have been considered with respect to physical, biological and socio-economic aspects. A site visit was conducted to survey the field area and to collect environmental data on physical, biological and socioeconomic parameters. Further, interviews were held with the general public and stakeholders of the areas adjacent to the project area in order to seek the public opinion on the implementation of the proposed action.

A review is made of locally existing resources that are inclusive and those which are exclusive to the probability of getting affected by the execution of the project. Much of the information on the topography and land use, geophysical, climate and water resources came from published literature and previously conducted studies. The information given in the sections on air, sound, soil, and water quality is the result of detailed surveys conducted specifically for this EIA.

5.2 Methodology

The methodology employed to collect the baseline data and information regarding the social structure and various related parameters as discussed in sub-sections below:

5.2.1 Data Collection

The primary data was collected by visiting the project area and its nearby communities. The secondary data regarding physical parameters (topography, geology, seismology, and climate) was obtained by visiting relevant various government departments and their official websites. The biological parameters such as flora and fauna were studied by preparing a floristic list based on visual observation and fauna was studied by using opportunities approach. The species were recorded with reference to their existence in the project area. Information on wildlife fauna specie (mammals, amphibians, reptiles, birds, etc.) in the assessment area was compiled based on opportunistic observation, gathering the existing information and

consultation with local experts, community members, government and Non-Government Organizations (NGOs). The socio- economic aspects were studied and analyzed by conducting socio-economic surveys.

5.2.2 Social Surveys

The purpose of social survey was to record the socio – economic conditions of people residing in the study area and to assess the expected project impacts on their life, subsistence systems and socio – cultural values. Prior to conducting the field surveys, the following steps were taken:

- Clear boundaries of the project area were identified.
- The sampling procedure in order to draw a representative sample size of the target population and households were designed.
- The tools for data collection i.e. questionnaires to access the socio-economic status of the area were developed.

5.2.3 Sampling Design

Social baseline data of the persons residing in the study area has been estimated and collected through random sampling by using pre-developed questionnaires.

5.2.4 Questionnaires

In order to test the validity and reliability of the proposed questionnaires, they were reviewed to assess whether questions needed to be clarified, changed or re-sequenced and then a final editing of questionnaires was conducted prior to their application in the project area. The sample of socio-economic questionnaires used is attached as **Annex-** of this EIA Report.

5.2.5 Data Editing and Analysis

The filled questionnaires and recorded information were compiled by the same field investigators who were involved in the data collection. This was done immediately after completing the field investigations and the data sets were processed accordingly. Analysis of the data and preparation of conclusions in the minimum possible time was done using statistical techniques of data analysis.

5.3 Physical Environment (Baseline Conditions)

Baseline conditions refer to the existing physical, environmental and socio-economic status of project and study area. Based on baseline information, the project interventions are assessed, and mitigation measures are proposed accordingly. The baseline information also helps to indicate the specific issues to be monitored during renovation & installation and operational phases of project development. The baseline data (physical, biological and socio-economic parameters) related to project and study area is described in sub-sections below. Information provided is based on primary and secondary data collected by site visits, desk studies and consultation with locals respectively. This section gives the overview of the topology, geology, seismology and meteorological conditions whereas, it gives detailed information about following; surface water, ground water (if present in the project area vicinity) and air quality of project area. The detail of each parameter is discussed in sub-sections below.

The physical environment consists of existing land use at the project site including geology, hydrology, meteorology and climatology. The pre-project condition (i.e. baseline) of these components of the physical environment is described in detail. To identify the potential impacts on the physical, biological and socio-economic environment that is likely to arise from the project activities.

5.3.1 Topography

The project study area (north zone) mostly consists of an alluvial plain formed by the southward flowing river Indus and its four major tributaries the Jhelum, Chenab, Ravi, and Sutlej rivers. The general slope of the land is from northeast to southwest, but it rises in the areas between rivers. The alluvial plain has a diversity of landforms as its active floodplains are flooded every rainy season and contain changing river channels, while meander floodplains lying adjacent to the active floodplain are marked by relict and abandoned channels.

The project area is a mainly a fertile region along the river valleys. The region contains the Thal deserts. The Indus River and its many tributaries traverse the Punjab from north to south. The landscape is amongst the most heavily irrigated on earth and canals can be found throughout the province.

The Project area selected for the aforesaid project are Sargodha Divisions where supply schemes will be constructed and filtration plants will be installed.

5.3.2 Geology

Sargodha District

The project is being situated in District Sargodha which has formation rocks mostly sandstone, lime stones and alluvial deposits. Some of the strata yield excellent building materials are also quarried for road materials.

5.3.3 Seismicity

According to seismic zoning of Pakistan, the project area lies in minor to moderate damage prone area. Distant earthquakes may cause damage to structures with fundamental period greater than 3 second corresponds to “Intensity V and VI of the M.M scale” (National Disaster Management Authority). The seismic zoning of Pakistan is given in figure below:

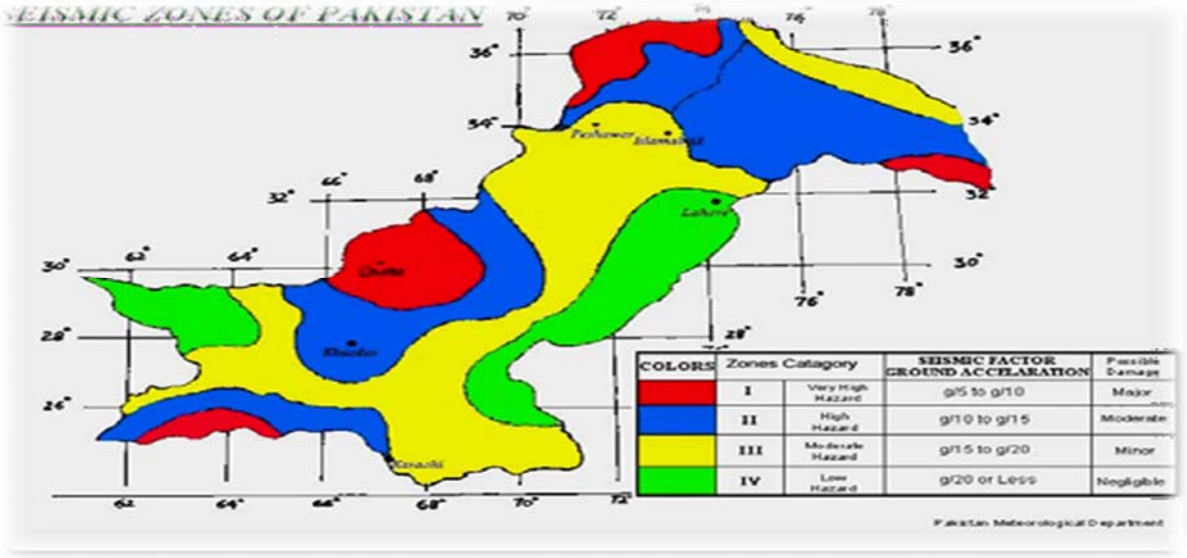


Figure 5-1: Seismic Zoning of Pakistan

5.3.4 Geography

Sargodha District

The district lies from 31 ° -34' to 32° -36' north latitudes and 72° - I 0' to 73° -18' east longitudes. The district is bounded on the north by Jhelum district, on the east by Chenab river beyond which lies the districts of Mandi Baha-ud-Din and Hafizabad, on the south by Jhang district and on the west by Khushab district, separating the two districts by Jhelum· river.

Mianwali District

The district lies from 31 ° - 10' to 33° - 15' north latitudes and 70° - 50' to 71 ° - 58' east Longitudes. It is bounded on the north by Attock and Kohat districts, on the east by Attack, Sargodha and Jhang districts, on the south by Muzaffargarh district and on the west by Bannu and Dera Ismail Khan districts.

Khushab District

District Khushab is one of the four districts of Sargodha Division. The district lies between north latitude 3 1 -33' to 32 -43 'degree and east longitude 71 -35' to 72 -37' degree.

5.3.5 Climate and Rainfall

Sargodha District

The district has extremes of climate. May, June and July are the hottest months when the mean maximum and minimum temperatures are 39 degree centigrade and 25 degree centigrade respectively. December, January, and February are the coldest months. During this period the mean maximum and minimum temperatures are 21 degree centigrade and 6 degree centigrade respectively. Most of the rainfall is in the months of July, August and September. The winter rainfalls mostly in December and January. The rainfall decreases from the northeast to the south-west. The hills get more rain than the plains.

Most of the rainfall is in the months of July, August and September, although some winter rain is also experienced. The rainfall decreases as one goes from the eastern and northern part of the district, westwards. The average rainfall is about 30.4

centimeters but in 1960 the total recorded was 38.1 centimeters. There is a tendency for the rainfall to increase with the expansion of cultivation and vegetation. The winter rain falls mostly in January and February.

Table 5-1: Climate and Rainfall Data of Sargodha District

Month	Mean Temperature (^{0}C)		Precipitation
	Maximum	Minimum	mm
January	18.9	4	33.0
February	22.8	6.4	11.0
March	26.9	12.5	23.0
April	33.2	17.6	18.0
May	37.5	21.9	19.0
June	41.5	26.7	22.0
July	37.7	27.6	136.0
August	36.0	26.3	74.0
September	36.1	24.1	26.0
October	33.4	17.3	11.0
November	25.4	10.1	13.0
December	21.4	5.4	27.0
Annual	30.9	16.7	413.0

Mianwali District

The district has extremes of climate. The summer season starts from April and continues till October. May, June and July are the hottest months. The maximum and minimum temperatures during these months are 41°C and 21°C respectively. The winter season last from November to March. December, January and February are the coldest months. The mean maximum and minimum temperatures during this period is 21°c and ° C respectively.

Regular cyclones do not pass over the district. Dust-storms are common in summer and some of them are very severe carrying away trees and thatched roofs before

them. However, they are not very destructive. Wind storm and hails are also not -un-common in this district.

Detailed data on temperature and precipitation is not available for this district. Mianwali district is, however, adjacent to Sargodha district and the climatic conditions of the two districts are approximately the same. The details in respect of temperatures and precipitation recorded at Sargodha are, therefore, given below:

Table 5-2: Climate and Rainfall Data of Mianwali District

Month	Temperature (^{0}C)		Precipitation
	Maximum	Minimum	mm
January	18.9	4.7	33.0
February	22.8	6.4	11.0
March	26	12.5	23.0
April	33.2	17.6	18.0
May	37.5	21.9	19.0
June	41.5	26.7	22.0
July	37.7	27.6	136.0
August	36.0	26.3	74.0
September	36.1	24.1	26.0
October	33.4	17.3	11.0
November	25.4	10.1	13.0
December	21.2	5.4	27.0
Annual	30.9	16.7	413.0

Khushab District

The climate of the district is more continental than the rest of Punjab due to Thal. On the other hand, the Soon valley which lies in the Salt Range has moderate climate.

The data on temperature and precipitation is not available for the district. Therefore, the climate data, recorded at Sargodha station, is given below:

Table 5-3: Climate and Rainfall Data of Khushab District

Month	Mean Temperature (^{0}C)		Precipitation
	Maximum	Minimum	mm
January	20.2	3.6	13.0
February	22.4	6.8	23.1
March	27.4	12.3	35.1
April	33.9	17.9	29.5
May	39.0	22.5	21.1
June	41.7	26.7	23.2
July	37.8	27.2	108.2
August	36.3	26.4	129.1
September	36.3	23.7	26.3
October	33.6	16.9	7.6
November	27.8	9.9	5.8
December	22.0	4.8	12.8
Annual	31.5	16.5	434.9

5.4 Land Use Pattern

The land use pattern of the Districts of Sargodha Division is characterized by residential, industrial and commercial activities in majority of the central area while institutional, industrial and commercial activities are located along main roads of the District. Open spaces are also frequently seen in the District. The project area is

located outside the District in its boundaries where most of the areas are agricultural lands.

5.5 Ground and Surface Water Resources

Sargodha District

In Sargodha District mostly the water supply sources are electric driven based on tube wells having vertical turbine pumping machinery. So tube wells are the major source of water. No impact is envisaged on the surface and ground water due to the aforesaid project activities rather it will promote efficient and enhanced potable use of water in the Sargodha District.

Mianwali District

Most of the households (77 percent} used hand-pump water for drinking. Ten percent households used piped water· and five percent well water for this purpose. In urban areas, hand-pump was mostly used (73 percent households} for drinking as compared to same source of water mostly used (78 percent) households in rural areas.

Khushab District

There is only one river Jhelum in the district. River Jhelum enters the district from the north-west of Bhalwal Sub- Division of Sargodha district. It then flows south -west up to the Town of Shahpur, which belongs to Sargodha district. Then the river takes a sharp turn and flows almost direct south to its junction with the river Chenab at Trimmu Head in the Jhang district. River Jhelum covers an area about 2 1.3 64 acres which is under river and where cultivation is not possible. About 14, 167 acres of land is under active flood plain where cultivation is possible during winter which yields excellent wheat crops.

5.6 Agriculture and Cropping Pattern

Districts of Sargodha Division are one of the prominent districts of rice growing areas in Pakistan. They are known for its high-quality Basmati, with very pleasant flavor which is popular in the world especially in Middle East. Other crops are wheat, cotton,

maize, Barley, potatoes, pearl millet, sugarcane and oil seeds. Due to the aforesaid project establishment no damage to the agriculture is being envisaged.

5.7 Biological Environment

The biological environment consists of flora and fauna present in study as well as project area. The detail of each parameter is given below:

5.7.1 Flora

Sargodha District

The characteristic trees and shrubs of the district arc the van (Selvadora abeoides), kari (Salsola fostids), jand (Prosopis spicigcra) and malla (Zigyplus nummulari a), together forming the jungle with which· the uncultivated lands are generally covered. The van or jal (Salvadora obeoides), with the leaves something like the mistletoe, often forms a dense bush.

In the riverain the most numerous trees are the Kikar (Acacia arabica) and Tahli (Dalbergia sisoo), which are very largely grown especially on cultivated land. The Shirin or Sfrin (Albizzia lebbek), with its fragrant flowers and rusting pods is fond chiefly along the roadsides. The Uksh or Kash or Fareash (Tamarix articulata), with its gnarled trunk and needlelike leaves, is fairly common and does not require so much moisture as most other trees. The Ber (Zizyphus jujuba) is very common on the roads and in the fields, and its fruit is much appreciated. In the neighborhood of wells may be seen the Sohanjna (Morings ptergosperma) with its corky bark, pollard head and bunches of white flowers, the Lasura (Cordia myxe), with its bright flowers and edible fruit; the mulberry or Toot (Morus alba), the fruit of which also is much appreciated. The date-palm or Khajji (Phoenix dactylifera) is common o nly in a few places on the river jhelum, and specially at Sada Kamboh, above Shahpur and at Majhoka and Khai near the Jhang border.

Khushab District

The desert of Thal has almost disappeared. The density of jungles has also become much less now-a-day. The characteristic trees and shrubs of the Bar uplands arc the Van (Salvadora abeo id es). Karir (Cappari s aphylla). Jand (Prosopis spicigera). Ma ll a (Zizy phus nummulari a) together forming jungle with which the uncultivated lands

are generally covered. The van or jal (Salvadora abeoides) with the leaves something like the mistletoe often forms a dense bush.

5.7.2 Fauna

Sargodha District

Wolves are common in the di strict. Jackal s are numerous everywhere, and do considerable damage to the crops, especially to maize and sugarcane. Wild boar are also find in abundance and damage the crops in the villages near the river. Foxes and wild cats also thrive in the district.

Khushab District

Khushab district is quite rich as far as various animals, Birds, reptiles and amphibioxus are concerned. About a century ago, the forests of the district had tigers. leopards, hyenas, wolves, jackals, wild cats, foxes, badgers, wild boars, neel gai (blue bull), deer, and the wild hill goats (Urial). During the last three or four decades some of the ferocious animals have become extinct due to hunting and killing. Changes in the climate soil changes after the colonization of Thal and diminishing of forests and jungles.

5.7.3 Endangered Species

There is no floral or fauna species inhabiting the project area that are included in the Red Data Book of IUCN. The populations of birds is reported to be reduced over time due to the conservation of open land into built up areas, excessive pesticide sprays in agricultural crops and loss of habitat.

5.8 Environmental Monitoring Through Laboratory

M/s Green Engineering Consultant was engaged to carry out environmental monitoring of ambient air quality, ground water quality, ambient noise level and particulate matter concentration in the project area. Laboratory analysis reports of water quality are annexed as **(Annex –V).**

5.8.1 Sampling Location of each Village of Sargodha Division

The proposed project consist of 36 Districts of Punjab with distribution of zones as north zone, south zone and central zone. The zone covered in this report is north zone which covers Sargodha Division:

Table 5-4: Sample Sites along with Coordinates

Sr #	Name of Scheme		GPS Coordinate	
	Tehsil	Village	Latitude	Longitude
	Package 9			
1	Bhakkar	Khan Pur Shumali	31°12'22.00"N	71°12'38.00"E
2	Darya khan	Dagar Yaar Shah Gharbi	31°55'01.00"N	71°12'34.00"E
3		Haji Hussain Shah Dagar	31°55'34.00"N	71°15'44.00"E
4	Kalur Kot	Bitti	32°56'59.00"N	71°36'40.00"E
5		Shaheedan Shumali	32°06'55.00"N	71°42'08.00"E
6	Mankera	Kheuo	31°35'07.00"N	71°45'45.00"E
7		Chamb	31°12'44.00"N	71°40'50.00"E
8		Gohar Wala	31°42'53.00"N	71°34'36.00"E
9		Chak 73 TDA	31°24'41.00"N	71°09'19.00"E
10	Khushab	Chak 46	32°12'48.00"N	72°14'42.00"E
11		Waheer Shumali	32°25'08.00"N	72°17'16.00"E
12		Chussu Wala	32°20'56.00"N	72°00'56.00"E
13		Chak 41	32°13'31.00"N	72°09'28.00"E
14		Chak 52mb	32°14'47.00"N	72°15'33.00"E
15		Chak 42 Mb	32°14'26.00"N	72°09'02.00"E
16		Jhuggiyaan	32°24'25.00"N	72°31'12.00"E
17		chak 48mb	32°14'36.00"N	72°12'02.00"E
18		Chak 44 Mb	32°13'17.00"N	72°11'40.00"E
19		Joiya	32°11'53.00"N	72°17'36.00"E
20		Kurpalka	32°14'42.00"N	72°19'09.00"E
21		Chak 43	32°14'16.00"N	72°10'17.00"E
22		Butala	32°16'05.00"N	72°08'31.00"E
23		Nalli	32°22'46.00"N	72°19'41.00"E
24		Gaggh Kalaan	32°20'35.00"N	72°26'05.00"E
25		Chak 40MB	32°12'21.00"N	72°09'25.00"E
26		Chak 50 Mb	32°13'08.00"N	72°14'51.00"E
27	Noor Pur Thal	Bambool	31°44'06.00"N	71°57'10.00"E
28		Borana Wala	31°39'60.00"N	71°59'33.00"E

Sr #	Name of Scheme		GPS Coordinate	
	Tehsil	Village	Latitude	Longitude
29		Shah Hussain	31°34'45.00"N	71°57'32.00"E
30		Maikan	31°47'30.00"N	71°44'32.00"E
31		Dadu Wala	31°37'36.00"N	71°54'42.00"E
32	Quaid abad	Chak No#28mb	32°06'42.00"N	71°55'28.00"E
33		Utra Janubi	32°19'16.00"N	71°54'09.00"E
34		Chak 36db	32°14'60.00"N	71°44'47.45"E
35	Essa Khel	Murghan Wala- Pacca Kamar Mushani	32.845425	71.298111
36		Mangalan Wala	32.879536	71.320709
37		Bhat	32.865801	71.35719
38		Dala Mer Wala	32.882896°	71.289858°
39		Dhedian Wala	32.881541°	71.268082°
40		Mari Khel- Pacca Kamar Mushani	32.856415	71.31385
41	Mianwali	Kund-1	32°45'49.00"N	71°51'15.00"E
42		Wan Bhachran Shumali	32°25'10.00"N	71°42'28.00"E
43		Noor-Ullah Wala	32°32'51.00"N	71°37'00.00"E
44		Chak No.026/D.B	32°18'48.00"N	71°40'00.00"E
45		Dhok Mohd . Khan	32°50'26.00"N	71°46'59.00"E
46	Piplan	Tibbi	32°28'33.00"N	71°34'22.00"E
47		Bala Sharif	32°13'29.00"N	71°40'20.00"E
48	Mianwalli	Bani Afghanan	32.94656	71.698226
49		Vanjari	32.90287	71.24511
50		Ban Mhea- Balo khel	32.513896	71.251681
51	Kot Momin	Chak 22 Nb	32°13'47.00"N	72°51'24.00"E
52		Chak 16nb	32°17'14.00"N	72°47'57.00"E
53		Nawab Pur	32°13'49.00"N	72°35'43.00"E
54		Purana Phlervan	32°21'19.00"N	73°00'50.00"E
55		Mateela	32°6'9.00"N	73°57'29.00"E
56		Tiba Murad	32°10'30.00"N	73°01'04.00"E
57		Chak No. 20/Sb	32°09'15.00"N	73°02'43.00"E
58	Sahiwal	Bochra Kohna	32°01'00.00"N	72°28'00.00"E
59		Rabana	31°48'37.00"N	72°22'09.00"E
60		Kishkan	32°00'50.00"N	72°17'52.00"E
61		Noor E Wala	31°46'16.00"N	72°19'27.00"E
62		Noorewala Colony	31°45'60.00"N	72°19'32.00"E
63		Baran	31°50'11.00"N	72°23'15.00"E
64		Thatti Jalal.	31°47'35.00"N	72°23'13.00"E
65		Dhirowal	32°02'14.00"N	72°19'41.00"E
66		Naoshera Khokhran	31°48'32.00"N	72°24'06.00"E

Sr #	Name of Scheme		GPS Coordinate	
	Tehsil	Village	Latitude	Longitude
67	Sargodha	Chak 86_Nb	32°02'16.00"N	72°38'37.00"E
68		Chak No 104 sb Janobi	31°59'59.00"N	72°41'38.00"E
69		Chak No 97 N.B	31°59'52.00"N	72°37'40.00"E
70		Chak No 70 Sb	32°06'09.00"N	72°54'56.00"E
71		Chak No 91 Sb	32°03'06.00"N	72°45'15.00"E
72		Ck 101 Sb	31°58'12.00"N	72°45'29.00"E
73		Chak No 95 Sb	31°59'50.00"N	72°47'20.00"E
74		Chak 99 S.B	32°00'45.00"N	72°43'26.00"E
75		Chak No 142 S.B Samal	31°56'47.00"N	72°40'23.00"E
76		Chak No 51 Nb	32°01'54.00"N	72°43'49.00"E
77		Chak No 56 Nb	32°11'21.00"N	72°39'17.00"E
78		Chak No#76sb	32°04'23.00"N	72°51'21.00"E
79		Chak No 116 N.B	31°55'2.00"N	72°32'34.00"E
80		Chak No 110 S.B Colony	31°55'18.00"N	72°45'30.00"E
81		Chak No 85sb	32°04'02.00"N	72°47'03.00"E
82		Say Dowana	32°02'15.00"N	72°46'15.00"E
83		100 Sb	31°58'03.00"N	72°46'36.00"E
84		Chak 2 Rakh Dharema	32°11'29.00"N	72°35'59.00"E
85		Chak No #94sb	31°59'26.00"N	72°49'05.00"E
86		Chak No 106 S.B	31°55'16.00"N	72°46'45.00"E
87		Chak No 32 Nb	32°05'24.00"N	72°47'28.00"E
88		Chak No 53 Nb	32°10'00.00"N	72°41'43.00"E
89		Chak Asaiyanwala	31°59'52.00"N	72°44'58.00"E
90		Chak No 83 Nb	32°07'22.00"N	72°29'55.00"E
91		Chak#1 Rakh Dharema	32°12'37.00"N	72°34'59.00"E
92		Chak#3 Rakh Dharema	32°11'57.00"N	72°36'18.00"E
93		Chak 102 sb	31°56'20.00"N	72°47'03.00"E
94		Chak No 108 Sb	31°58'55.00"N	72°41'08.00"E
95		Chak No 84 N.B	32°04'58.00"N	72°33'50.00"E
96		Chak 40 NB	32.104302°	72.728662°
97		Chak No 49 SB.	32°01'26.00"N	72°41'38.00"E
98		Chak No 72 N.B Shazadia Wala	32°07'01.00"N	72°38'60.00"E
99		Chak#58 Nb	32°13'08.00"N	72°37'30.00"E
100		Godhy Wala	32°02'25.00"N	72°30'43.00"E
101	Shah Pur	Jalpanan	32°15'52.00"N	72°30'58.00"E
102		Wegowal	32°21'57.00"N	72°32'09.00"E

Sr #	Name of Scheme		GPS Coordinate	
	Tehsil	Village	Latitude	Longitude
103		Jalpana	32°15'52.00"N	72°30'58.00"E
104		Sardar Pur	32°12'54.00"N	72°33'01.00"E
105		Chak No 5,4 Jinha Colony	32°11'22.00"N	72°33'07.00"E
106		Hayatpur	32°17'49.00"N	72°38'00.00"E
107		Thati Lami	32°04'06.00"N	72°19'28.00"E
108		Chak Muzafra Abad Colony	32°16'36.00"N	72°20'4.00"E
109		Chahaar Shareef	32°20'43.00"N	72°31'13.00"E
110	Sillanwali	Chak No 129s.B	31°53'23.00"N	72°36'24.00"E
111		Chak No 154	31°40'48.00"N	72°19'54.00"E
112		Chak 128sb	31°51'48.00"N	72°38'50.00"E
113		Chak No 138 Sb	31°49'45.00"N	72°33'26.00"E
114		Chak No 50sb	31°49'47.00"N	72°39'52.00"E
115		Chak 89 Nb	32° 1'24.46"N	72°36'38.41"E
116		Chak 133sb	31°50'23.00"N	72°26'25.00"E
117		Chak No 160 Nb	31°37'35.00"N	72°17'31.00"E
118		Chak 155 Nb	31°40'08.00"N	72°19'14.00"E
119	Kot Momin	Bhabra	32°13'49.00"N	73°12'52.00"E
120		Jalla Makhdum	32°01'16.00"N	73°04'26.00"E
121		Chak No 9 Lokri	32°13'38.00"N	72°55'11.00"E
122		Chak 9 SB	32°11'53.00"N	72°59'54.00"E
123		Bucha Kalan	32°11'24.00"N	73°08'52.00"E
124	Shahpur	Manke walla	32°17'52.00"N	72°39'55.00"E
	Package 10			
1	Khushab	R/W/S Sch: Roda	32°04'05.00"N	72°05'57.00"E
2		R/W/S Sch: Panja	32°13'49.00"N	72°03'16.00"E

Sr #	Name of Scheme		GPS Coordinate	
	Tehsil	Village	Latitude	Longitude
3		R/W/S Sch: Bola	32°19'32.00"N	72°15'02.00"E
4		R/W/S Sch: Jabbi Shumali	32°23'24.00"N	72°54'44.00"E
5		R/W/S Sch: Nali Shumali	32°29'18.00"N	72°19'30.00"E
6		R/W/S Sch: Katha Saghral	32°30'51.00"N	72°26'28.00"E
7		R/W/S Sch: Daiwal	32°31'40.00"N	72°32'20.00"E

Sr #	Name of Scheme		GPS Coordinate	
	Tehsil	Village	Latitude	Longitude
8		R/W/S Sch: Nari Sumali	32°28'12.00"N	72°24'35.00"E
9	Naushera	R/W/S Sch: Padhrar	32°39'14.00"N	72°29'43.00"E
10	Quaidabad	R/W/S Sch: Okhali Mohla	32°15'17.00"N	71°58'17.00"E
11		R/W/S Sch: Gole Wali City	32°29'17.00"N	71°50'46.00"E

Sr #	Name of Scheme		GPS Coordinate	
	Tehsil	Village	Latitude	Longitude
12	Isa Khel	R/W/S Scheme New Wanjari City	32.90287	71.24511
13		R/W/S Scheme Chapri & Chapri Thal.	32.979646	71.387017
14	Mianwali	R/W/S Scheme Musa Khel	32.633993	71.744055
15		R/W/S Scheme Wan Bhachran	32.426302	71.684772
16		R/W/S Scheme Pai Khel	32°47'16.0 N	71°35'8.0 E

Sr #	Name of Scheme		GPS Coordinate	
	Tehsil	Village	Latitude	Longitude
17		R/W/S Scheme Mari Indus New	32.948197	71.563171
18		R/W/S Scheme Parwandi	32.642419	71.745124
19		R/W/S Scheme Chitta Watta	32.671837	71.666987
20		R/W/S Scheme Rikhi	32.707798	71.796348
21		R/W/S Scheme Swance / Pai Khel Thal.	32.728558	71.628825

Sr #	Name of Scheme		GPS Coordinate	
	Tehsil	Village	Latitude	Longitude
22	Sargodha	RWSS Mari	32°11'33.00"N	72°41'20.00"E
23		RWSS Dhreema	32°09'21.00"N	72°36'04.00"E
24	Sillanwali	RWSS Shaheenabad	32°55'16.00"N	72°38'06.00"E

5.8.2 Water Quality Analysis

Following are the parameters being considered for the water quality analysis in the different villages of Sargodha Divisions. The considered parameters for testing are as follows:

Table 5-5: Physical Parameter Analysis

Parameter	Unit	PEQS	WHO Standers	Reference Method
Turbidity	NTU	‹ 5	‹ 5	APAHA-2130 B
Total hardness as CaCO3	mg/l	<500	----	APHA-2340 C
TDS	mg/l	<1000	<1000	APHA-2540 C

TSS	mg/l	-	---	APHA-2540
Odour	-	Acceptable / Non-objectionable	Acceptable / Non-objectionable	In-House
Tste	-	Acceptable / Non-objectionable	Acceptable / Non-objectionable	In-House
Color	TCU	15	15	ASTM D 1209
pH	-	6.5-8.5	6.5-8.5	APHA-4500H+ B

Table 5-6: Chemical parameter Analysis

Parameter	Unit	PEQS	WHO	Method	Reference Method
Arsenic	mg/l	< 0.05	0.01	AAS	APHA-3111B
Fluoride	mg/l	<1.5	1.5	Spectrophotometric	APHA-4500 F-/C
Nitrate	mg/l	<50	50	Spectrophotometric	-

Table 5-7: Microbiological Parameter Analysis

Parameter	Unit	PEQS	WHO	Reference
Coli Form	CFU/100ml	Must not be detectable	Must not be detectable	APHA-9222 B

Feacal Coli Form	CFU/100ml	Must not be detectable	Must not be detectable	APHA-9222 D
E Coli	CFU/100ml	Must not be detectable	Must not be detectable	APHA-9222

The detailed lab results of water quality analysis of Sargodha Division are attached as **Annex- VI.**

5.8.3 Noise and Ambient Air Monitoring

Noise level and Ambient Air Monitoring were conducted at the project sites using digital sound level meter and Haz-Scanner respectively and the results were found satisfactorily.

5.9 Socio-Economic Environment

The project area is adjacent to the residential, commercial and agricultural area. Aforesaid project area is accessible through metaled road network such as Main Grand Trunk (GT) road which also connects to the other parts of the city. The socio – economic survey was conducted in the project area and the **Social Profile / Results of Survey** is being discussed here under:

5.9.1 Employment Status

The respondents were asked about their employment status. According to the socio-economy survey majority of the respondents were employed. It is being envisaged that around **80%** of the respondents were working in various private and government sectors. Around **34%** of respondents were found employed in private sector, **28%** of responded were running their own business at small scale such as; shops, selling various essential goods, working as labors, etc. Only **20%** respondents according to the socio-economic survey were un-employed. Only **18 %** of the respondent were working as government employees. This reflects that overall maximum individuals are employed in settlements near the project area.

5.9.2 Favor for the aforesaid Project

Respondents were inquired about their views regarding the proposed project. Almost **90%** respondents were in favor of the proposed project whereas **10%** of respondents showed no concern for the establishment aforesaid project.

5.9.3 Common Diseases

Respondents were asked about the common diseases prevailing within their area. Most respondents suffered from eater borne diseases such as typhoid, Jaundice and diarrhea; whereas a smaller number of individuals was suffering from diabetes and hepatitis. People were mostly affected by diseases due to drinking contaminated water.

5.9.4 Community Issues

Community residents were asked about the burning issues they are facing. The majority of respondents complained about the improper and inefficient supply of safe drinking water which emphasizes the need of the aforesaid project in order to provide potable water to the individuals of Sargodha division and few of respondents were interested in the expansion of the market for the selling of their goods.

5.9.5 Quality of Life Values

Most of the respondents had the basic facilities of life such as; health and education facilities as well as basic amenities such as electricity, gas, water supply and transportation to sustain life. Most of the respondents were working with the various private sector companies. Primary & Secondary Schools, College and Universities are present in the vicinity of project area. People of the nearby residents enjoy basis amenities of life.

5.9.6 Population

5.9.6.1 Sargodha Division

Sargodha Division is an administrative division of Punjab Province, Pakistan. Sargodha city is the capital of the division. According to the 2017 Census of Pakistan, the total population of division was **8,181,499**. The District wise population of Sargodha Division is given as under:

Table 5-8: District Wise population of Sargodha Division

District	Population
Sargodha District	3,903,588
Bhakkar District	1,650,518
Mianwali District	1,546,094
Khushab District	1,281,299
Total	**8,381,499**

5.9.7 Demographic Profile of Sargodha Division

The Demographical profile of Sargodha Division are as follows:

Table 5-9: Population and Intercensal increase and Growth Rates

Division	Description	1951	1961	1972	1981	1998
Sargodha	**Population in (1000`s)**	79	131	199	293	458
	Intercensal Increase (%)	-	65.82	51.90	47.23	56.31
	Average Annual Growth Rate (Percent)	-	4.63	3.89	3.85	2.43

- **Religion**

  Sargodha Division

As emerged from 1998 Census the population of di strict is predominantly Muslims i.e. 97.47 per cent. The next higher percentage is of Christian with 2.20 points, followed by Ahmadi 0.32 per cent. While other minorities like Hindu (Jati), Scheduled Castes etc. are very small in number. The population of Muslims is higher in rural areas, 98.03 per cent, as compared to their counterparts in urban, 96.03 per cent, Christians are mostly living in urban areas representing 3.69 per cent as compared to just 1.62 per cent in rural areas. Ahmadis are more in rural areas as compared to their proportion in urban areas. The following table gives percentage of population by religion in rural and urban areas in 1998:

Table 5-10: Percentage of religions of Sargodha District of rural & urban areas

Religion	Sargodha District		
	All Areas	Rural	Urban
Muslims	97.47	98.03	96.03
Christians	2.20	1.62	3.69
Hindus	*	*	*
Ahmadis	0.32	0.34	0.27
Schedule Caste	*	*	*
Others	*	*	*

Khushab District

The people of the district do not believe in superstitions but are strict and devotional Muslim s. An overwhelming majority of the population is Muslim s. A large number are devotes and observers of the religious rites of Islam, viz, saying pray five times a day, fasting, in the month of Ramazan, distributing Zakat among the poor, going on

pilgrimage to Makkah and performing other sanctions laid down in holy Quran and Sunnah.

- **Races and Tribes in Sargodha Divisions**
  The principal tribes of the district are Jat, Rajpot, Syed, Gujar, Awan and Arain. In the urban areas Kashmiri, Mughal, Pathan, Ansari and Qureshi are the major castes.

5.9.8 Languages of Sargodha Division

The mother tongue refers to the language used for communication between parents and their children in any household. Punjabi is the predominant language being spoken in Sargodha Division by majority of the population of followed by Urdu, Pushto and Siraiki etc.

5.9.9 Literacy Rate and Education Level

The literacy rate of Sargodha Division is 90 %. These Divisions are Pakistan`s moderate producer of professionals in the fields of science, technology, law, IT, engineering, medicine, nuclear sciences, pharmacology, telecommunication, biotechnology, microelectronics and nanotechnology.

The educational facilities of Sargodha Division are as follows:

Figure 5-2: Educational Facilities of Sargodha Division

5.9.10 Civic Amenities

Respondents were inquired about the civic amenities available in the respective areas during socio-economic survey of project area. Most of the respondents had the basic amenities to sustain life such as; electricity, water supply services, sewerage collection system, and transport facilities. Adequate educational and healthcare facilities were also present in the area.

5.9.10.1 Health Care Facilities

Sargodha

Sargodha has many government and private hospitals to address and maintain the health standards. Some of the health care units available in the project area vicinity are shown as follows:

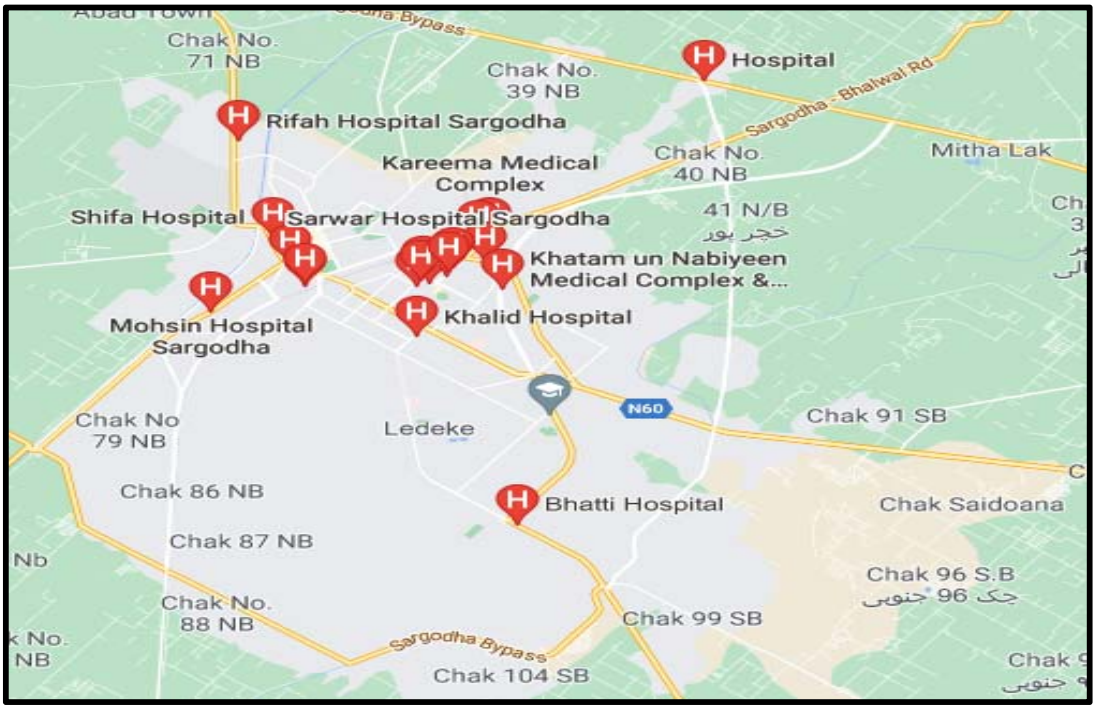


Figure 5-3: Health care facilities of Sargodha Division

5.9.11 Environmentally Sensitive Areas

Sargodha Division

The important places of Sargodha divisions are listed as under:

- **Kirana Hills**

The Kirana Hills is a small and extensive rocky mountain range located in Sargodha, Pakistan. It is also a place of tourist attraction in Sargodha City. Locally known as "Black Mountains" due to its brownish landscape, its highest peak is about 980 feet (300 m).

Kirana Hills covers large fertile land. Kirana Hills are situated 14 miles away from Sargodha. This place is regarded as one of the best spots in Sargodha. Before independence this site has been regarded as a sacred site by Hindus.

Kirana Hills also features a small temple where an annual festival is held.

- **Remont Depot, Mona**

Remount Depot was built up in 1902 and is spread over a vast zone of more thatn 10000 sections of land alongside the 660 sections of land woods. Warehouse today stands out as the prime rearing ground for fine quality ponies.

There are not Auto Vehicles permitted inside Mona station from the principle entryway you need to go through pony traveler trucks and carriages or through Tanga (Horse Cart). These trucks are reminiscent of a great past. Surreys utilized by Quaid-e-Azam Muhammad Ali Jinnah and the Queen Elizabeth II are there in plain view in the historical place alongside other mid nineteenth century's utilized carriages. The spot is 90 km from city of Sargodha and around 24 km from Lahore.

- **Sher Shah Suri Mosque Bhera**

This memorable mosque was worked by extraordinary Muslim Warrior Sher Shah Suri in 1540 AD. The structure is very much safeguarded and cared for. There is additionally a data focus in the mosque which gives all help to anybody keen on investigating Bhera.

- **Sial Sharif**

Sial Sharif is famous for the Sufi shrine of Khwajah Muhammad Shamsuddin Sialvi, popularly known as Pir Sial, who was a waliullah (saint) belonging to the Chishti order. His descendants, all of whom are believed to have reached the highest levels of sainthood (one of them is explicitly designated by the title Qutb-al-Aqtab), are also buried in the same shrine.

Today the Khanqah (Zawya, i.e. Sufi convent) of Sial Sharif is counted among the foremost Chishti centres of the Punjab, and indeed of the whole Indian subcontinent. Many spiritual personalities are or have been associated with Sial Sharif. Most notably, Pir Meher Ali Shah of Golra Sharif, the famous saint of the 20th century, was a faithful murid (disciple) of Pir Sial of Sial Sharif. Hazrat Pir Syed Haider Ali Shah sb, astana Aalia Jalal-Pur Shareef, These two were most prominent mureed of Pir Sial Lajjpal also so many others like Pir Muhammad Karam Shah Al-Azhari of Bhera Sharif and Hazrat Molvi Abdul Ghani Chisti of Bareela Sharif.

Attached to the spiritual centre (referred to as Darbaar, i.e. court) at Sial Sharif there is also a religious school (madrasa). Many other religious schools and mosques, scattered throughout Pakistan, are affiliated to the Darbaar of Sial Sharif. The Darbaar at Sial Sharif is closely linked to many other spiritual centres, including the Darbar at Bhera Sharif.

Sial Sharif is a village in the Sargodha District of Punjab, Pakistan. It is located in Sahiwal Tehsil and lies 48 km (30 miles) away from the city of Sargodha, about midway on the Sargodha-Jhang road.

To this day, the Islamic spiritual tradition is very much alive in this (Nizami) branch of the Chishti order. Its barakah (spiritual influence, blessing) is experienced by tens of thousands of disciples and visitors. Every Friday, scores of devotees travel long distances just to attend the Jumu'ah prayer there and obtain some blessings from the Holy Shrine.

6 PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

6.1 General

Public Consultation refers to the process by which the concerns of the various stakeholders and local community who have a plausible stake in the environmental management and associated impacts of the project or activity are ascertained with a view to taking into account all the design and construction concerns in the project activity as appropriate. According to the IEE and EIA Review Regulations 2000 (Amended 2022) public consultation is mandatory for any socio-economic environmental study for the commencement of any project. The objectives of this process were to:

- Share information with stakeholders on the construction of the aforesaid water supply schemes, filtration plants & RO plants and expected impacts on the physical, biological and socio-economic environment of the project area.
- Understand Stakeholder`s concerns regarding various aspects of the project, including construction and installation of the project components and the likely impacts of the construction related activities and operation of the project.
- Understand the perceptions, assessment of social impacts and concerns of local residents of the Sargodha division.
- Disclose information about contact offices/ officers for any complaints/queries.
- Provide an opportunity to the public to provide valuable suggestions in the project design in a positive manner; and
- Reduce the chances of the conflicts through the early identification of controversial issues and consult them to find acceptable solutions.

This EIA Report includes all the comments, which were taken into account during the social survey and preparing the definitive development concept for the installation and operation of aforesaid project. Public Consultation performas is attached as **Annex-VI.**

6.2 Methodology

On the basis of the project location a survey plan was developed in order to gather details of the current socio-economic norms and activities. The survey plan was developed under the supervision of Environmental Expert.

6.3 Identification of Stakeholders

All the people who are directly or indirectly affected or concerned with the project are stakeholders. Besides the living population of the surrounding areas, some other stakeholders were identified and contacted which are enlisted below. They are the key players including; residential community, labors present in the study area in the vicinity of the proposed project area, public and government offices, schools, universities, hospitals, hotels, international agencies and the NGO`s. Not only published material, brief or other literature were obtained on request, but also noted their views and the concerns, in an official capacity as well as on the personal basis. Project Affected Persons (PAP`s); includes the settled families, shopkeepers, vendors etc.) And employees of the commercial entities. PAP`s are of two types, for instance:

6.3.1 Direct Stakeholders

Direct impact will occur on the local community due to the installation of filtration plants at the proposed locations, land use and resettlement plan will be implemented during the construction phase of the project in order to mitigate the aforesaid short term impact effectively.

6.3.2 Indirect Stakeholders

Indirect impact will occur on those who are living or doing business within a Project Area of Influence (AOI). In the case of aforesaid project, the citizens of Sargodha division will get opportunities of being employed. So, in the early development stages and during the operational phase the people will be benefited. Indirect respondents include:

- Government agencies responsible to deal and supervise the project related activities.

- Government agencies directly, indirectly or widely involved in the execution and monitoring of the aforesaid project.
- Government Departments such as; Field Office Environment (Sargodha) divisions, Public Health and Engineering Department (PHED), Local Government Bodies had been consulted and considered as indirect stakeholders.
- Workers of political, cultural, religious or social scientific bodies, directly or indirectly are related to the project.

6.4 Public Disclosure

Public disclosure is the outcome of all such activities where the public is involved at least in the information sharing process. This is an integral part of the process. So, before the proponent applies for NOC to the Punjab-EPA. This disclosure will be distributed properly among all stakeholders. It is the responsibility of the proponent and the consultants to display a public disclosure document in prominent places where community has easy access.

6.5 Consultation Process

Information disclosure, public consultation and discussion regarding the various aspects of the project with the people of the area are necessary. This process is intensified during the EIA Studies and rounds of Public Consultation were held with local community and various government departments as listed below. Surveys were carried out in order to investigate physical, biological and socio-economic resources falling within the immediate AOI of the project. Primary data collection included:

- Data collection regarding the socio-economic condition of study area.
- Pre-testing of socio-economic survey tools in the field.
- To consult the locals for collection of information on biological environment.

Various meeting with the stakeholders were held in order to fulfill the following objectives:

- Share information with stakeholders on the proposed project and expected impacts on community in the vicinity of the project.

- Understand Stakeholder`s concerns regarding various aspects of the project, including the existing condition of the upgrading requirements, and the likely impact of construction & installation and operational activities.
- Provide opportunity to the public to influence the project design in a positive manner.
- Obtain local and traditional knowledge, before decision making.
- Increase public confidence about the proponent, reviewers and decision makers.
- Reduce conflict through the early identification of controversial issues and work through them to find acceptable solutions.
- Dissemination of information through discussions, education and liaison.
- Documentation of information narrated by the stakeholders and mitigation measures proposed by the stakeholders.
- Incorporating the public concerns and their address in the EIA and eliciting their comments and feedback.
- Create a sense of ownership of the proposal in the mind of the stakeholders.

6.6 Consultation with Officials

Following offices of government departments were consulted by the socio-environmental team of the consultants and concerned details about the project were noted down through personnel interviews, group meetings, etc. in their offices, for instance see table 6.1 below:

Table 6-1: Views of Government Officials about aforesaid Project

Sr.No	Participant	Designation	Concerns/Remarks
Public Health Engineering Department (Sargodha)			
1.	**Anwar ul Haq Toor**	Executive Engineer (XEN)	Following recommendations were suggested by the PHED • Energy Consumption must be limited up to the extent for the operation of filtration plants.

Sr.No	Participant	Designation	Concerns/Remarks
			• Usage of Solar panels and other renewable sources will be effective in terms of energy conservation for the said project. • Assistance at the site will also be provided by the PHED.
Town Municipal Administration (Bhalwal)			
2.	**Aqeel Awan**	Municipal Officer (TMA) 0315-3389323	Following measures should be adopted while designing the proposed project. • Solid waste should be managed properly during the construction of filtration plants. • Mechanical equipment`s should be serviced and monitored on monthly basis. • The social concerns should be addressed accordingly, if any.
Public Health Engineering Department (Bhalwal)			
3.	**Arshad Sandhu**	Sub Engineer (PHED)	Following measures should be adopted while designing the proposed project:

Sr.No	Participant	Designation	Concerns/Remarks
			• Solid waste should be managed properly from the filtration plants. • Pipes should be used of adequate strength to avoid leakage. • Air pollution should be controlled from the generators. • Traffic should be diverted properly to avoid blockages and • Dust should be controlled due to excavation during construction activities by sprinkling of water on daily basis.
Public Health Engineering Department (Sargodha)			
4.	**Mohammad Aslam**	SDO (Sub Divisional officer) PHED 0300-6003313	• The maintenance of the filtration plants must be the main focus of the authority for the long term provision of potable water to the residents of Sargodha division.

6.7 Consultation with Beneficiaries

In addition, to the use of direct methods to evidence the response of the various stakeholders in the targeted population residing in study area was ascertained by conducting a sample survey, through specially formatted questionnaires (attached in the Annex- of this EIA report). Questions posed to the public were related to creation

of possible impacts, adverse impacts and beneficial impacts, including; employment opportunities, income generation activities, change in living standards and provision of the basic amenity.

Personnel views of the respondents on the installation of the filtration plants and water supply schemes by Punjab Aab-e-Pak Authority (PAPA) were noted. Possible disturbance to the residents near the AOI and infringement of their privacy were also recorded. The various rounds of public meetings and consultations were arranged in project and study area. The objectives of consultation with the affected persons are given as follows:

- To disclose the proponent plan for the construction of the proposed facilities.
- To share information on the design and specifications of project work.
- To analyze the expected impact on the socio-economic environment.
- To understand their concerns regarding various aspects of project commencement.

6.8 Views, Concerns and Suggestions of Various Stakeholders

The major socio-economic concerns and problems of the affected persons of various communities along with their main concerns and remarks are compiled in the table below:

Table 6-2: Views and Concerns of Stakeholders

Sr#	Respondents	CNIC/Contact Nos.	Concerns
1	**Karam Altaf**	**38202-1220145-0**	During the survey in the study area following concerns of the local community were noted: • Air pollution should be controlled effectively such as emissions generated from power generating and construction activities.
2	**Muhammad Tariq**	**38201-8386600-7**	
3	**Qaiser Abbas**	**38202-1263003-5**	
4	**Jamshaid Khan**	**0344-8185581**	
5	**M. Naseem**	**0307-7172160**	
6	**Ghulam Rasool Parcha**	**38302-1070721-3**	

Sr#	Respondents	CNIC/Contact Nos.	Concerns
7	Haji Muhammad Iqbal	38201-2380136-3	• Dust should be catered of during construction activities by regular sprinkling of water. • Locals should be preferred for the job opportunities. • Solid waste should be managed effectively by adopting the standard practices of the area. • Cleanliness of the area should be ensured. • An effective EMMP should be designed and enforced with true spirit. • Health of the workers should be ensured. • Planation should be carried out at extensive scale. • Construction activity should be carried out during day hours. • Noisy activities should be confined. • Workers should be hired from local community.
8	Muhammad Hussain	38201-1151721-3	
9	Shah Muhammad	38201-5739354-1	
10	Amir Shehzad	0304-4182312	
11	Muhammad Tahir	38201-3961447-3	
12	Ehsan Badar	38201-5343625-5	
13	Tasawar Iqbal	38201-2620398-5	
14	Dilawar Hussain	38201-2804608-7	
15	Khuda Bakhsh	38201-5179680-1	
16	M. Shafique	0300- 4663214	
17	Muhammad Ahsan	38201-7601531-9	
18	Haji Sardar	38201-9320279-9	
19	M.Tasbeel	0346-0144498	
20	Faseeh Zafar	38403-2868508-7	
21	Muhammad Sajid	38403-1146865-3	
22	Muhmmad Ahmed	384038731264-5	
23	Usman Akram	0310-7475700	
24	Hafiz Ghulam Mujtaba	0306-2549039	
25	Asad Ali	38403-204504-9	

Sr#	Respondents	CNIC/Contact Nos.	Concerns
26	Ahmad Butt	38403-1659244-1	
27	Ahmed Sher	0302-6728531	
28	Tariq Mehmood	38403-805614-1	

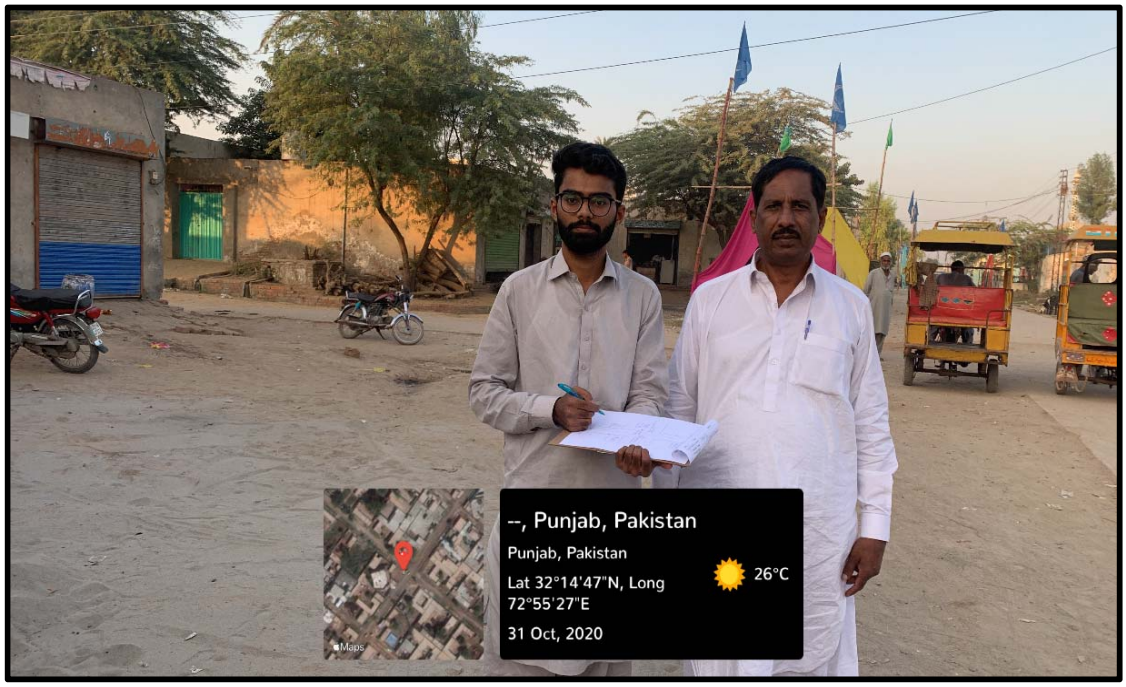
Pictorial view of Public Consultation is as follows:

Public Consultation with PHED (XEN)

Consultation with Government officials regarding the aforesaid project

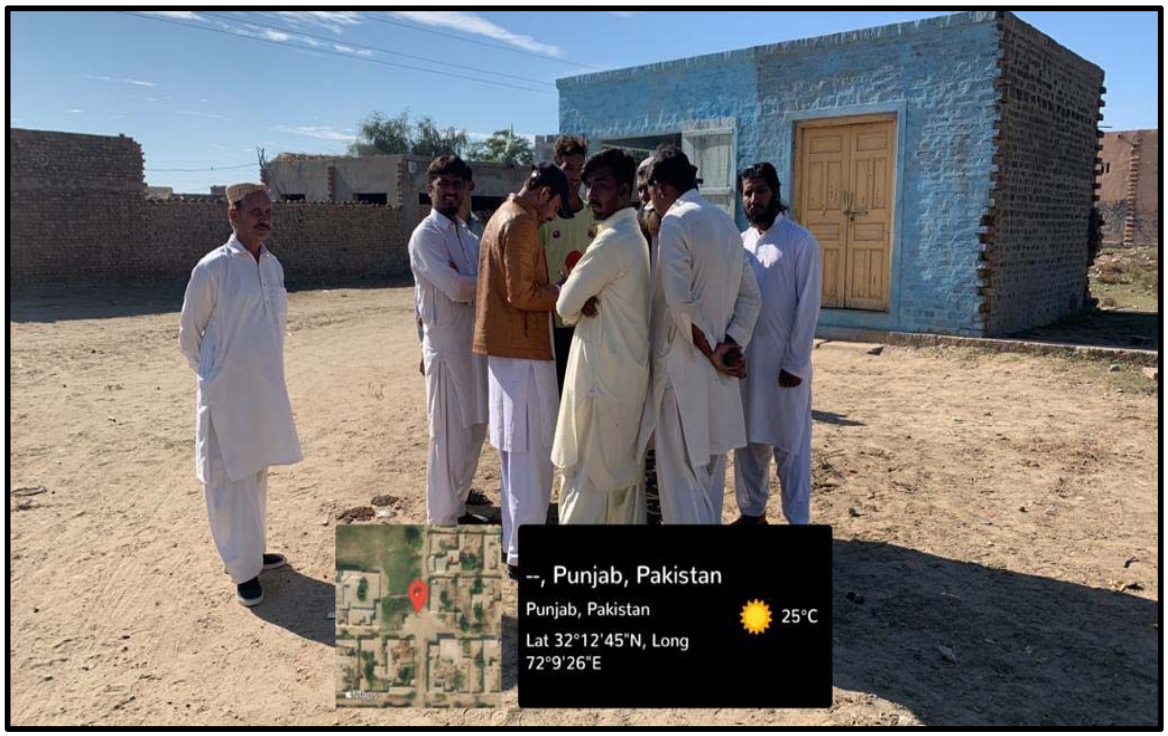
Consultation with Government Official Regarding Aforesaid Project

Public Consultation in project vicinity of Aforesaid project

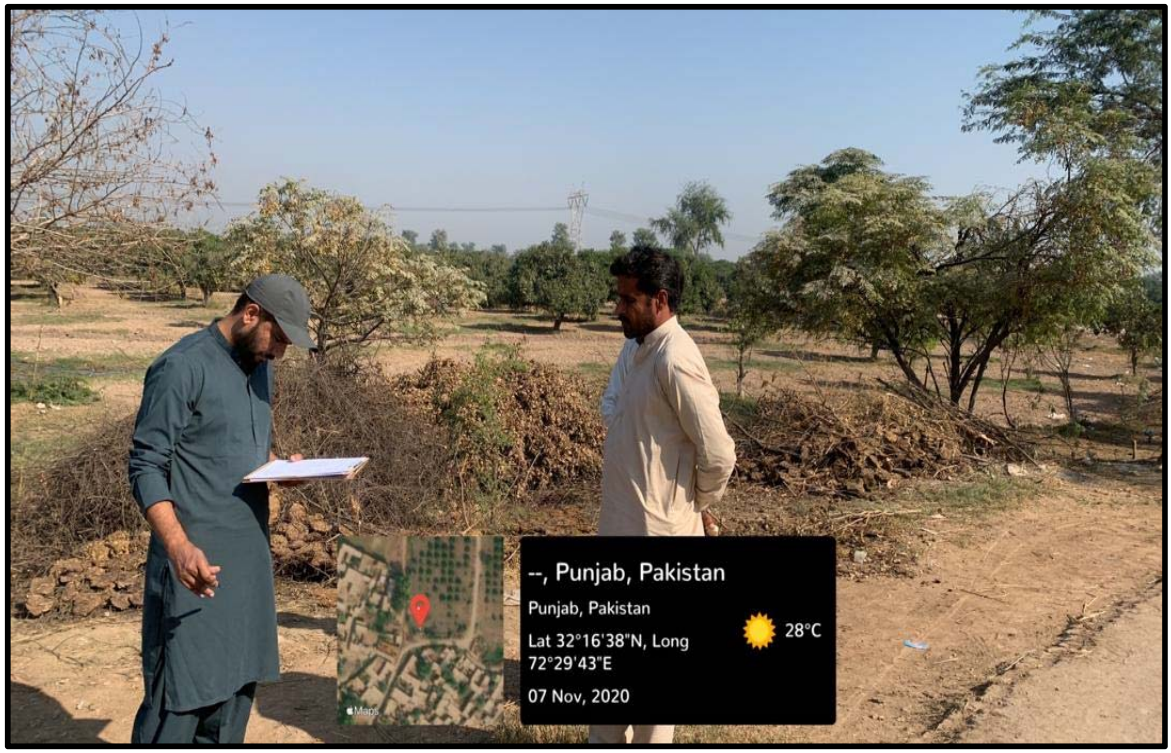


Consultation with Local Residents Regarding Aforesaid Project

Consultation with local residents regarding aforesaid project



Consultation with local residents regarding aforesaid project



Consultation with local residents regarding aforesaid project

6.9 Addressing Public Concerns

The best mechanism of effective communication between the community and the proponent is by the nomination of the Company Representative and all the issues/concerns of the community must be for future reference. This representative may be the member of the Grievances Redressed Committee (GRC).

6.9.1 Grievances Addressed Committee

Grievances Redressed Committee (GRC) will be formulated by the proponent to address to address the concerns of the locals during the construction as well as during operational phase. The main role of the GRC will be to resolve the issues of the community associated with aforesaid project, if any.

7 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION MASURES

This section presents the screening process that identifies the environmental aspects and makes assessment of impact of different activities during the pre-construction, construction and operation phases of the proposed installation of water filtration plants in the mentioned villages of the Sargodha division. The screening process has been a thorough review of literature, primary as well as secondary baseline data, and expert judgment, made assessment of the potential impacts of the said activities on the physical, biological and socioeconomic environment of the project. Mitigation measures have been proposed to reduce, minimize or compensate for the identified potential negative impacts.

The proposed project will involve the construction and operation phase impacts associated with the activities of the project at the proposed site. The environmental impacts of the project is identified situation analysis which are based on the following:

- Physical environment, particularly siting of the project
- Biological environment and
- Socio- economic environment

This section of the EIA report presents an evaluation of the screening process and identifies the existence, if any, of significant environmental impacts during the different phases of the project and provides, if necessary, the mitigation measures that may have to be adopted in order to reduce and minimize the negative impacts.

7.1 Impact Assessment Methodology

Potential environmental impacts of the proposed project on different features of micro and macro- environment pertain to installation of water filtration plants. The screening process proceeds by identifying the potential environmental impacts at pre-construction, construction and operational stages of the project and identifying the residual impacts after adoption of mitigation measures that may be needed at the outset of activities. The impacts on environmental resources from the proposed project will be short-term and temporary in nature.

Environmental impact of a project is worked out using various factors, so that an environmental management plan can be evolved to take mitigation measures.

A systematic strategy was developed to provide an assessment of the likely impacts on the micro and macro environment of the project site. The strategy includes:

- Review of general guidelines;
- Identification of potential environmental impacts by conducting survey, public consultation and using checklists;
- Assessment of the intensity and significance of potential impacts by obtaining expert opinion and carrying out environmental analysis;
- Defining mitigation measures to reduce impacts to as low as practicable;
- Predicting any residual impacts, including all long-term and short-term, direct and indirect and beneficial / adverse impacts.
- Monitoring of residual impacts.

7.2 Objectives of Screening

The objective of screening is identification of the adverse as well as beneficial impacts and then mitigating the effect of adverse impacts up to acceptable limits or within PEQ`s. Following are the objectives of screening out all significant environmental and social impacts:

- To find different alternatives and ways of carrying out the project activities;
- To enhance the environmental and social benefits of the project;
- To avoid, minimize and remediate adverse impacts and
- To ensure that residual adverse impacts are kept within acceptable limits.

7.3 Magnitude

The magnitude of the adverse impacts associated with the establishment of the aforesaid project includes; the type of impacts project commencement will cause to its immediate environment and social structure. It could be direct, indirect and cumulative.

7.3.1 Immediacy

Immediacy of the impact focuses on the following parameters:

- Temporal extent (during installation and operation of filtration plants)
- Spatial extent (local or widespread)

7.3.2 Sustainability and Reversibility

Sustainability and Reversibility of the impact focuses on the following parameters:

- Implementation of mitigations (Fully / Partially)
- Monitoring (Fully / Partially)

7.4 Purpose of Mitigation Measures

The basic purpose of mitigation measures is to reduce the impacts associated with the socio – economic environment up to maximum possible extent for construction / installation of the RO plants, Pre-filtration plants and water supply schemes in the Sargodha Division. The mitigation measures are suggested based on the following parameters:

7.4.1 What is the Problem?

By the commencement of the aforesaid project, the ever-increasing water demand in the mentioned villages of Sargodha division needs to be catered in the near future along with provision of potable water to the community. The study area is commercial and residential in nature and is located at adequate distance from various sensitive receptors. In addition, to the noise and fugitive dust emissions anticipated to be generated during the construction phase, solid waste management and disposal issues may arise at the project site.

7.4.2 When problem will occur and when it should be addressed?

The impacts from the aforesaid project activities will occur during the installation and operational phase due to the civil works involved and the people residing in the project area. These issues include; noise generation, fugitive dust emission, solid waste

management, construction debris management, top-soil removal, health and safety issues and change in the geometric features of area. These all problems should be addressed on-site where they are being generated, to avoid the residual or adverse impacts.

7.4.3 Where problem should be addressed?

The problem will be generated from site development and operation of aforesaid project activities. So, it should be addressed on source i.e. site at within the same time frame.

7.4.4 How the problem should be addressed?

Proper mitigation measures will be provided according to the nature of the impacts / problems. For example, against dust emissions sprinkling of water may be done on regular basis, for solid waste proper solid waste management and disposal practices may be adopted and to manage the construction debris from the aforesaid project activities.

7.4.5 Ways of achieving mitigation measures

- The proposed project design will follow the principle of sustainable development;
- Improved management and monitoring practices;
- By providing adequate mitigation measures for air, noise and land pollution during constructional and operational phases of the project and
- Replacement / Relocation / Rehabilitation

7.4.5.1 Changing in Planning Design

The proposed project is being constructed in Sargodha division of Pakistan and no sensitive area, or preserved natural resource is present which could impacted due to the commencement of aforesaid project as it is located in commercial area and residential area. No replacement, relocation and rehabilitation will be required for the commencement of the aforesaid project.

There is no endangered and threatened species has been reported in the project & study area. Moreover, there is not any settlement or infra-structure present on-site

that will be dislocated or dismantled due to the establishment of aforesaid project. Hence, there is no need to change the location of the project.

The anticipated impacts had been reduced significantly by adopting better management activities, as it will be carried out for betterment of the society.

7.4.5.2 Compensation in Monetary Terms

Due to the establishment of the aforesaid project at the proposed locations, some of the vegetation will be removed during the construction activities. No impact on the geography / landscape of area will be envisaged due to the installation of aforesaid project. However, there is no protected or environmentally sensitive area present within 5.0 Km vicinity of the project area periphery that could be impacted. Hence, no compensation in the monetary terms will be required. However for the removal of one tree from the project area, 2-3 trees will be planted as the compensation.

7.4.5.3 Replacement, Relocation and Rehabilitation

The proposed project is being constructed at the proposed location in Sargodha Division, and no sensitive area, human population or preserved natural resource is present which could be impacted due to the commencement of aforesaid project as it is located in commercial and residential area and the purpose of project is to provide potable (safe drinking) water to the residents of the mentioned districts. Therefore, no major replacement, relocation and rehabilitation will be required for the commencement of the aforesaid project activity.

7.4.5.4 Improved Monitoring and Management Practices

In order to mitigate negative impacts envisaged due to the aforesaid project will require adaptation of some improved monitoring and management practices which are covered in detail in the given EMP plan in this EIA report.

7.5 Evaluation of Residual Impacts

Incorporation of suggested mitigation measures may reduce the magnitude of the environmental impacts of abovementioned project but sometimes, it may fail in bringing them within the acceptable limits. This step refers to the identification of the anticipated remaining impacts after mitigation measures have been applied. It can be concluded in view of these reasons that the selected site is best suited for implementation of aforesaid project and the practices adopted for completion of the

aforesaid project activities. The said project will pose not any adverse impact or threat on any component of the environment. The impact assessment criteria are given below along with their impacts:

Table 7-1: Impact Screening Criteria

Impact	Criteria
No Impact	When the proposed activity will have no impact on biotic and abiotic factors.
Long Term	When the impact is of high intensity with high spread and high duration or of high intensity with medium spread and medium duration
Moderate	When the impact is of moderate intensity with high spread and high duration or of high intensity with low / moderate spread and low duration.
Short Term	When the impact is of low intensity but with moderate spread and moderate duration or of moderate intensity.
Insignificant	When the impact is of low intensity, low spread and low duration.

The evaluation of impacts has been carried out on the basis of developing impact matrix, in which impacts have been rated on the basis of their significance. For rating impact significance, the following criterion has been developed.

The following scale has been used for the evaluation of impacts:

LA = Low Adverse (low / short-term damage to the environment)

MA = Medium Adverse (Moderate damage to the environment)

HA = High Adverse (severe damage to the environment)

LB = Low Beneficial (Less beneficial to the environment)

MB = Medium Beneficial (Moderately beneficial to the environment)

HB = High Beneficial (Highly beneficial to the environment)

N / A = Not Applicable

O = Insignificant / No Impact

Table 7-2: Environmental Impacts Evaluation Matrix: Installation Phase of Filtration Plants

Sr. No.		Physical Environment							Biological Environment			Socioeconomic Environment								
	Environmental Components / Project Activities	Topography	Soil Erosion/Contamination	Landscape	Air Quality	Hydrology and Drainage	Surface Water Quality	Groundwater Quality	Habitat Change	Vegetation	Fauna Movement	Public Health & Safety	Disruption of Public Utilities	Employment	Population Disturbance	Social Disorder	Cultural/Religious Values	Noise & Vibration	Local Economy/Benefits to Community	Traffic Management
1	Vegetation Clearing	O	LA	LA	LA	O	O	O	LA	LA	O	O	O	MB	LA	O	O	LA	O	LA
2	Construction camps	O	LA	LA	LA	O	O	O	O	LA	LA	LA	O	LB	LA	LA	O	LA	LB	O
3	Excavation operations	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	MB	LA	O	LA	MA	LB	LA
4	Transportation of construction materials	O	LA	O	MA	O	LA	O	O	O	LA	MA	O	MB	O	LA	O	MA	LB	MA
5	Use of construction materials etc.	O	LA	O	LA	O	LA	LA	O	O	O	LA	LA	O	O	O	O	LA	LB	O
6	Earthwork/concretework operations	O	LA	LA	LA	LA	LA	O	LA	O	LA	LA	O	MB	O	O	O	MA	MB	O
7	Solid Waste Management	O	LA	O	LA	O	LA	LA	O	O	O	LA	O	MB	O	LA	O	O	O	O

Legend:

O-Insignificant/No Impact, NA – Not Applicable, LA- Low Adverse, MA-Medium Adverse, LA – Low Beneficial, MB- Medium Beneficial

Table 7-3: Environmental Impacts Evaluation Matrix: Operational Phase of Filtration Plants

Sr. No.		Physical Environment							Biological Environment			Socioeconomic Environment								
	Environmental Components / Project Activities	Hydrology / Drainage	Soil Erosion/ Quality	Surface Runoff	Air Quality	Landscape	Surface Water Quality	Groundwater Quality	Habitat Change	Vegetation	Fauna Movement	Public Health & Safety	Land Use	Employment	Community Development	Economic Activity	Communication System	Noise & Vibration	Local Economy/Benefits to Community	Traffic Management
1	Energy Conservation	O	O	O	LA	O	LA	O	O	LA	O	HB	O	HB	MB	MB	HB	LA	HB	LA
2	Impact of Backwash water	O	O	O	LA	O	LA	O	O	O	LA	MB	O	HB	MB	HB	HB	LA	HB	O
3	Air Emissions	LA	O	LA	LA	O	LA	O	O	O	LA	LA	O	HB	O	LA	LA	LA	NA	LA
4	Maintenance of equipment's & machinery	O	O	O	LA	O	LA	O	O	O	LA	MB	O	HB	M	HB	HB	LA	HB	O
5	Leakage from installed pipes	LA	O	LA	LA	O	LA	O	O	O	LA	LA	O	HB	O	LA	LA	LA	NA	LA

Legend:

O-Insignificant/No Impact, NA – Not Applicable, LA- Low Adverse, MA-Medium Adverse, LA – Low Beneficial, MB- Medium Beneficial.

7.5.1 Impact Screening Checklist

The impact screening checklist is developed to screen out potentially insignificant environmental and social impacts from potentially significant adverse environmental and social impacts during planning & designing, construction & installation and operational phases of the project. The objective of impact screening process is to assess the significance of issues related to the air, water, noise, soil, transportation, civil work, communication, the hazards and external constraints. The beneficial and adverse impacts of project during planning & designing, renovation & installation and operational phases are identified based on their duration, location, frequency, extent, significance and reversibility. The impact of each activity on various environmental parameters is given below:

Sr.No	Environmental Component	Impact Characteristics												
		Duration		Location		Frequency		Extent		Significance			Reversibility	
		Long	Short	Direct	Indirect	Cont.	Intermittent	Wide	Local	Large	Moderate	Minor	Rev.	Irrev.
Beneficial Impacts														
1	Employment Opportunity	◙		◙		◙		◙			◙		◙	
2	Economic Uplift in Country	◙		◙			◙	◙			◙			◙
3	Tree Plantation	◙		◙		◙			◙		◙		◙	
4	Water Quality	◙		◙		◙		◙		◙			◙	
5	Infrastructure development	◙		◙		◙			◙	◙				◙
Adverse Impacts														
1	Air Pollution		●	●			●		●			●	●	
2	Wastewater		●	●		●			●			●		●
3	Solid Waste/Construction Debris		●	●		●			●		●			●
4	Health and Safety		●		●		●		●			●		●
5	Energy Consumption		●	●			●		●		●			●

7.6 Impact and Mitigation Management

Purpose of mitigation is to evade, reduce or balance the expected antagonistic effects in suitable way and to integrate these for devising environmental management strategy or plan. At every stage of project, mitigation plan for all the adverse impacts should be predicted to find out the best alternative. The objectives of mitigation are to:

- Invent of best situation, better alternatives and ways to reduce the adverse environmental and social impacts in immediate surroundings.
- To improve the environmental and societal payback of project.
- To prevaricate, remedy / reduce and pro – vocative impacts.
- To certify that remaining negative influences are kept within permissible limits.

In this part of EIA Report several complications may occur which will include; cleanliness, environmental health & safety, societal & environmental managing, inspection, tools & apparatuses, etc. During operational activities, influx of workers and impacts of operational activities have been deeply elaborated.

7.7 Approaches for Mitigation Measures

Following approaches may be used to mitigate the impacts of the project:

Table 7-4: Approaches for Mitigation Measures

Avoid: Change of route or site details, to avoid damage to important ecological or Archaeological features.
Replace: Regenerate similar habitat of equivalent ecological value in different location.
Reduce: Filters, noise barriers, dust, enclosures, visual screening, wildlife corridors and changed time of activities to reduce the impact.
Restore: Site restoration at the end of the operational activities.
Compensate: Relocation of displaced communities, facilities for the affected communities, financial compensation for the affected individuals, etc.

7.8 Expected Positive Impacts of Aforesaid Project

The major positive impacts of project are given as under:

- Direct employment of approximately 150 to 200 local people during construction phase and direct employment of approximately 100 to 125 employees is anticipated during the operational phase. The development will also generate indirect employment. This represents a significant and positive, both direct and indirect, long term impact.
- Other than providing direct & indirect employment and revenue source, the development shall lead to an improvement of infrastructure of the town area. These are important direct and lasting positive impacts on the community.
- Socioeconomic conditions of the area will be enhanced along with the overall boost to the environment of the project area.
- The project activity will fulfill the growing demand of potable drinking water in Sargodha division of Pakistan.
- This project is directly beneficial for the Residents Sargodha division as potable drinking water will reduce the chances of pathogenic diseases such as typhoid, dysentery, hepatitis etc.
- At the end of the construction phase, 02 – 03 times of removed trees will be planted in the designated green areas, this will enhance the aesthetic beauty of the plot areas.
- Availability of water at the designated times in the filtration plants will reduce the unnecessary loss of water in these divisions.
- Due to aforesaid project sustainable development goals in Pakistan will be achieved on a minor scale with the passage of time.
- With the construction of the proposed project and subsequent development of infrastructure in the area, the lifestyle of the community will be improved. This is considered a positive impact.

7.9 Adverse Environmental Impacts and Mitigation Measures

This section identifies the potentially significant and in-significant adverse environmental and social impacts anticipated during the planning & designing, construction & installation and operation phases for establishment of aforesaid project. Appropriate mitigation and management measures, where applicable, have

also been suggested to reduce the severity of anticipated impact up to the extent possible.

7.9.1 Impacts and Mitigation Measures during (Design / Pre – Construction Phase)

1) Inadequate Design

Inadequate design may affect the proposed project due to deficiencies like improper estimation, pumping equipment and accessories, selection of improper pipe material and accessories vulnerable to leakages. At the design stage, correct water demand by considering population corresponding to the Project Area will be calculated. The selection of machinery will be for at least 15 years for smooth functioning of the filtration plants.

Nature of Impact

The nature of proposed impact will be direct, low, long-term and hence significant.

Mitigation Measures

The leakages will be controlled by appropriate selection of materials for pipe and accessories suitable for local conditions and provision of optimum pipe sizes. Life time of machinery will be 15 years for proper functioning of filtration plants in the long run.

2) Inadequate design of Tube well components

Design of tube-well components must be appropriate for the proper functioning of the water supply schemes in the mentioned districts.

Nature of Impact

The impact is moderate, adverse and permanent in nature.

Mitigation Measures

Design of the strainer of the tube well must be accurate to ensure the proper functioning of the tube well and water supply schemes. Depletion of water table must also be accounted in this respect.

3) Inadequate Buffer Zone

Inadequate buffer zone around the filtration plants may cause inconvenience to the local population due to the running of heavy-duty pumps resulting in noise levels and odor generated by backwash water.

Nature of Impact

The magnitude of this impact is high, adverse and permanent in nature.

Mitigation Measures

The mitigation measures will include:

- Provision of buffer zone in the form of raised walls / plantation and round the clock maintenance in the form of oiling of parts producing noise and vibrations.
- Landscaping and plantation will improve the aesthetic value and ecological habitat of the project area as well as reducing the impact of noise on the surrounding environment.

4) Land Use

The present land use of the area available for the construction of the proposed filtration plants at different locations is barren land. The remaining land other than the built-up structures will be utilized for landscaping and tree plantation.

Mitigation Measures

A proper landscape plan will be designed for the proposed action to minimize the impact. Landscaping and plantation will improve the aesthetic value and ecological habitat of the project area as well as reducing the impact of noise on the surrounding environment.

7.9.2 Impacts and Mitigation Measures during Construction / Installation Phase of Filtration Plants

Construction activities will involve acquisition of small pieces of land, establishment of contractor`s camps, generation of dust, noise, soil erosion and contamination, waste water and solid waste generation from labor camps. Each impact of

construction activities and their mitigation measures accordingly is discussed here under:

1) Impact of Earth fill Material

To raise the plinth level of selected plots to protect them against flooding, soil would be needed to collect from nearby areas for filling. This may result in slope failure and water ponding.

Nature of Impact

The magnitude of this impact is moderate negative and temporary in nature.

Mitigation Measures

A small quantity of earth fill material will be required for raising plots plinth level, so existing sources for earth fill material will be used to minimize the impacts on natural environment of the area. In addition, earth will be leveled after borrow of material to avoid any slope failure and ponding of the area during rain.

2) Topography and Geology

There will be area requirement for the construction of water treatment plants, so minor change in topography will be expected.

Nature of Impact

This impact is considered negative of minor magnitude.

Mitigation Measures

All the mitigation measures mentioned below should be taken in order to minimize the impacts on topography in the Project Area. These measures include, but are not limited to the following:

With the construction of proposed filtration buildings and by providing plenty of plantation the topography of the area will be improved. Plantation of trees in the plain areas will be carried out to increase aesthetic value of the area.

3) Impact of Laying of Water Pipelines

This project involves laying of water supply lines (i.e. water distribution network pipelines) from water filtration plants to supply water to the residents of the area.

Mitigation Measures

The lying of water supply lines should be as per standard specifications. Fence should be installed as protection during lying of pipelines to avoid access of people and animals to pipeline trenches.

4) Impact of Contractor`s Camps

Contractor camps will be established near the Project site to carry out the Project activities. Though the number of labor and size of camp will not be large, even then this will have an impact on the surrounding environment. The transportation of construction material, fuel, construction plants and daily use items may also create disturbance to the local community.

Nature of Impact

The magnitude of this impact is moderate adverse and temporary in nature.

Mitigation Measures

The Contractor camp size should be as per standard specifications and should be established at least 500m away from settlements to avoid/minimize the construction impacts. Traffic signs and safety warnings will be installed at Project site to avoid disturbance to local communities. In addition to that the night time deliveries will also be restricted and normal working hours will be observed for such deliveries.

5) Soil Erosion

The project area is plain with paved road structure. Soil erosion and contamination may occur on roadside, at contractor's camps due to the following likely impacts:

- Excavation process can destabilize the surrounding land surface, particularly if excavated area is left unfilled for a long time, which may lead to rainfall induced soil erosion.

- Leakages of oils, lubricants, chemicals and other similar substances from their storage sites and from engines of the generators, machines, equipment`s and vehicles.
- Non – provision of septic tanks with the temporary work site toilets, constructed for the labors and others, can contaminate the receiving soils because of raw nature of the effluents; and
- Also washing of the machinery and equipment without proper drainage of the washout water can adversely affect the soil quality.

Mitigation Measures

Mitigation measures will include:

- Ensure that surface run-off controls are installed and maintained so as to minimize erosion.
- Ensure adherence to the speed limit of 40 km/hr. on access roads.
- Ensure that no contaminated effluent is released in to the environment.
- Ensure spills are avoided during fuel and oil transfer operations. Appropriate arrangements, such as concrete base or drip pans, should be used to avoid spills.
- Ensure that the maintenance of vehicles and other equipment takes place only in designated areas underlined with concrete slabs and a system to collect runoff in to mud pit.
- Ensure fuels, oil and chemical storage is daily checked for leakage.
- Ensure that shovels, plastic bags, sand bags and absorbent materials, are kept available near fuel and oil storage areas.
- Ensure that operating vehicles are checked regularly for any fuel, oil or battery fluid leakage.
- Ensure that leak / spill record is maintained for each vehicle and such vehicles are operated after proper repair.
- Soil contaminated by minor spill (covering an area up to 1 m^2 and 7.5 mm deep) will be collected and disposed at burn pit.
- Ensure that soil contaminated by moderate spills or leaks (up to 200 liters) is controlled using shovels, sand and mud. The contaminated soil if any will be removed from the site and disposed off at landfill or burn pit as required.

- Loose soil and side slopes will be planted with grass to retain the upper soil and reduce the rainwater velocity.
- Rainy season should be avoided for earth fill as far as practicable.
- Heavy machinery movement should be avoided where the structure of the soil is expected to be destroyed in agriculture areas of the project, and
- A plantation program for grassing slopes will be launched to stabilize soil structure and to reduce soil erosion.

6) Impact of Dust

Air quality is expected to deteriorate locally at active construction sites due to mainly fugitive dust emission and exhaust emission from construction vehicles and equipment's, which will have short term but moderate impacts on local communities. Construction sites activities may generate soil disturbance in a small area and prone to open space for wind to pick up dust particles. Light construction machinery and vehicles will be used during the construction phase. This construction machinery will generate dust, smoke and other potential pollutants in the air.

Nature of Impact

The impacts are considered to be moderate adverse and temporary in nature.

Mitigation Measures

Dust control measures are important in the Project area; as the area is arid or semiarid, where soil can become extremely dry and vulnerable to transport by high winds. The dust control measures that are implemented at Project site will depend on the topography and land cover of that particular site and its soil characteristics and expected rainfall. The Contractor will be responsible to determine that which practice accommodate their needs according to specific site and weather conditions. The following is a brief list of some control measures:

- All sections of the access tracks that are prone to dust emission and where sensitive receptors are located within 500 m should be identified and marked on the map of the project area.
- Ensure that the access tracks which are prone to dust emissions and marked on the map should be maintained by water spraying daily.

- Regular water sprinkling will be carried out in nearby residential areas during earth fill and construction machinery movement.
- Ensure that all equipment, generators and vehicles used during the project are properly tuned and maintained in good working condition, in order to minimize the exhaust emissions.
- Ensure that dust emission at the construction sites is minimized by implementing best management practices.
- Air quality monitoring and analysis for NO_x, SO_x and PM will be done every month during the construction / installation phase.

7) Impact of Noise

Construction activities may increase noise levels at active construction sites particularly near residential areas. There are residential colonies where number of sensitive receptors may expose to the noise pollution. Noise impact on construction workers/ laborers may be avoided in case of loud noise by provision of adequate Personal Protective Equipment's (PPEs) like ear muffs, ear plugs, etc.

Nature of Impact

This impact is considered negative of minor magnitude.

Mitigation Measures

Following measures should be adopted to minimize the noise levels:

- Construction activities should be managed to minimize the impacts on nearby community.
- Noise barriers (paneled fencing) should be installed where possible to keep the noise levels within the permissible limits.
- Ensure prohibition of use of vehicle horns anywhere inside the fenced areas or on the access roads is strictly observed.
- Noise reducing devices (silencers and baffles) should be used for the construction machinery.
- Engines should be turned off when they are not in use.
- Contractor obligation is to use appropriate and fit machinery.
- Noise analysis should be done every month during construction phase.

8) Disposal of Mucking Material

Inevitable earthwork operations during construction will open scars on the land around the project area.

Nature of Impact

This impact is temporary and minor negative in nature.

Mitigation Measures

Mitigation measures will include landscaping, which should be given due consideration along the re-establishment of the local/indigenous vegetation. The excavated materials that are unsuitable for use will need to be stored, transported and disposed of appropriately at designated sites.

9) Accidental damage to Utilities in Excavated Areas

The excavation operations may result in accidental damage to existing utilities like Sui gas, telephone etc. causing inconvenience to the local people.

Nature of Impact

The impacts on the loss of resource are considered to be moderate adverse and temporary in nature.

Mitigation Measures

- Coordination between different utility departments shall be maintained to get the details of existing underground utilities before starting construction of the proposed project.
- The contractor will made arrangement to avoid any accidental damage to the utilities.
- Provision shall be made in the cost estimate for restoration / replacement of damaged utilities and relocation to minimize the adverse impact and restoration of excavated road to its original condition.

10) Impact on Aesthetic / Scenic Quality

The lush green crops and trees in field present a good scenic view of project area. But the project construction and operational activities (clearance of trees) may affect aesthetic / scenic quality of the area.

Nature of Impact

The impact is considered negative of minor magnitude.

Mitigation Measures

Efforts should be made to improve the aesthetics of the project site by plantation around the site.

11) Obstructions to Traffic Flow

Excavation operations for pipe laying may result in temporary blockage of some roads/streets, which may result in hindrance to normal traffic flow. The operation of excavator and movement of vehicles carrying construction materials will certainly hamper the existing traffic movement.

The impacts on vehicle travelers will include the following:

- Increase in traffic congestion; and
- Longer waiting times at intersections.

Nature of Impact

The impacts are regarded as adverse if measures are not implemented to mitigate and control traffic movements and routes.

Mitigation Measures

Mitigation measures to reduce transport and accessibility impacts during construction will be addressed as part of a detailed EMP to include the following traffic management measures.

- Inclusion of further access routes to facilitate the accessibility of vehicles and pedestrians to and from the proposed project areas.
- Close liaison with contractors to ensure minimal interruptions.
- Implementation of site speed limits along with introduction of speed humps.

12) Solid and Hazardous Waste

Construction activities such as excavation, lying of pipes, construction of operator rooms and construction of tube-wells etc. will generate waste materials like excavated soil and domestic waste from workers. Other types of waste that are likely to be generated during construction include:

- Recyclables - paper, cardboard, glass, plastic, wood, metals.
- Organic waste - food waste, vegetation; and
- Hazardous waste – including for example, chemical wastes such as coating substances, solvents, used chemical drums and used spill kit materials.

Any surplus construction waste will be sent to the nearby solid waste landfill site. Assuming that excavation and demolition will be kept to a minimum and considering the construction will only be temporary and will be disposed of to landfill.

Nature of Impact

The waste generated during construction would have a moderate, adverse effect and is temporary in nature.

Mitigation Measures

Construction debris and demolition material will not be allowed to accumulate during construction phase. All such material is to be disposed of on daily basis. Waste piles will only be allowed if the contractors meet the following requirement at the site:

- Pile only contains passive waste (e.g. wood, metal, plastic, dry concrete) and no food waste, hazardous waste or wastewater.
- Waste pile is controlled so that it does not spread and start to impede other activities and stays at a height that it does not become a safety hazard. Barricades may also be placed around the pile to delineate the safe distance for other workers.
- Waste piles are positioned so that they are not visible to the general public where they could have a negative visual impact.
- If the waste pile contains plastic, paper or other light-weight material it needs to be covered with a tarpaulin; and
- Liquid waste, such as grey water, sewage, slurry and other wastewater will be collected from source by a designated tanker and taken off-site for disposal at safe disposal facility.

13) Flora

Tree cutting is involved for land clearing for the installation of filtration plants. The conversion of agriculture land will have moderate negative impact on the floral species and vegetation. However, the impact will be minimized after the landscaping.

Mitigation Measures

The proposed mitigation measures will include:

- Incorporate technical design measures to minimize removal of the trees, if possible.
- Landscaping and plantation will improve the aesthetic value and ecological habitat of the project area.
- A landscape will be properly designed with provision of new trees/ plantations around the boundary, roadside and stretches of open land. The vegetation for the attenuation of air pollution would be most needed in the areas where ground level concentrations of the pollutants are expected to rise.

14) Fauna

During construction, any existing species of fauna could be affected by disturbance and fragmentation, as the construction area may represent a barrier to the species and result in the splitting up of populations. During the construction phase, there will

be adverse impact on the mammals, birds and reptiles of the area, due to the construction activities involving excavation, movement of labor, carriageway of goods and machinery to various sites along the project area.

Given that the species of fauna are thought to be present at low density, the number of individuals affected by the proposed Project is likely to be relatively low. Furthermore, the loss of this habitat would not constitute a large impact.

Nature of Impact

The magnitude of this impact is expected to be low adverse and temporary in nature.

Mitigation Measures

- The camps will be properly fenced and gated to check the entry of animals in search of eatable goods. Similarly, wastes of the camps will be properly disposed of to prevent the chances of eating by animals, which may become hazardous to them.
- Special measures will be adopted to minimize impacts on birds, such as avoiding noise generating activities during the critical periods of breeding.
- Staff working on the project should be given clear orders, not to shoot, snare or trap any bird; and
- The Contractor will decide to minimize the vibration, noise pollution through good engineering practices.

15) Impact of Transferrable Diseases

Presence of labor from outside at project site may pose hazard of communicable diseases, which can also spread to the surrounding community.

Nature of Impact

This impact is considered negative of moderate magnitude.

Mitigation Measures

Following must be ensured during project implementation:

- Ensure project staff interaction with local community is minimized.
- Ensure that field crew is medically screened before employed on site.

- Ensure that periodic awareness campaigns for HIV / AIDS are undertaken for the project staff.
- Ensure that guidelines are prepared and implemented to sensitize non-local laborers to local norms and customs in order to minimize cultural tensions.
- When operating in residential areas, display project contact details in prominent locations. This will give local residents a point of contact and should allow you to address any nuisance issues that may arise.

16) Health and Safety of Workers

The health and safety issues are associated with the operation of construction machinery and equipment and storage of flammable materials which may cause minor and severe injuries to workers. Moreover, concrete releasing agents and cleaning agents may cause toxic effects on the workers.

Nature of Impact

The magnitude of this impact is moderately adverse.

Mitigation Measures

- Occupational safety measures such as use of well-maintained machinery and equipment and training of workers in the construction safety shall be taken.
- Ensure provision of protective clothing for laborers handling hazardous materials, e.g. helmet, adequate footwear, gloves etc.
- The safety of the public at all stages of the construction will be ensured through appropriate public education and safety measures such as use of sign boards, barriers and flags and proper illumination at night.
- The flammable and combustible substances will be properly stored in designated areas and Material Safety Data Sheets (MSDS) will be used for proper handling.
- Firefighting equipment will be placed at an easily accessible place and inspected on regular basis.

17) Impacts of Heavy Machinery on Existing Road Networks

The plying of heavy vehicles on existing road network may result in air pollution (if unpaved roads), noise pollution due to tire-road friction especially near sensitive receptors (residential areas, school, mosque, health facility etc.), and damage to roads and traffic congestion.

Nature of Impact

The impact would be temporary and moderately negative in nature.

Mitigation Measures

- Any vehicle with an open load carrying area used for transport of potentially dust producing materials shall have properly fitted side and tailboards. Materials having potential to produce dust shall not be loaded to a level higher than the side and tail boards and shall be covered with clean tarpaulin in good condition.
- The Contractor shall not use any vehicles either on or off road with grossly excessive noise pollution. In case of built-up areas, noise mufflers shall be installed and maintained in good condition on all motorized equipment under the control of the Contractor.
- The traffic on the existing road shall be managed cooperation with the local traffic police department in order to avoid traffic accidents and congestions causing unnecessary delays.

18) Socio – Economic Impacts

In project area, no significant changes are envisaged in traditional lifestyle and occupation of local people residing in the nearby communities as it is being established at adequate distance from various sensitive receptors. The local people are rather benefited due to the provision of job opportunities. No impact is envisaged due to influx of workers as local will be preferred and hired for working. Social issues may arise which will cause minor negative impact on the social lifestyle of people. Moreover, health and safety related issues may arise during the construction activities. These impacts are in-significant can be further reduced significantly by adopting best management practices.

Nature of Impact

The nature of proposed impact will be direct, low, short-term and hence insignificant.

Mitigation Measures

Following mitigation measures will be adopted to reduce the socio – economic impact on the community:

- Good relations with local communities will be promoted by encouraging contractor to provide opportunities for skilled and un-skilled employment to the locals as well as on job training.
- In case of not hiring the locals, contractor will restrict his permanent staff to mix with the locals to avoid any social problems.
- The contractor should prefer hiring local labor from adjacent communities.
- The contractor will keep the copy of National Identity Card (CNIC) of his employees and will warn the workers not to involve in any anti-social activities otherwise they may face dire consequences.
- At the time of hiring the contractor must ensure that workers should be good repute.
- First aid kits having all the necessary first aid stuff will be available at site.
- Routine medical checkups of all the field staff including unskilled labor needs to be conducted by qualified physician and surgeon.
- Trainings of workers should be carried out for operating various constructional machinery, safety procedures should be adopted, environment awareness should be carried out, equip all workers with safety boots, helmets, and protective masks and monitoring for their proper and sustained usage will be carried out. In case of accidents, contractor will provide free medical treatment to the community.
- The contractor will be responsible for sensitivity towards the local customs and traditions.

7.9.3 Impacts and Mitigation Measures during Operational Phase

1) Impact of Water Intake

Water source for filtration plants will be ground water in Sargodha division. The population of these divisions use ground water for their daily activities. The ground water is collected through hand pumps and motor pumps for their daily activities. Ground water will not be depleted by using it as source intake in filtration plants, because community will use treated water instead of directly using the ground water. The ground water is contaminated by chemical and biological contaminants. Thus treatment of this water by RO and Pre-Filtration Plants will lead a positive impact on health of the local community. So there is no negative impact envisaged in using ground water as source intake and no mitigation is required accordingly. This is considered as a significant positive impact.

2) Impact of Disposal of Backwash from filtration plants

The quantity and composition of the filter backwash water are functions of the process and the efficiency of the treatment units preceding the filter. The backwash generated from the filtration plants may contaminate the receiving body as well as the ground water.

Nature of Impact

This impact is considered negative of moderate magnitude.

Mitigation Measures

It is suggested that backwash from filtration plants should be injected in deep wells, injection depth should be two to three times greater than suction level.

3) Impact of Air Emissions

The air may be polluted due to vehicular emissions and dust producing activities during the operational phase of the project.

Nature of Impact

This impact is considered negative of moderate magnitude.

Mitigation Measures

Monitoring of air quality (SOx, NOx and PM) should be carried out effectively during operational phase of the project.

4) Impact of Clean drinking water

Clean drinking water will be available in remote areas of Punjab during operational phase of this Project; where contaminated water was used earlier for drinking purposes. Project Area community will get rid of the water borne diseases with provision of clean drinking water. This is a significant positive impact of this Project.

5) Impact on Infrastructure / Rehabilitation / Restoration

So far it is anticipated that no harm or damage will be done to any infrastructure. In case of any damage to any structure during the operational phase of the project the client will be the responsible authority.

Mitigation Measures

Restoration and Rehabilitation through

- Disposal of debris as per regulatory requirements given in earlier sections.
- Disposal of waste products, solids and liquid in accordance with regulatory requirements given in earlier sections.
- Backfilling and closing of all solid waste disposal pits as per regulatory requirements given in earlier sections.
- Removal of fencing and gates.

6) Occupational Health and Safety Issues

The occupational health and safety issues are mostly associated with the operation of machinery and equipment, handling of fuel, noise, Odour, exposure to disease vectors etc.

Nature of Impact

The magnitude of this impact is considered to be major adverse, short-term.

Mitigation Measures

- The issues related to operation of machinery and equipment will be controlled by efficient management, staff training, maintenance of machinery and equipment, and other preventive measures.

- Proper Storage and Handling of fuel.
- First Aid kit should be provided at operator rooms
- Provision of PPE`s to the employees including masks, gloves etc.

7) Ecological Resources

No negative impacts are envisaged on the flora of the area during the operational phase. New tress/plants will render a positive impact on the flora of the area and will also cause positive impact on the landscape of the area, which will be permanent in nature.

Presence of adequate flora will absorb emissions, through photosynthesis.

Nature of Impact

The magnitude of impact is moderate beneficial

Mitigation Measures

This aspect is considered to be beneficial; hence no mitigation measure is required.

8) Emergency Preparedness and Response

The operation of the filtration plants may encounter emergencies like operation failure. In addition, disasters such as earthquakes and fires may occur which have to be considered for minimizing their impacts.

Nature of Impact

This impact is moderate inverse.

Mitigation Measures

- An Emergency Response Plans for floods, earthquakes, and manmade disasters will be developed by management. Emergency Response Plan will be implemented in close consultation with Fire Fighting Department and paramedics. In addition, training of staff/employees regarding the emergency procedures/plans should be regularly conducted.
- Responsible person to implement the Emergency Response Plan should be clearly designated.

- The staff should be trained timely and concise response procedures.
- Emergency numbers should be clearly posted so that a quick action is taken when an emergency arises.
- Firefighting systems should be calibrated and maintained regularly; and
- Regular drills for fire emergencies should be carried out.

9) Socio Economic Impacts

It is envisaged that the adverse impacts associated with the development of abovementioned project includes; local community will be disturbed due to increase in the traffic load (i.e., vehicles approaching towards site on daily basis), wastewater management, soil pollution, etc. The intensity of the aforesaid project will be quite low. The commencement of the aforesaid project will have a beneficial impact on the surrounding community such as; increase in employment opportunity, increase in the wages of the local area employees, increase in revenue generation, provision of social welfare funds of the employees, provision of potable drinking water and appreciation in the land value of the area.

Nature of Impact

The aforesaid impact is considered to be positive and will have a direct, medium impact.

Mitigation Measures

No mitigation measures will be required.

7.10 Environmental Enhancement Measures

The said project will be resulting in following benefits:

- Direct and Indirect Employment Opportunities
- Gains in local and national economy
- Increase in aesthetics of commercial and residential areas
- Business spins – off in the project area
- Provision of clean and safe drinking water to the residents

Tree plantation along boundary of project will act as environmental enhancement measure. Trees including shatoot, Jaman, Moor Pankh, Fish paam, Trysenia, etc. will be grown on all open spaces and along boundary of project. Environmental Budget allocated for the said project is **1 – 2 %** of the project cost.

8 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

This chapter elaborates the approach and mechanism best suited and essential for monitoring environmental and social issues through an institutional framework ensuring resource allocations related to the proposed subproject. The mechanism thus called as Environmental Management Plan (EMP) is devised being indispensable for the Proper Environmental Management. The EMP crucially includes allocation of resources for mitigation of any potential environmental impacts that might take place due to the implementation of the project comprising of design, execution and operation phases.

As per the environmental legislation in Pakistan, the EMP for operations phase, along with other documents, is to be submitted to the Environmental Protection Agency to obtain confirmation for compliance and Environmental Approval for project operation. Even after implementation of the suggested mitigation measures, the impact may remain significant, and require monitoring. This section also underlines the monitoring framework for operation phase to check compliance of the EMP and to take timely actions for correction in case any incidence of significant criteria, requirements or goals is found.

8.1 Objectives of Environmental Management Plan

The primary objectives of EMP are to:

- Define the responsibilities of the project proponent and other role players during the pre-construction, construction and operational phases;
- Facilitate the implementation of the mitigation measures by providing technical details of each project impact, and proposing an implementation schedule of the proposed mitigation measures
- To develop a monitoring mechanism and identify monitoring parameters to ensure that all the proposed mitigation measures are completely and effectively implemented;
- Identify training requirements at various levels and provide a plan for the implementation of training sessions;

- Identify the resources required to implement the EMP and outline corresponding financing arrangements; and
- Providing a cost estimate for all the proposed EMP actions.'

8.2 Management Approach

The organizational roles and responsibilities of the key managers are summarized as below:

Table 8-1: Roles and Responsibilities

Sr.#	Managers	Responsibilities
1.	**Contract Manager**	• Ensure EMP development. • Implementation of EMP with true spirit. • Environmental issues identification within pre-construction phase. • Communication of EMP with other employees.
2.	**Contractor**	• Ensuring that the control measures identified from environmental surveys are implemented as they are relevant to their work/visit. • Ensuring that the project management team is notified of any non-conformance of control measures or environmental incident where the environment has been put at risk.
3.	**Site Manager**	• Ensure site material and chemicals are safe. • Controlled access arrangement to avoid hazards. • Emergency egress arrangements to avoid dangerous situation. • Provide first aid facilities.
4.	**Site HSE Advisor**	• Ensure work is carried out in safe manner. • Ensure good standards of workmanship. • Health and safety advisor to complete the site waste management plan to be followed. • Ensure EMP implementation. • Daily checks and weekly checks. • Consultation with workers.
5.	**Site Environment Advisor**	• According to legislation and consent develop EMP. • Ensure application of EMP. • Carry out site inspection.

8.3 Components of EMP

Components of EMP are as follows:

- Management Plan
- Monitoring Plan
- Communication and Documentation
- Environmental Training

8.4 Institutional Capacity of Aforesaid Project

The organizational structure for the Environmental Management Plan is as follows:

8.4.1 Primary Responsibilities

The primary responsibility for implementing EMP during construction and operational phase of the project lies with the client: Punjab Aab-e-Pak Authority.

8.4.2 Operational Management and Control

Conducting the operational activities in environmentally sound manner will be the responsibility of the concerned Manager; for which he will be trained.

8.4.3 Supervision and Monitoring

Senior Supervisor will be responsible for all environmental issues and for the implementation of EMP.

8.4.4 Role of Contractor in EMP

The Contractor will be responsible for the implementation of the Proposed Project under the supervision of the Punjab Aab-e-Pak Authority & Consultant. The Contractor will be bound to follow the provisions of the contract documents especially about environmental protection and apply good construction / installation techniques and methodology without damaging the environment. Obligation of the contractor, to safeguard, mitigate adverse impacts and rehabilitate the environment should be addressed through environmental provisions in the contract document and through adequate implementation at site.

8.4.5 Communication and Documentation

An effective mechanism to store and communicate environmental information during the project is an essential requirement of an EMP.

8.4.6 Meetings

Two kinds of environmental meetings will take place during the project:

- Kick Off Meetings
- Weekly Meetings

The purpose of the kick-off meeting will be to present the EMP to project staff and discuss its implementation and to discuss any event of environmental significance that has happened in the under-discussion hotel or a similar five star hotel to investigate its route causes and develop its solutions. The purpose of the weekly meetings will be to discuss the conduct of the operation and environmental issues and their management. The proceedings of the meeting will be recorded in the form of a weekly environmental report.

8.4.7 Changes Record Register

A change record register will be maintained at the site in order to document any changes in the project design. The changes will be handled through the change management mechanism.

8.5 Environmental Management and Monitoring Framework

The purpose of environmental management and monitoring framework is to facilitate the implementation of environmental commitments, included in environmental impact assessment study. The proponent is committed for protection of environment and for sustainable management of its related operation and activities. The environmental management and monitoring plan are given below:

Table 8-2: Environmental Management Plan (EMP)

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
(CONSTRUCTION PHASE)				
1.	Lying of water pipelines	▪ This project involves lying of water supply pipelines (i.e. water distribution network pipelines) from Water Filtration units to the residential communities.	▪ The lying of water supply pipelines should be according to the specifications. Fence should be installed as protection during lying of pipelines to avoid access of people and animals to pipeline trenches.	PAPA, CC, RE and EPA
2.	Backwash Pipeline Construction	▪ The backwash pipeline for transportation of backwash to injection wells will be part of construction`s scope of work.	▪ It is suggested that backwash from treatment plants should be injected in deep well, injection depth should be two to three times greater than the suction level.	PAPA, CC, RE and EPA
3.	Land Acquisition	▪ Land will be acquired within the villages of Sargodha division. In case of non-availability of state / Government Land, Private Land will be acquired. In these divisions mostly state lands are available and at remaining locations, donation of private land will be acquired. ▪ CBO`s were concerned for the said purpose and the sites were visited and the private land will be acquired during implementation phase of the project.	▪ During mobilization of the contractor, PAPA authority officials, CBO`s of PHED, Contractors and Consultants will meet with the owners of the private lands and the lands will be purchased for installation of the filtration plants and water supply schemes.	PAPA, CBO`s, CC, PC

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
4.	Contractor Camps	▪ Contractor camp will be established near the Project site to carry out the Project activities. Though the number of labor and size of camp will not be large, even this will have an impact on the surrounding environment.	▪ Ensure that contractor camp size is per standard specifications. ▪ Ensure that contractor camp is established at least 500 m away from settlements to void / minimize the construction impacts.	PAPA, CC, RE and EPA
5.	Installation of Batching Plant	▪ Batching Plant will be installed at Project area for construction activities. Batching Plant operation will be a source of nuisance for surrounding community.	▪ Ensure that location of batching plant must be at least 500 meters away from the settlement. ▪ Ensure that Batching plant material is stocked on specified material in compliance with specifications of installation of Batching Plant. ▪ Ensure that the Batching Plant is installed with zero emissions. ▪ Ensure that the Batching material does not contaminate the land or natural drainage.	PAPA, CC, RE and EPA
6.	Dust	▪ The earthen portion of road / tracks may be prone to dust emissions due to moving machinery. Machinery consisting of bulldozers, dumpers, generators and vehicles will be used during the construction phase. This construction machinery will generate lot of dust, smoke and other potential pollutants in the air.	▪ All sections of the access tracks that are prone to dust emission and where sensitive receptor are located within 500 m should be identified and marked on the map of the project area. ▪ Wind breaks or barriers (either natural or constructed) should be installed at susceptible construction sites that reduce	CC, RE and EPA

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
			wind velocity and reduce the possibility of suspended particles. Wind breaks can cause trees or shrubs left in place during site clearing or constructed barriers such as a wind fence or sediment wall. ▪ Ensure that the access tracks which are prone to dust emissions and marked on the map should be maintained by water sprinkling daily. ▪ Ensure that batching plant design meets requirements of zero emission. ▪ Ensure that dust emissions due to vehicular traffic are minimized through good traffic management and water sprinkling when required. ▪ Ensure that dust emissions at the construction sites are minimized by implementing best management practices.	
7.	Noise	▪ Noise will be produced from constructional activities. This can disrupt the daily activities of the nearby communities and could prove to be a noise nuisance for them.	▪ Noise barriers should be installed where possible to keep the noise levels within permissible limits. ▪ Ensure prohibition of use of vehicle horns anywhere inside the fenced areas or on the access roads is strictly observed.	PAPA, CC, RE and EPA

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
			▪ While replacing equipment, consider purchasing quieter alternatives. New equipment can introduce a noise problem, therefore a noise assessment should be carried out while installing new machinery / equipment`s. ▪ Noise reducing devices (Silencers / Baffles) should be used for the machinery. ▪ Engines should be turned off when they are not in use. ▪ Contractor obligation is to use appropriate and modern machinery. ▪ Selection of up-to-date and well-maintained plant or equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriate muffling devices; ▪ Confining excessively noisy work to normal working hours in the day, as far as possible; ▪ Providing the construction workers with suitable hearing protection like ear cap, or earmuffs and training them in their use; ▪ Preferably, restricting construction vehicles movement during nighttime; ▪ Heavy machinery like percussion hammers and pneumatic drills should not be used	

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
			during the night without prior approval of the Client; ▪ Vehicles and equipment used should be fitted, as applicable, with silencers and properly maintained; ▪ Use of low noise machinery, or machinery with noise shielding and absorption; ▪ Contractors should comply with submitted work schedule, keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and employ strict implementation of operation procedures. ▪ Locating the concrete mixing and materials shipment yards away from residential areas, particularly schools and homes will also help reduce local noise levels. Such activity taking place near or through villages will broadcast continuous noise in the 70–80 dB (A) range or above. ▪ In accordance with the Environmental Monitoring Plan noise measurements will be carried out at locations and schedule specified to ensure the effectiveness of mitigation measures.	

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
8.	Solid Waste Generation	▪ The contractor camp will generate solid waste. Improper disposal of solid waste will contaminate land and can sprout numerous diseases.	▪ Solid waste should be segregated according to its type. ▪ Material suitable for recycling should be stored separately and sold afterwards. ▪ Combustible waste to be burnt at designated burn pit only as demarcated by Resident Engineer. ▪ Non-combustible, non-recyclable garbage should be sent to the designated landfill site in project area as demarcated by Resident Engineer. ▪ Contaminated soil should be sent to burn pit or landfill. ▪ Medical waste (if any) should be transported to the nearby hospital incineration plant. ▪ Solid residue from the septic tanks of the construction sites should be transported to the municipality's sewage facilities as demarcated by Resident Engineer.	PAPA, CC, RE and EPA
9.	Waste Water Discharge	▪ The contractor camp will produce waste water. Unmanaged disposal of this water will contaminate land and will lead to water borne diseases.	▪ Ensue that washing areas are demarcated and water from washing areas and kitchen is released in sumps. ▪ Ensure septic tanks of appropriate design have been used for sewage treatment and outlets are released into sumps.	PAPA, CC, RE and EPA

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
			▪ Ensure that outlets released into sumps must not make a pond of stagnant water. ▪ Ensure that latrines, septic tanks, and sumps are built at a safe distance from water body, stream, or dry streambed and the bottom of the sump is above the ground water level. ▪ Ensure that the sumps are in absorbent soil, down slope and away from the camp, downstream from the camp water source and above the high water mark of nearby water body (if any). ▪ Ensure that effective drainage is in place at the site.	
10.	Construction Waste	▪ Project activities will generate construction waste. Improper disposal of that waste could create nuisance to the surrounding community.	▪ Ensure that the site selected for waste material disposal is demarked by Resident Engineer before starting the work. ▪ Ensure that all trucks used for the transportation of waste material are airtight and watertight. ▪ Ensure that photographs of selected area are taken. ▪ Ensure that the movement of waste lifting machinery and vehicles is limited to the work area.	PAPA, CC, RE and EPA

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
			▪ Ensure that waste material is properly disposed-off in a manner that does not affect the natural drainage. ▪ Ensure that the dumping area has been leveled properly after disposal of waste material.	
11.	Soil Erosion	▪ Construction activities will lead to soil erosion. Soil erosion from construction sites can cause pollutants generation and also depletion of the soil quality.	▪ Ensure that surface run-off controls are installed and maintained so as to minimize erosion. ▪ Ensure adherence to the speed limit of 40 km/hr. at the access roads. ▪ Ensure that vegetation clearing is minimized and no trees are felled without prior permission of Consultant's Environmentalist.	PAPA, CC, RE and EPA
12.	Land Contamination	▪ The construction machinery including cranes, trucks, loaders/ dumper and batching plants will be used during the construction period. There are chances of land contamination due to release / spill of lubricants, oil, chemicals and toxic materials.	▪ Ensure that the maintenance of vehicle and other equipment takes place only in designated areas underlined with concrete slabs and a system to collect runoff in to mud pit. ▪ Ensure that no contaminated effluent is released in to the environment. ▪ Ensure machinery wash and other potentially contaminated effluents are released in mud pit.	PAPA, CC, RE and EPA

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
			▪ Ensure that fuels, oils, and other hazardous substances are handled and stored according to standard safety practices such as secondary containment. Fuel tanks should be labeled according to impervious lining and dykes etc. ▪ Ensure spills are avoided during fuel and oil transfer operations. Appropriate arrangements, such as concrete base or drip pans, should be used to avoid spills. ▪ Ensure fuels, oil and chemical storage are daily checked for leakage. ▪ Ensure that shovels, plastic bags, sand bags and absorbent materials, are kept available near fuel and oil storage areas. ▪ Ensure that operating vehicles are checked regularly for any fuel, oil, or battery fluid leakage. ▪ Ensure that leak /spill record is maintained for each vehicle and such vehicles are operated after proper repair. ▪ Soil contaminated by minor spill (covering an area up to 01 m² and 7.5 mm deep) will be collected and disposed at burn pit. ▪ Ensure that soil contaminated by moderate spills or leaks (up to 200 liters) is controlled	

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
			using shovels, sand and mud. The contaminated soil if any will be removed from the site and disposed-off at landfill or burn pit as required.	
13.	Relocation of Camps	▪ In case if the Contractor changes the locations of camps materials and specified approaches of routes and roads then proper measures need to be adopted.	▪ Ensure that the Contractor makes the necessary arrangements (as discussed earlier) by his own expenses, if Contractor decides to change the location of camp.	CC and RE
14.	Wastage of Water Resource	▪ Water may be wasted during daily activities of labor camps.	▪ Avoiding undue wastage of water through conservation techniques and selection of adequate water supply sources to ensure that water usage does not affect local consumption.	PAPA, CC, RE and EPA
15.	Flora	▪ The construction of the water treatment buildings may involve cutting and removal of number of trees. ▪ There is no protected or reserved forest in the vicinity of the construction area. Therefore, no effect is envisaged.	▪ Ensure that during aligning the access roads, minimum vegetation is lost. If any tree is uprooted, ensure that the Contractor has planted at least three fold of trees lost. ▪ Ensure that endangered trees species (if any) indicated in Section 7 (EIA) are not cut. ▪ Ensure that trees and shrubs are not used as fuel during construction or operation.	PAPA, CC, RE and Forestry department.

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
			▪ After completion of construction phase the vegetation of the area should be restored through plantation.	
16.	Fauna	▪ The construction activities may disturb the habitats of native animal species.	▪ Natural habitats should be maintained to the maximum extent and undue interference should be avoided during construction phase of the Project. ▪ Endangered species if any should be documented and activities should be carried out to reduce negative impacts on endangered species. ▪ Contractor's staff should be strictly prohibited from buying any wild animals/birds. ▪ Ensure that safe driving practices are observed so that the accidental killing of reptiles or small animals crossing the roads could be avoided. ▪ Ensure that a no-hunting, no trapping, no harassing wildlife policy is strictly observed. ▪ Ensure that the general awareness of the crew is enhanced regarding the wildlife, through environmental training, notices boards etc.	PAPA, CC, RE and EPA

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
17.	Agricultural Land and Crop destruction	▪ No agricultural land is involved anywhere in the Project implementation.	No action is required	-
18.	Health impacts due to water borne diseases	▪ Construction activities can lead to stagnant water. This may govern water borne diseases.	▪ Good design and construction management to avoid stagnant water. ▪ Proper management and disposal of rubbish and wastes from camp site.	PAPA, CC, RE and EPA
19.	Job Opportunities	▪ The project will open job opportunities which the local population can avail. Contractor should hire skilled and unskilled labor force from the local communities.	▪ Ensure that at least up to 95% of unskilled, up to 43% of semi-skilled employment and up to 100% of skilled jobs are provided to people from local communities, provided that the persons with required qualifications are available. ▪ Ensure Project staff interaction with local community is minimized. ▪ Ensure that guidelines are prepared and implemented to sensitize non-local laborers to local norms and customs in order to minimize cultural tensions.	PAPA, CC, RE and EPA
20.	Communicable Diseases	▪ Presence of labor at Project site may pose hazard of communicable diseases, which can also spread to the surrounding community.	▪ Ensure that field crew is medically screened before employed on site. ▪ Ensure Project staff interaction with local community is minimized.	PAPA, CC, RE and EPA

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
			▪ Ensure that periodic awareness campaigns for HIV / AIDS are undertaken for the project staff.	
21.	Health and Safety of workers	▪ Construction machinery and equipment and storage of flammable materials and may cause minor severe injuries to workers.	▪ Well-maintained machinery and equipment and training of the workers in the construction safety shall be taken. ▪ Provision of protective clothing for laborers handling hazardous materials, e.g. helmet, adequate footwear, protective googles, gloves etc. ▪ The flammable and combustible substances will be properly stored in designated areas and Material Safety Data Sheet (MSDS) will be used for proper handling. ▪ Fire-fighting equipment will be placed at an easily accessible place and inspected on regular basis.	CC, RE, HSE and EPA
(OPERATIONAL PHASE)				

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
1.	Water Intake	• Water source for filtration plants will be ground water in Sargodha divisions.	The population of these divisions use ground water for their daily activities. The ground water is collected through hand pumps and motor pumps for their daily activities. Ground water will not be depleted by using it as source intake in filtration plants, because community will use treated water instead of directly using the ground water. The ground water is contaminated by chemical and biological contaminants. Thus treatment of this water by RO and Pre-Filtration Plants will lead a positive impact on health of the local community. So there is no negative impact envisaged in using ground water as source intake and no mitigation is required accordingly. This	PAPA and Local Municipal Corporation

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
			is considered as a significant positive impact.	
2.	Disposal of Backwash	▪ The quantity and composition of the filter backwash water are functions of the process and the efficiency of the treatment units preceding the filter. The backwash generated from the treatment plants may contaminate the receiving body as well as the ground water.	▪ It is suggested that backwash from treatment plants be injected deep in the aquifer.	PAPA and Local Municipal Corporation
3.	Air Emissions	▪ Movement of vehicles and machinery during normal operation and under maintenance work may impair air quality. ▪ Stack emissions of generators at site will produce hazardous gas like NO_2, SO_2, CO_2, PM and CO. These gases will cause air pollution if not properly managed or mitigated	▪ Setting up of system to monitor air quality along project area in accordance with acceptable standards; ▪ Roadside tree plantations as applicable and feasible under harsh climatic conditions; plants should be selected in accordance to their ability to absorb emissions; ▪ Air quality monitoring will be carried out on regular basis for parameters like CO, CO2, NO2, SO2 and PM10.	PAPA and Local Municipal Corporation

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
4.	Aesthetic / Scenic Quality	▪ The Project construction and operational activities may affect aesthetic/scenic quality of the area.	▪ The standing lush green crops and trees in filed present a good scenic view of Project area. This should be conserved at all costs.	PAPA and Local Municipal Corporation
5.	Groundwater	▪ Contamination of groundwater source may occur in case of corrosion or leakage of pipelines.	▪ The impact should be minimized by regular checks for leaks and corrosion etc. and maintenance of damaged pipes should be done periodically. ▪ Moreover, monitoring of groundwater will be conducted.	PAPA, Local Municipal Corporation and EPA
6.	Energy Consumption	▪ Loss of Natural resource	▪ Regular maintenance of the equipment should be ensured to avoid excessive fuel consumption or leaks. ▪ Switch off machinery / appliances when not in use.	PAPA, and Local Municipal Corporation
7.	Occupational Health and Safety Issues	▪ Operation of machinery and equipment, handling of fuel, noise odor, exposure to disease vectors etc.	▪ The issues related to operation of machinery and equipment will be controlled by efficient management, staff training, maintenance of machinery and equipment, and other preventive measures. ▪ Proper storage and handling of fuel. ▪ First Aid kits should be provided. ▪ Provision of safe drinking water. ▪ Provision of PPE`s to the employees including masks, gloves etc.	PAPA, Local Municipal Corporation and HSE.

Sr. No	Component	Description	Recommended Mitigation Measures	Implementation Responsibility
8.	Ecological Resources	▪ New trees / plants will render a positive impact on the flora of the area and will also cause positive impact on the landscape of the area, which will be permanent in nature. ▪	▪ Not Required	-
9.	Emergency Preparedness and Response Plan	▪ The operation of the filtration plants may encounter emergencies like operation failure.	▪ An Emergency Response Plans for floods, earthquakes, and manmade disasters will be developed by management. ▪ Responsible person to implement the Emergency Response Plan should be clearly designated. ▪ The staff should be trained timely and concise response procedures. ▪ Emergency numbers should be clearly posted so that a quick action is taken when an emergency arises. ▪ Fire-fighting systems should be calibrated and maintained regularly.	PAPA, and Local Municipal Corporation

KEY:

- CC = Construction Contractor
- PAPA = Punjab Aab-e-Pak Authority
- RE = Resident Engineer
- HSE = Health & Safety Engineer
- EPA = Environmental Protection Agency

8.6 Environmental Monitoring

This section provides environmental monitoring Plan that identifies the roles and responsibilities of project staff involved in environmental monitoring and list the parameters that will be used in the monitoring process.

8.6.1 Objectives of Environmental Monitoring

The main objectives of the pre-construction and construction phase monitoring plans will be to:

- Monitor the actual impacts of the works on the project site physical, biological and socio – economic receptors. This will indicate the adequacy of the EIA assessment.
- Recommend mitigation measures for any unexpected impact or where the impact level exceeds the anticipated impacts.
- Ensure compliance with legal obligations including safety on construction site.
- To monitor the rehabilitation of the borrow areas and the restoration of construction campsites as described in the EMP.

The main objectives of monitoring during operational phase activities are as follows:

- Appraise the adequacy of the EIA with respect to the project`s predicted long term impacts of operation of the filtration plants on physical, biological and socio-economic environment.
- Evaluate the effectiveness of the mitigation measures proposed in the EMP and recommend improvements, when necessary; and
- Compile periodic environmental monitoring reports on the basis of recommendations provided in the EMP.

8.6.2 Environmental Monitoring Parameters

The following environmental parameters will be monitored at locations identified during the construction phase of the aforesaid project.

- Ambient Air Quality (NO_X, SO_X, CO and PM_{10})
- Ambient Noise level
- Ground Water Quality

8.6.3 Reporting Structure and Outcomes

Progress reporting will be the overall responsibility of the project director who will provide inputs to the supervision consultants for submission of progress reports to the concerned client.

8.6.4 Environmental Monitoring Plan

Table 8-3: Environmental Monitoring Plan at the Construction and Operational Phases of the Project

Components	Parameters	Location	No. of Samples	Frequency	Responsibility	Duration
CONSTRUCTION PHASE						
Ambient Air Quality	CO, NOx, SOx, PM_{10}	Labor camp sites Batching Plant sites	2	Monthly	PC & independent testing authority	**24 Hours**
Noise Level	-	Construction Site Camp Site	4	Monthly at both sites throughout the construction period and When required.	PC & independent testing authority	Reading taken at 15 Sec. Intervals over 15 min, every hour and then averaged
Ground Water Quality	For Parameters given in PEQS	At Filtration Plant Sites	2	Monthly	PC & independent testing authority	Composite or Grab Samples

Visual Check for Vegetation Loss	Type and number of tree species uprooted	Construction Site Camp Site	-	At the beginning of construction activities	-	-
OPERATIONAL PHASE						
Air Quality	CO, NOx, SOx, PM_{10}	Filtration Plant Sites	1	Quarterly	PAPA	24 Hours
Ground Water Quality	As mentioned in PEQS	Filtration Plant sites	1	Quarterly	PAPA	Composite or Grab Sample
Noise Level	-	Filtration Plant sites	4	Quarterly	PAPA	Reading taken at 15 Sec. Intervals over 15 min, every hour and then averaged

8.7 Environmental Training

An environmental training and technical assistance program will be carried out to build the capacity to effectively implement this EMP, as well as to facilitate the improved environmental management of future projects by increasing the environmental and social awareness of PAPA staff in general. PAPA with the collaboration of monitoring consultants will arrange the environmental trainings sessions for their staff. The objectives of this session will be to help establish appropriate systems, and to train PAPA staff responsible for managing environment, operations and planning, who can then impart training at a broader level within and outside the PAPA. The details of this training program is presented in table below:

Table 8-4: Training Program / Technical Assistance Services

Consultants	Contents	Trainees	Duration
Monitoring consultants/ organizations specializing in environmental management and monitoring	Short seminars and courses on: Environmental laws and regulations daily monitoring and supervision	Two seminars for PAPA Project staff	2 Weeks
Monitoring consultants/ organizations specializing in social management and monitoring	Short seminars and courses on Social awareness	Two seminars for Project staff dealing in Social matters	2 Weeks
Monitoring consultants/ organizations specializing in Occupational, health and safety issue	Short lectures relating to Occupational Health and Safety	Two seminars for contractor's staff	2 Weeks

8.8 Equipment Maintenance Details

PPE`s and other required machinery of latest technology with high efficiency will be purchased by the proponent. Maintenance of equipment such as filters will be done twice a year for the smooth operation of disposal station`s and water filtration plants.

Table 8-5: Equipment Maintenance Details

Task	Weekly	Monthly	Semi - Annually	Annually
Testing and Inspection		✓		
Check for Leakage		✓		
Recharging				✓
Filters and pipelines		✓		
Machinery			✓	
Cartridges			✓	

9 CONCLUSION AND RECOMMENDATIONS

9.1 General

This section presents conclusions of the EIA study of proposed Project. The overall objective of this EIA is to carry out a detailed environmental assessment of the project area; to assess impacts caused by the different activities of the proposed project and to address measures to mitigate adverse environmental impacts arising from the execution of the proposed project. The conclusions mentioned below are based on the findings of detailed environmental assessment, which has been carried out as per requirement of Environmental Protection Agency (EPA).

9.2 Main Issues and Concerns

During the field surveys, significant efforts were made to identify the main environmental, ecological and social issues related to the implementation of the proposed project. Residents and stakeholders were also contacted for obtaining salient information of the project. Following is the list of main issues and concerns:

- Disturbance to the public movement during constructional activity.
- Noise and air pollution due to the operation of construction machinery during construction phase of the project.
- Disruption of existing public utilities during construction phase.
- Oil spillages from construction machinery, resulting in soil and drinking / spring water contamination.
- Health and safety problem of the workers may also arise during the construction and operation phases of the project.

All the adverse impacts of the proposed project have properly been mitigated and a comprehensive EMP has been formulated. The implementation of EMP will help to reduce the adverse impacts of the aforesaid project.

9.3 Conclusions

After the completion of the proposed project, residents of the project area will get the following benefits;

- Improvement in environmental conditions of the project area.
- Direct employment of approximately 150 to 200 local people during construction phase and direct employment of approximately 100 to 125 employees is anticipated during the operational phase. The development will also generate indirect employment. This represents a significant and positive, both direct and indirect, long term impact.
- Other than providing direct & indirect employment and revenue source, the development shall lead to an improvement of infrastructure of the town area. These are important direct and lasting positive impacts on the community.
- Socioeconomic conditions of the area will be enhanced along with the overall boost to the environment of the project area.
- The project activity will fulfill the growing demand of potable drinking water in Sargodha division of Pakistan.
- This project is directly beneficial for the Residents of Sargodha division as potable drinking water will reduce the chances of pathogenic diseases such as typhoid, dysentery, hepatitis etc.
- At the end of the construction phase, 02 – 03 times of removed trees will be planted in the designated green areas, this will enhance the aesthetic beauty of the project areas.
- Availability of water at the designated times in the filtration plants will reduce the unnecessary loss of water in these divisions.
- Due to aforesaid project sustainable development goals in Pakistan will be achieved on a minor scale with the passage of time.
- With the construction of the proposed project and subsequent development of infrastructure in the area, the lifestyle of the community will be improved. This is considered a positive impact.
- Improvement in health conditions of the residents of the project area.
- Decrease in health budget of the residents of the project area.
- Business will spin – off in the water sector and for filtration plants providers.

9.4 Recommendations

- The construction activities shall be phased to confine the disruption of traffic. Traffic diversion / re – routing plans, if found necessary, shall be made with

the help of traffic police for smooth flow of traffic. The vehicles carrying the construction materials will not be allowed to enter the town during rush hours.

- Inclusion of further access routes to facilitate the accessibility of vehicles and pedestrians to and from the proposed Project site.
- Strict supervision of the excavation process should be carried out and residents should be informed in advance about the excavation activity.
- Noise measurements will be carried out at locations and schedule specified to ensure the effectiveness of mitigation measures.
- Odour (if any) should be minimized by installing ventilators and vegetation arrangements.

As a conclusion of the study, the proposed project will not cause potentially significant environmental and social adverse impacts on the local environment after implementation of the mitigation measures. Results of the EIA Study have shown that overall, the project is environmentally feasible. Most of the environmental impacts are moderate adverse in nature. However, these impacts can be mitigated by the implementation of Environmental Management Plan. Overall; the impacts related to construction phase could be minimized by the implementation of the proper mitigation measures.

9.4.1 Contractor`s Obligations

- **Environmental Mitigation Measures**
  The contractor should carry out the mitigation measures according to the guidelines and satisfaction of the client. Environmental management and monitoring is to be performed as per environmental management and monitoring plans.
- **Existing infrastructure / Utilities**
  The contractor should make necessary arrangements to protect the existing infrastructure / existing utilities and if not avoidable should compensate the damages occurred to the utilities at his own expense.
- **First Aid Facilities**
  The contractor should arrange first aid facilities at site for any emergency purpose. Contractor should designate one of the staff members to act as lead person for emergency response and safety issues.
- **Health and Safety of Workers**

The Contractor should make arrangements for the health and safety of the workers and general public by; providing safety equipment such as helmets, gloves, safety harnesses etc.; erection of safety signage at potentially dangerous working areas; making proper lighting arrangements should be provided for night shift working; providing insurance against accidental death and injuries to workers and public; restricting public and animal access to construction site by providing fence on the periphery.

- **Employment of Local Personnel**

  The contractor should subject to availability and workability, employ maximum number of workers from the local area.

- **Disposal of Waste**

  The Contractor should in consultation with and with the approval of Resident Engineer (RE) of the Project select and abide by the selection, sites for disposal of waste construction material, solid waste and waste water.

- **Location of Labor Camps, Material Depots, Equipment and Machinery, approach routes and roads etc.**

  Where Government owned land is available for location of Labor Camps, Material Depots, Equipment and Machinery Yard, Link Road or other activities related to these matters the Contractor should choose particular sites within the overall project area indicated in consultation with RE. These activities shall not be allowed outside this land. If the Contractor chooses to locate his facilities on a private land, he himself should be responsible for any compensation, resettlement or rehabilitation process and costs.

- **Socio-economic, Cultural values and Heritage**

  The contractor should be bound to:

  a) Ensure that no damage or disruption is caused to the public services being supplied to the people e.g. education, health, electricity supply, drinking water supply facilities for public gathering or religious congregations.
  b) Ensure the contractor or his employees remain above the local tribal tensions.
  c) Ensure that existing ownership of land around the project is respected.
  d) Ensure that if some construction material, has to be procured from or through a member of local community, it must be by a proper Social Framework Agreement.

e) Ensure that no damage or adverse effect is caused to archaeological (present or chance find) sites, graveyards and burial places.
f) Ensure that privacy of local women is respected and any violator is strictly disciplined.

The above clauses have been suggested in technical context. These should be got vetted by qualified law officer before incorporation into the Tender Documents or the Contract Documents.

Annexure-I

Punjab Environmental Protection Act
1997 (Amendment 2017)

THE PUNJAB ENVIRONMENTAL PROTECTION ACT, 1997

(XXXIV of 1997)

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24. Jurisdiction of Environmental Magistrates

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26. Power to delegate

27. Power to give directions

28. Indemnity

29. Dues recoverable as arrears of land revenue

30. Ordinance to override other laws

31. Power to make rules

32. Power to amend the Schedule

33. Power to make regulations

34. Repeal, savings and succession

SCHEDULE

TEXT

[1]THE [2][PUNJAB] ENVIRONMENTAL PROTECTION ACT, 1997

(XXXIV of 1997)

[6th December, 1997]

An
Act

to provide for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and promotion of sustainable development

WHEREAS, it is expedient to provide for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution, promotion of sustainable development, and for matters connected therewith and incidental thereto;

It is hereby enacted as follows:–

1. Short title, extent and commencement.– (1) This Act may be called the [3][Punjab] Environmental Protection Act, 1997.

(2) It extends to the whole of [4][the Punjab].

(3) It shall come into force at once.

2. Definitions.– In this Act, unless there is anything repugnant in the subject or context,**–**

(i) "adverse environmental effect" means impairment of, or damage to, the environment and includes–

(a) impairment of, or damage to, human health and safety or to biodiversity or property;

(b) pollution; and

(c) any adverse environmental effect as may be specified in the regulations;

(ii) "agriculture waste" means waste from farm and agricultural activities including poultry, cattle farming, animal husbandry, residues from the use of fertilizers, pesticides and other farm chemicals;

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[1]This Act of Parliament received the assent of the President on 3 December 1997, and was published in the Gazette of Pakistan, Extraordinary, dated 6 December 1997.This Act was originally in the Federal ambit, however, the subject on which this law was enacted devolved to the provinces by virtue of 18th Amendment in the Constitution, hence it was adapted, with amendments, for the province of the Punjab by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012).

[2]Substituted for the word "Pakistan" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.3; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[3]Substituted for the word "Pakistan" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.3; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[4]Substituted for the word "Pakistan" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.3; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

(iii) "air pollutant" means any substance that causes pollution of air and includes soot, smoke, dust particles, odor, light, electro-magnetic, radiation, heat, fumes, combustion exhaust, exhaust gases, noxious gases, hazardous substances and radioactive substances;

(iv) "biodiversity" or "biological diversity" means the variability among living organisms from all sources, including *inter alia* terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; including diversity within species, between species and of eco-systems;

(v) "Council" means the [5][Punjab] Environmental Protection Council established under section 3;

(vi) "discharge" includes spilling, leaking, pumping, depositing, seeping, releasing, flowing out, pouring, emitting, emptying or dumping;

(vii) "ecosystem" means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit;

(viii) "effluent" means any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapour;

(ix) "emission standards" means the permissible standards established by the [6][Provincial Agency] for emission of air pollutants and noise and for discharge of effluent and waste;

(x) "environment" means–

(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 inter-relationships between any of the factors in sub-clauses (a) to (f);

(xi) "environmental impact assessment" means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed;

[5]Substituted for the word "Pakistan" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.4; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[6]Substituted for the words "Federal Agency or a Provincial Agency" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.4; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

(xii) "Environmental Magistrate" means the Magistrate of the First Class appointed under section 24;

(xiii) "Environmental Tribunal" means the Environmental Tribunal constituted under section 20;

[7][(xiv) * * * * * * * * * * *]

(xv) "factory" means any premises in which industrial activity is being undertaken;

[8][(xvi) "Government" means Government of the Punjab;]

[9][(xvii) "Government Agency" includes–

(a) a department, an attached department or any other office of the Government; and

(b) a development authority, local authority, company or a body corporate established or controlled by the Government;]

(xviii) "hazardous substance" means–

(a) a substance or mixture of substances, other than a pesticide as defined in the Agricultural Pesticides Ordinance, 1971 (II of 1971), which, by reason of its chemical activity or toxic, explosive, flammable, corrosive, radioactive or other characteristics causes, or is likely to cause, directly or in combination with other matters, an adverse environmental effect; and

(b) any substance which may be prescribed as a hazardous substance;

(xix) "hazardous waste" means waste which is or which contains a hazardous substance or which may be prescribed as hazardous substance or which may be prescribed as hazardous waste, and includes hospital waste and nuclear waste;

[10][(xx) * * * * * * * * * * *]

(xxi) "hospital waste" includes waste medical supplies and materials of all kinds, and waste blood, tissue, organs and other parts of the human and animal bodies, from hospitals, clinics and laboratories;

(xxii) "industrial activity" means any operation or process for manufacturing, making, formulating, synthesising, altering, repairing, ornamenting, finishing, packing or otherwise treating any article or substance with a view to its use, sale, transport, delivery or disposal, or for mining, for oil and gas exploration and development, or for pumping water or

[7]Omitted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.4; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[8]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.4; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[9]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.4; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[10]Omitted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.4; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

sewage, or for generating, transforming or transmitting power or for any other industrial or commercial purpose;

(xxiii) "industrial waste" means waste resulting from an industrial activity;

(xxiv) "initial environmental examination" means a preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a proposed project to determine whether it is likely to cause an adverse environmental effect for requiring preparation of an environmental impact assessment;

(xxv) "local authority" means any agency set-up or designated by the [11][Government] by notification in the official Gazette to be a local authority for the purposes of this Act;

(xxvi) "local council" means a local council constituted or established under a law relating to local government;

(xxvii) "motor vehicle" means any mechanically propelled vehicle adapted for use upon land whether its power of propulsion is transmitted thereto from an external or internal source, and includes a chassis to which a body has not been attached, and a trailer, but does not include a vehicle running upon fixed rails;

(xxviii) "municipal waste" includes sewage, refuse, garbage, waste form abattoirs, sludge and human excreta and the like;

[12][(xxix) * * * * * * * * * * *]

(xxx) "noise" means the intensity, duration and character of sounds from all sources, and includes vibration;

(xxxi) "nuclear waste" means waste from any nuclear reactor or nuclear plant or other nuclear energy system, whether or not such waste is radioactive;

(xxxii) "person" means any natural person or legal entity and includes an individual, firm, association, partnership, society, group, company, corporation, co-operative society, Government Agency, non-governmental organization, community-based organization, village organization, local council or local authority and, in the case of a vessel, the master or other person having for the time being the charge or control of the vessel;

(xxxiii) "pollution" means the contamination of air, land or water by the discharge or emission of effluents or wastes or air pollutants or noise or other matter which either directly or indirectly or in combination with other discharges or substances alters unfavourably the chemical, physical, biological, radiational, thermal or radiological or aesthetic properties of the air, land or water or which may, or is likely to make the air, land or water unclean, noxious or impure or injurious,

[11]Substituted for the words "Federal Government or a Provincial Government" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.4; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[12]Omitted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.4; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

disagreeable or detrimental to the health, safety, welfare or property of persons or harmful to biodiversity;

[13][(xxxiv) "prescribed" means prescribed by the rules or regulations;]

(xxxv) "project" means any activity, plan, scheme, proposal or undertaking involving any change in the environment and includes–

(a) construction or use of buildings or other works;

(b) construction or use of roads or other transport systems;

(c) construction or operation of factories or other installations;

(d) mineral prospecting, mining, quarrying, stone-crushing, drilling and the like;

(e) any change of land use or water use; and

(f) alteration, expansion, repair, decommissioning or abandonment of existing buildings or other works, roads or other transport systems, factories or other installations;

(xxxvi) "proponent" means the person who proposes or intends to undertake a project;

[14][(xxxvii) "Provincial Agency" means the Provincial Environmental Protection Agency established under the Act, or any Government Agency, local council or local authority exercising the powers and functions of the Provincial Agency;]

[15][(xxxvii-a) "Punjab Environmental Quality Standards" mean the standards prepared by the Provincial Agency and approved by the Council;]

(xxxviii) "regulations" means regulations made under this Act;

(xxxix) "rules" means rules made under this Act;

(xl) "sewage" means liquid or semi-solid wastes and sludge from sanitary conveniences, kitchens, laundries, washing and similar activities and from any sewerage system or sewage disposal works;

(xli) "standards" means qualitative and quantitative standards for discharge of effluents and wastes and for emission of air pollutants and noise either for general applicability or for a particular area, or from a particular production process, or for a particular product, and includes the [16][Punjab] Environmental Quality Standards, emission standards and other standards established under this Act and the rules and regulations made thereunder;

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[13]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.4; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[14]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.4; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[15]Inserted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.4; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[16]Substituted for the word "National" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

(xlii) "sustainable development" means development that meets the needs of the present generation without compromising the ability of future generations to meet their needs;

[17][(xliii) * * * * * * * * * * *]

(xliv) "vessel" includes anything made for the conveyance by water of human beings or of goods; and

(xlv) "waste" means any substance or object which has been, is being or is intended to be, discarded or disposed of, and includes liquid waste, solid waste, waste gases, suspended waste, industrial waste, agricultural waste, nuclear waste, municipal waste, hospital waste, used polyethylene bags and residues from the incineration of all types of waste.

3. Establishment of the [18][Punjab] Environmental Protection Council.– [19][(1) The Government shall, by notification in the official Gazette, establish a Council to be known as the Punjab Environmental Protection Council consisting of–

i)	Chief Minister of the Punjab; or such other person as nominated by the Chief Minister;	Chairperson
ii)	Minister Incharge of the Environment Protection Department;	Vice Chairperson
iii)	such other persons not exceeding thirty five as the Government may appoint, of which at least twenty five shall be non-official including at least three Members of the Provincial Assembly of the Punjab, five representatives of the Chambers of Commerce and Industry and one or more representatives of the Chambers of Agriculture, Medical and legal profession, trade unions and non- governmental organizations concerned with the environment and sustainable development, and scientists, technical experts and educationalists20[:] 21[Provided that at least one female member of the Assembly and at least four women shall be appointed as non-official members; and]	Members
iv)	Secretary to the Government, Environment	Member/Secretary]

[17]Omitted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.4; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[18]Substituted for the word "Pakistan" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.5; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[19]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.5; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[20]Substituted for the semi-colon and word "; and" by the Punjab Fair Representation of Women Act 2014 (IV of 2014), w.e.f. 12.3.2014, s.2 and the Schedule; and published in the Punjab Gazette (Extraordinary), pages 2733-2744.

[21]Added by the Punjab Fair Representation of Women Act 2014 (IV of 2014), w.e.f. 12.3.2014, s.2 and the Schedule; and published in the Punjab Gazette (Extraordinary), pages 2733-2744.

Protection Department.

(2) The Members of the Council, other than *ex-officio* members, shall be appointed in accordance with the prescribed procedure and shall hold office for a term of three years.

(3) The Council shall frame its own rules of procedure.

(4) The Council shall hold meetings as and when necessary, but not less than two meetings shall be held in a year.

(5) The Council may constitute committees of its members and entrust them with such functions as it may deem fit, and the recommendations of the committees shall be submitted to the Council for approval.

(6) The Council or any of its committees may invite any technical expert or representative of any Government Agency or non-governmental organization or other person possessing specialized knowledge of any subject for assistance in performance of its functions.

4. Functions and powers of the Council.– (1) The Council shall**–**

(a) co-ordinate and supervise enforcement of the provisions of this Act;

(b) approve comprehensive [22][Punjab] environmental policies and ensure their implementation within the framework of a [23][Punjab] conservation strategy as may be approved by the [24][Government] from time to time;

(c) approve the [25][Punjab] Environmental Quality Standards;

(d) provide guidelines for the protection and conservation of species, habitats, and biodiversity in general, and for the conservation of renewable and non-renewable resources;

(e) coordinate integration of the principles and concerns of sustainable development into [26][Punjab] development plans and policies; and

(f) consider the [27][Punjab] Environment Report and give appropriate directions thereon.

(2) The Council may, either itself or on the request of any person or organisation, direct the [28][Provincial Agency] or any Government Agency to prepare, submit, promote or implement projects for the protection, conservation, rehabilitation

[22]Substituted for the word "National" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[23]Substituted for the word "National" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[24]Substituted for the words "Federal Government" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[25]Substituted for the word "National" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[26]Substituted for the word "National" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[27]Substituted for the word "National" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[28]Substituted for the words "Federal Agency" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

and improvement of the environment, the prevention and control of pollution, and the sustainable development of resources, or to undertake research in any specified aspect of environment.

5. Establishment of the [29][Provincial] Environmental Protection Agency.– [30][(1) The Government shall, by notification in the official Gazette, establish the Provincial Environmental Protection Agency to exercise the powers and perform the functions assigned to it under this Act, the rules and the regulations.]

(2) The [31][Provincial Agency] shall be headed by a Director-General, who shall be appointed by the [32][Government] on such terms and conditions as it may determine.

(3) The [33][Provincial Agency] shall have such administrative, technical and legal staff as the [34][Government] may specify, to be appointed in accordance with such procedure as may be prescribed.

(4) The powers and functions of the [35][Provincial Agency] shall be exercised and performed by the Director-General.

[36][(5) The Director General may, by general or special order, delegate any of the functions of the Provincial Agency exercised by him under subsection (4) to any other officer appointed under subsection (3).]

(6) For assisting the [37][Provincial Agency] in the discharge of its functions, the [38][Government] shall establish Advisory Committees for various sectors, and appoint as members thereof eminent representatives of the relevant sector, educational institutions, research institutes and non-governmental organizations.

6. Functions of the [39][Provincial Agency].– (1) The [40][Provincial Agency] shall–

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[29]Substituted for the word “Pakistan” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.6; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[30]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.6; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[31]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[32]Substituted for the words “Federal Government” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[33]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[34]Substituted for the words “Federal Government” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[35]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[36]Substituted by the Punjab Environmental Protection (Amendment) Act 2017 (XIX of 2017), published in the Punjab Gazette (Extraordinary), dated: 08 November 2017, pp 3139 - 3140, s.2

[37]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[38]Substituted for the words “Federal Government” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[39]Words “Federal Agency” substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

[40]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

(a) administer and implement the provisions of this Act and the rules and regulations made thereunder;

(b) prepare, in coordination with the appropriate Government Agency and in consultation with the concerned sectoral Advisory Committees, [41][* * * *] environmental policies for approval by the Council;

(c) take all necessary measures for the implementation of the [42][* * * *] environmental policies approved by the Council;

(d) prepare and publish an annual [43][Punjab] Environmental Report on the state of the environment;

(e) prepare or revise, and establish the [44][Punjab] Environmental Quality Standards with approval of the Council:

Provided that before seeking approval of the Council, the [45][Provincial Agency] shall publish the proposed [46][Punjab] Environmental Quality Standards for public opinion in accordance with the prescribed procedure; and

(f) ensure enforcement of the [47][Punjab] Environmental Quality Standards;

[48][(g) establish standards for the quality of the ambient air, water and land, by notification in the official Gazette;]

(h) co-ordinate environmental policies and programmes nationally and internationally;

(i) establish systems and procedures for surveys, surveillance, monitoring, measurement, examination, investigation, research, inspection and audit to prevent and control pollution, and to estimate the costs of cleaning up pollution and rehabilitating the environment in various sectors;

(j) take measures to promote research and the development of science and technology which may contribute to the prevention of pollution, protection of the environment, and sustainable development;

(k) certify one or more laboratories as approved laboratories for conducting tests and analysis and one or more research institutes as

[41]Omitted the word “national” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.7; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[42]Omitted the word “national” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.7; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[43]Substituted for the word “National” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[44]Substituted for the word “National” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[45]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[46]Substituted for the word “National” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[47]Substituted for the word “National” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[48]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.7; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

environmental research institutes for conducting research and investigation, for the purposes of this Act;

(l) identify the needs for, and initiate legislation in various sectors of the environment;

(m) render advice and assistance in environmental matters, including such information and data available with it as may be required for carrying out the purposes of this Act:

Provided that the disclosure of such information shall be subject to the restrictions contained in the proviso to sub-section (3) of section 12;

(n) assist the local councils, local authorities, Government Agencies and other persons to implement schemes for the proper disposal of wastes so as to ensure compliance with the standards established by it;

(o) provide information and guidance to the public environmental matters;

(p) recommend environmental courses, topics, literature and books for incorporation in the curricula and syllabi of educational institutions;

(q) promote public education and awareness of environmental issues through mass media and other means, including seminars and workshops;

(r) specify safeguards for the prevention of accidents and disasters which may cause pollution, collaborate with the concerned person in the preparation of contingency plans for control of such accidents and disasters, and co-ordinate implementation of such plans;

(s) encourage the formation and working of non-governmental organizations, community organizations and village organizations to prevent and control pollution and promote sustainable development;

(t) take or cause to be taken all necessary measure for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution and promotion of sustainable development; and

(u) perform any function which the Council may assign to it.

(2) The [49][Provincial Agency] may–

(a) undertake inquires or investigation into environmental issues, either of its own accord or upon complaint from any person or organisation;

(b) request any person to furnish any information or data relevant to its functions;

(c) initiate with the approval of the [50][Government], requests for foreign assistance in support of the purposes of this Act and enter into arrangements with foreign agencies or organizations for the exchange

[49]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[50]Substituted for the words “Federal Government” substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

of material or information and participate in international seminars or meetings;

(d) recommend to the [51][Government] the adoption of financial and fiscal programmes, schemes or measures for achieving environmental objectives and goals and the purposes of this Act, including–

(i) incentives, prizes awards, subsidies, tax exemptions, rebates and depreciation allowances; and

(ii) taxes, duties, cesses and other levies;

(e) establish and maintain laboratories to help in the performance of its functions under this Act and to conduct research in various aspects of the environment and provide or arrange necessary assistance for establishment of similar laboratories in the private sector; and

(f) provide or arrange, in accordance with such procedure as may be prescribed, financial assistance for projects designed to facilitate the discharge of its functions.

7. Powers of the [52][Provincial Agency].– Subject to the provisions of this Act, the [53][Provincial Agency] may–

(a) lease, purchase, acquire, own, hold, improve, use or otherwise deal in and with any property both movable and immovable;

(b) sell, convey, mortgage, pledge, exchange or otherwise dispose of its property and assets;

(c) fix and realize fees, rates and charges for rendering any service or providing any facility, information or data under this Act or the rules and regulations made thereunder;

(d) enter into the contracts, execute instruments, incur liabilities and do all acts or things necessary for proper management and conduct of its business;

(e) appoint with the approval of the [54][Government] and in accordance with such procedures as may be prescribed, such advisers, experts and consultants as it considers necessary for the efficient performance of its functions on such terms and conditions as it may deem fit;

(f) summon and enforce the attendance of any person and require him to supply any information or document needed for the conduct of any enquiry or investigation into any environmental issue;

(g) enter and inspect and under the authority of a search warrant issued by the Environmental Tribunal or Environmental Magistrate, search at

[51]Substituted for the words “Federal Government” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[52]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[53]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[54]Substituted for the words “Federal Government” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

any reasonable time, any land, building, premises, vehicle or vessel or other place where or in which, there are reasonable grounds to believe that an offence under this Act has been or is being committed;

(h) take samples of any materials, products, articles or substances or of the effluents, wastes or air pollutants being discharged or emitted or of air, water or land in the vicinity of the discharge or emission;

(i) arrange for test and analysis of the samples at a certified laboratory;

(j) confiscate any article used in the commission of the offence where the offender is not known or cannot be found within a reasonable time:

Provided that the power under clauses (f), (h), (i), and (j) shall be exercised in accordance with the provisions of the Code of Criminal Procedure, 1898 (Act V of 1898), or the rules made under this Act and under the direction of the Environmental Tribunal or Environmental Magistrate; and

[55][(k) establish the Punjab Environmental Coordination Committee comprising the Director General as its convener and such other members as the Government may appoint to exercise such powers and perform such functions as may be delegated or assigned to it by the Government for carrying out the purposes of this Act.]

[56][8. *Establishment, powers and functions of the Provincial Environmental Protection Agencies*.– * * * * * * * * * *]

9. Establishment of the Provincial Sustainable Development Funds.– [57][(1) There shall be established a Provincial Sustainable Development Fund.]

(2) The Provincial Sustainable Development Fund shall be derived from the following sources, namely:–

(a) grants made or loans advanced by the [58][Government or the Federal Government];

(b) aid and assistance, grants, advances, donations and other non-obligatory funds received from foreign governments, [59][Punjab] or international agencies, and non-governmental organizations; and

(c) contributions from private organizations, and other persons.

(3) The Provincial Sustainable Development Fund shall be utilized in accordance with such procedure as may be prescribed for–

[55]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.8; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[56]Omitted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.9; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[57]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.10; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[58]Substituted for the words “Federal Government or the Provincial Governments” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.10; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[59]Substituted for the word “National” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

(a) providing financial assistance to the projects designed for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, the sustainable development of resources and for research in any specified aspect of environment; and

(b) any other purpose which in the opinion of the Board will help achieve environmental objectives and the purposes of this Act.

10. Management of the Provincial Sustainable Development Fund.– [60][(1) The Provincial Sustainable Development Fund shall be managed by a Board known as the Provincial Sustainable Development Fund Board consisting of-

(i)	Chairman, Planning and Development Board;	Chairperson
(ii)	Such officers of the Government, not exceeding six, as the Government may appoint including Secretaries incharge of the Finance, Industries and Environment Departments;	Members
(iii)	such non-official persons not exceeding ten as the Government may appoint including representatives of the Chamber of Commerce and Industry, non-governmental organizations and major donors; and	Members
(iv)	Director General of the Provincial Agency.	Member/Secretary]

(2) In accordance with such procedure and such criteria as may be prescribed, the Board shall have the power to–

(a) sanction financial assistance for eligible projects;

(b) invest moneys held in the Provincial Sustainable Development Fund in such profit-bearing government bonds, savings schemes and securities as it may deem suitable; and

(c) take such measures and exercise such powers as may be necessary for utilization of the Provincial Sustainable Development Fund for the purposes specified in sub-section (3) of section 9.

(3) The Board shall constitute committees of its members to undertake regular monitoring of projects financed from the Provincial Sustainable Development Fund and to submit progress reports to the Board which shall publish an Annual Report incorporating its annual audited accounts, and performance evaluation based on the progress reports.

11. Prohibition of certain discharges or emissions.– (1) Subject to the provisions of this Act and the rules and regulations made thereunder no person shall discharge or emit or allow the discharge or emission of any effluent or waste or air pollutant or noise in an amount, concentration or level which is in excess of the

[60]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.11; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[61][Punjab] Environmental Quality Standards or, where applicable, the standards established under [62][* * * * * * *] clause (g) of sub-section (1) of section 6.

(2) The [63][Government] may levy a pollution charge on any person who contravenes or fails to comply with the provisions of sub-section (1), to be calculated at such rate, and collected in accordance with such procedure as may be prescribed.

(3) Any person who pays the pollution charge levied under sub-section (2) shall not be charged with an offence with respect to that contravention or failure.

(4) The provisions of sub-section (3) shall not apply to projects, which commenced industrial activity on or after the thirtieth day of June, 1994.

12. Initial environmental examination and environmental impact assessment.– (1) No proponent of a project shall commence construction or operation unless he has filed with the [64][Provincial Agency] an initial environmental examination or, where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the [65][Provincial Agency] approval in respect thereof.

(2) The [66][Provincial Agency] shall–

(a) review the initial environmental examination and accord its approval, or require submission of an environmental impact assessment by the proponent; or

(b) review the environmental impact assessment and accord its approval subject to such conditions as it may deem fit to impose, or require that the environmental impact assessment be re-submitted after such modifications as may be stipulated, or reject the project as being contrary to environmental objectives.

(3) Every review of an environmental impact assessment shall be carried out with public participation and no information will be disclosed during the course of such public participation which relates to**–**

(i) trade, manufacturing or business activities, processes or techniques of a proprietary nature, or financial, commercial, scientific or technical matters which the proponent has requested should remain confidential, unless for reasons to be recorded in writing, the Director-General of

[61]Substituted for the word “National” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[62]The words “sub-clause (i) of” Omitted by the Punjab Environmental Protection (Amendment) Act 2017 (XIX of 2017), published in the Punjab Gazette (Extraordinary), dated: 08 November 2017, pp 3139 - 3140, s.3

[63] Substituted for the words “Federal Government” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[64]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[65]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[66]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

the [67][Provincial Agency] is of the opinion that the request for confidentiality is not well-founded or the public interest in the disclosure outweighs the possible prejudice to the competitive position of the project or its proponent; or

(ii) international relations, [68][Punjab] security or maintenance of law and order, except with the consent of the [69][Government]; or

(iii) matters covered by legal professional privilege.

(4) The [70][Provincial Agency] shall communicate its approval or otherwise within a period of four months from the date the initial environmental examination or environmental impact assessment is filed complete in all respects in accordance with the prescribed procedure, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations made thereunder.

(5) Subject to sub-section (4) the [71][Government] may in a particular case extend the aforementioned period of four months if the nature of the project so warrants.

(6) The provisions of sub-sections (1), (2), (3), (4) and (5) shall apply to such categories of projects and in such manner as may be prescribed.

(7) The [72][Provincial Agency] shall maintain separate Registers for initial environmental examination and environmental impact assessment project, which shall contain brief particulars of each project and a summary of decisions taken thereon, and which shall be open to inspection by the public at all reasonable hours and the disclosure of information in such Registers shall be subject to the restrictions specified in sub-section (3).

[73][**13. Prohibition of import of hazardous waste**.– No person shall import hazardous waste into the Punjab.]

14. Handling of hazardous substances.– Subject to the provisions of this Act, no person shall generate, collect, consign, transport, treat, dispose of, store, handle or import any hazardous substance except–

[67]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[68]Substituted for the word “National” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[69]Substituted for the words “Federal Government” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[70]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[71]Substituted for the words “Federal Government” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[72]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[73]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.12; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

(a) under a licence issued by the [74][Provincial Agency] and in such manner as may be prescribed; or

(b) in accordance with the provisions of any other law for the time being in force, or of any international treaty, convention, protocol, code, standard, agreement or other instrument to which Pakistan is a party.

15. Regulation of motor vehicles.– (1) subject to the provisions of this Act and the rules and regulations made thereunder, 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 [75][Punjab] Environmental Quality Standards, or where applicable the standards established under clause (g) of sub-section (1) of section 6.

(2) For ensuring compliance with the standards mentioned in sub-section (1), the [76][Provincial Agency] may direct that any motor vehicle or class of vehicles shall install such pollution control devices or other equipment or use such fuels or undergo such maintenance or testing as may be prescribed.

(3) Where a direction has been issued by the [77][Provincial Agency] under sub-section (2) in respect of any motor vehicles or class of motor vehicles, no person shall operate any such vehicle till such direction has been complied with.

16. Environmental protection order.– [78][(1) Where the Provincial Agency is satisfied that the discharge or emission of any effluent, waste, air pollutant or noise, or the disposal of waste, or handling of hazardous substance, or any other act or omission is likely to occur, or is occurring, or has occurred, in violation of any provision of this Act, rules or regulations or of the conditions of a license, or is likely to cause, or is causing, or has caused an adverse environmental effect, the Provincial Agency may, after giving the person responsible for such discharge, emission, disposal, handling, act or omission an opportunity of being heard, by order, direct such person to take such measures as the Provincial Agency may consider necessary within such period as may be specified in the order.]

(2) In particular and without prejudice to the generality of the foregoing power, such measures may include–

(a) immediate stoppage, preventing, lessening or controlling the discharge, emission, disposal, handling, act or omission, or to minimize or remedy the adverse environmental effect;

(b) installation, replacement or alteration of any equipment or thing to eliminate or control or abate on a permanent or temporary basis, such discharge, emission, disposal, handling, act or omission;

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[74]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[75]Substituted for the word “National” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[76]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[77]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[78]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.13; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

(c) action to remove or otherwise dispose of the effluent, waste, air pollutant, noise, or hazardous substances; and

(d) action to restore the environment to the condition existing prior to such discharge, disposal, handling, act or omission, or as close to such conditions may be reasonable in the circumstances, to the satisfaction of the [79][Provincial Agency].

(3) Where the person, to whom directions under sub-section (1) are given, does not comply therewith, the [80][Provincial Agency] may, in addition to the proceeding initiated against him under this Act or the rules and regulations, itself take or cause to be taken such measures specified in the order as it may deems necessary, and may recover the costs of taking such measures from such person as arrears of land revenue.

17. Penalties.– (1) Whoever contravenes or fails to comply with the provisions of sections 11, 12, 13, or section 16 or any order issued thereunder shall be punishable with fine which may extend to [81][five million] rupees, and in the case of a continuing contravention or failure, with an additional fine which may extend to one hundred thousand rupees for every day during which such contravention or failure continues and where such contravention or failure continues:

Provided that if contravention of the provision of section 11 also constitutes contravention of the provisions of section 15, such contravention shall be punishable under sub-section (2) only.

(2) Whoever contravenes or fails to comply with the provisions of section 14 or 15 or any rule or regulation or conditions of any licence, any order or direction issued by the Council or by the [82][Provincial Agency] shall be punishable with fine which may extend to [83][five hundred thousand] rupees, and in case of continuing contravention, or failure with an additional fine which extend to one thousand rupees for every day during which such contravention continues.

(3) Where an accused has been convicted of an offence under sub-section (1) and (2), the Environmental Tribunal and Environmental Magistrate shall, in passing sentence, take into account the extent and duration of the contravention or failure constituting the offence, and the attendant circumstances.

(4) Where an accused has been convicted of an offence under sub-section (1) and the Environmental Tribunal is satisfied that as a result of the commission of the offence monetary benefits have accrued to the offender, the Environmental Tribunal may order the offender to pay, in addition to the fines under

[79]Substituted for the words and comma “Federal Agency or, Provincial Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.13; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[80]Substituted for the words “Federal Agency or Provincial Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.13; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[81]Substituted for the words “one million” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.14; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[82]Substituted for the words “Federal Agency or Provincial Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.14; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[83]Substituted for the words “one hundred thousand” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.14; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

sub-section (1), further additional fine commensurate with the amount of the monetary benefits.

(5) Where a person convicted under sub-sections (1) or sub-section (2); and had been previously convicted for any contravention under this Act, the Environmental Tribunal or, as the case may be, Environmental Magistrate may, in addition to the punishment awarded thereunder–

(a) endorse a copy of the order of conviction to the concerned trade or industrial association, if any, or the concerned Provincial Chamber of commence and Industry or the Federation of Pakistan Chambers of Commerce and Industry;

(b) sentence him to imprisonment for a term which may extend up to two years;

(c) order the closure of the factory;

(d) order confiscation of the factory, machinery, and equipment, vehicle, material or substance, record or document or other object used or involved in contravention of the provisions of the Act:

Provided that for a period of three years from the date of commencement of this Act, the sentence of imprisonment shall be passed only in respect of persons who have been previously convicted for more than once for any contravention of section 11, 13,14 or 16 involving hazardous waste;

(e) order such person to restore the environment at his own cost, to the conditions existing prior to such contravention or as close to such conditions as may be reasonable in the circumstances to the satisfaction of the [84][Provincial Agency]; and

(f) order that such sum be paid to any person as compensation for any loss, bodily injury, damage to his health or property suffered by such contravention.

(6) The Director-General of the [85][Provincial Agency] or an officer generally or specially authorised by him in this behalf may, on the application of the accused compound an offence under this Act with the permission of the Environmental Tribunal or Environmental Magistrate in accordance with such procedure as may be prescribed.

(7) Where the Director-General of the [86][Provincial Agency] is of the opinion that a person has contravened any provision of this Act, he may, subject to the rules, by notice in writing to that person require him to pay to the [87][Provincial

[84]Substituted for the words and commas “Federal Agency or,as the case may be , Provincial Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.14; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[85]Substituted for the words “Federal Agency or of a Provincial Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.14; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[86]Substituted for the words “Federal Agency or of a Provincial Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.14; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[87]Substituted for the words and commas “Federal Agency or, as the case may be, Provincial Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.14; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

Agency] an administrative penalty in the amount set out in the notice for each day the contravention continues; and a person who pays an administrative penalty for a contravention shall not be charged under this Act with an offence in respect of such contravention.

(8) The provisions of sub-sections (6) and (7) shall not apply to a person who has been previously convicted of offence or who has compounded an offence under this Act or who has paid an administrative penalty for a contravention of any provision of this Act.

18. Offences by bodies corporate.– Where any contravention of this Act has been committed by a body corporate, and it is proved that such offence has been committed with the consent or connivance or, or is attributed to any negligence on the part of, any director, partner, manager, secretary or other officer of the body corporate, such director, partner, manager, secretary or other officer of the body corporate, shall be deemed guilty of such contravention along with the body corporate and shall be punished accordingly:

Provided that in the case of a company as defined under the Companies Ordinance, 1984 (XLVII of 1984), only the Chief Executive as defined in the said Ordinance shall be liable under this section.

Explanation.– For the purposes of this section, "body corporate" includes a firm, association of persons and a society registered under the Societies Registration Act, 1860 (XXI of 1860), or under the Co-operative Societies Act, 1925 (VII of 1925).

19. Offences by Government Agencies, local authorities or local councils.– Where any contravention of this Act has been committed by any Government Agency, local authority or local council, and it is proved that such contravention has been committed with the consent or connivance of, or is attributable to any negligence on the part of the Head or any other officer of the Government Agency, local authority or local council, such Head or other officer shall also be deemed guilty of such contravention along with the Government Agency, local authority or local council and shall be liable to be proceeded against and punished accordingly.

20. Environmental Tribunals.– (1) The [88][Government] may, by notification in the official gazette, establish as many Environmental Tribunals as it considers necessary and, where it establishes more than one Environmental Tribunal, it shall specify territorial limits within which, or the class of cases in respect of which, each one of them shall exercise jurisdiction under this Act.

(2) An Environmental Tribunal shall consist of a Chairperson who is, or has been, or is qualified for appointment as, a Judge of the High Court to be appointed after consultation with the Chief Justice of the High Court and two members to be appointed by the [89][Government] of which at least one shall be a technical member with suitable professional qualifications and experience in the environmental field as may be prescribed.

[88]Substituted for the words "Federal Government" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[89]Substituted for the words "Federal Government" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

(3) For every sitting of the Environmental Tribunal, the presence of the Chairperson and not less than one Member shall be necessary.

[90][(4) A decision of an Environmental Tribunal shall be expressed in terms of the opinion of the majority, or if the case has been decided by the Chairperson and only one of the members and there is a difference of opinion between them, the decision of the Environmental Tribunal shall be expressed in terms of the opinion of the Chairperson.]

(5) An Environmental Tribunal shall not, merely by reason of a change in its composition, or the absence of any member from any sitting, be bound to recall and rehear any witness who was given evidence, and may act on the evidence already recorded by, or produced, before it.

(6) An Environmental Tribunal may hold its sittings at such places within its territorial jurisdiction as the Chairperson may decide.

(7) No act or proceeding of an Environmental Tribunal shall be invalid by reason only of the existence of vacancy in, or defect in the constitution of, the Environmental Tribunal.

(8) The terms and conditions of service of the Chairperson and members of the Environmental Tribunal shall be such as may be prescribed.

21. Jurisdiction and powers of Environmental Tribunals.– (1) An Environmental Tribunal shall exercise such powers and perform such functions as are, or may be, conferred upon or assigned to it by or under this Act, or the rules and regulations made thereunder.

(2) All contravention punishable under sub-section (1) of section 17 shall exclusively be triable by an Environmental Tribunal.

(3) An Environmental Tribunal shall not take cognizance of any offence triable under sub-section (2) except on a complaint in writing by–

(a) the [91][Provincial Agency] [92][or an officer authorized by it] or any Government Agency or local council; and

(b) any aggrieved person, who has given notice of not less than thirty days to the [93][Provincial Agency] [94][or an officer authorized by it] of the alleged contravention and of his intention to make a complaint to the Environmental Tribunal.

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[90]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.15; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[91]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[92]Inserted by the Punjab Environmental Protection (Amendment) Act 2017 (XIX of 2017), published in the Punjab Gazette (Extraordinary), dated: 08 November 2017, pp 3139 - 3140, s.4

[93]Substituted for the words “Federal Agency or the Provincial Agency concerned” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.16; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[94]Inserted by the Punjab Environmental Protection (Amendment) Act 2017 (XIX of 2017), published in the Punjab Gazette (Extraordinary), dated: 08 November 2017, pp 3139 - 3140, s.4

(4) In exercise of its criminal jurisdiction, the Environmental Tribunal shall have the same powers as are vested in Court of Session under the Code of Criminal Procedure, 1898 (Act V of 1898).

(5) In exercise of the appellate jurisdiction under section 22 the Environmental Tribunal shall have the same powers and shall follow the same procedure as an appellate court in the Code of Civil Procedure, 1908 (Act V of 1908).

(6) In all matters with respect to which no procedure has been provided for in this [95][Act], the Environmental Trib unal shall follow the procedure laid down in the Code of Civil Procedure, 1908 (Act V of 1908).

(7) An Environmental Tribunal may, on application filed by any officer duly authorised on this behalf by the Director-General of the [96][Provincial Agency], issue bailable warrant for the arrest of any person against whom reasonable suspicion exists of his having been involved in contravention punishable under sub-section (1) of section 17:

Provided that such warrant shall be applied for, issued, and executed in accordance with the provisions of the Code of Criminal Procedure, 1898 (Act V of 1898):

Provided further that if the person arrested executes a bond with sufficient sureties in accordance with the endorsement on the warrant, he shall be released from custody, failing which he shall be taken or sent without delay to the officer-in-charge of the nearest police station.

(8) All proceedings before the Environmental Tribunal shall be deemed to be judicial proceedings within the meaning of sections 193 and 228 of the Pakistan Penal Code (Act XLV of 1860), and the Environmental Tribunal shall be deemed to be a court for the purposes of sections 480 and 482 of the Code of Criminal Procedure, 1898 (Act V of 1898).

(9) No court other than an Environmental Tribunal shall have or exercise any jurisdiction with respect to any matter to which the jurisdiction of an Environmental Tribunal extends under this Act or the rules and regulations made thereunder.

(10) Where the Environmental Tribunal is satisfied that a complaint made to it under sub-section (3) is false and vexatious to the knowledge of the complainant, it may, by an order, direct the complainant to pay to the person complained against such compensatory costs which may extend to one hundred thousand rupees.

22. Appeals to the Environmental Tribunal.– (1) Any person aggrieved by any order or direction of the [97][Provincial Agency] under any provision of this Act and rules or regulations made thereunder may refer an appeal with the Environmental Tribunal within thirty days of the date of communication of the impugned order or direction to such person.

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[95]Misprinted in the Gazette as “Ordinance”.

[96]Substituted for the words “Federal Agency or of Provincial Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.16; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[97]Substituted for the words “Federal Agency or any Provincial Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.17; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

(2) An appeal to the Environmental Tribunal shall be in such form, contain such particulars and be accompanied by such fees as may be prescribed.

23. Appeals from orders of the Environmental Tribunal.– (1) Any person aggrieved by any final order or by any sentence of the Environmental Tribunal passed under this Act may, within thirty days of communication of such order or sentence, prefer an appeal to the High Court.

(2) An appeal under sub-section (1) shall be heard by a Bench of not less than two Judges.

24. Jurisdiction of Environmental Magistrates.– (1) Notwithstanding anything contained in the Code of Criminal Procedure, 1898 (Act V of 1898), or any other law for the time being in force, but subject to the provisions of this Act, all contraventions punishable under sub-section (2) of section 17 shall exclusively be triable by a judicial Magistrate of the first class as Environmental Magistrate especially empowered in this behalf by the High Court.

(2) An Environmental Magistrate shall be competent to impose any punishment specified in sub-sections (2) and (4) of section 17.

(3) An Environmental Magistrate shall not take cognizance of an offence triable under sub-section (1) except on a complaint in writing by**–**

(a) the [98][Provincial Agency], or Government Agency or local council; and

(b) any aggrieved person.

25. Appeals from orders of Environmental Magistrates.– Any person convicted of any contravention of this Act or the rules or regulations by an Environmental Magistrate may, within thirty days from the date of his conviction, appeal to the Court of Sessions, whose decision thereon shall be final.

[99][**26. Power to delegate**.– The Government may, by notification in the official Gazette, delegate any of its or of the Provincial Agency's powers or functions under this Act, the rules or the regulations to any Government Agency, local council or local authority.]

[100][**27. Power to give directions**.– In the performance of its functions, the Provincial Agency shall be bound by the directions given to it in writing by the Government.]

[101][**28. Indemnity**.– No suit, prosecution or other legal proceedings shall lie against the Government, the Council, the Provincial Agency, the Director General of the Provincial

[98]Substituted for the words and comma "Federal Agency, Provincial Agency" by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.18; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[99]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.19; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

Section 27 substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012).

[101]Substituted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.21; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

Agency, members, officers, employees, experts, advisors, or consultants of the Provincial Agency or the Environmental Tribunal, an Environmental Magistrate or any other person for anything which is in good faith done or intended to be done under this Act or the rules or the regulations.]

29. Dues recoverable as arrears of land revenue.– Any dues recoverable by the [102][Provincial Agency] under this Act, or the rules or regulations made thereunder shall be recoverable as arrears of land revenue.

30. Ordinance to override other laws.– The provisions of this Act shall have effect notwithstanding anything inconsistent therewith contained in any other law for the time being in force.

31. Power to make rules.– The [103][Government] may, by notification in the official Gazette, make rules for carrying out the purposes of this Act including rules for implementing the provisions of the international environmental agreements, specified in the Schedule to this Act.

32. Power to amend the Schedule.– The [104][Government] may, by notification in the official Gazette, amend the Schedule so as to add any entry thereto or modify or omit any entry therein.

33. Power to make regulations.– (1) For carrying out the purposes of this Act, the [105][Provincial Agency] may, by notification in the official Gazette and with the approval of the [106][Government], make regulations not inconsistent with the provisions of this Act or the rules made thereunder.

(2) In particular and without prejudice to the generality of the foregoing power, such regulations may provide for**–**

(a) submission of periodical reports, data or information by any Government Agency, local authority or local council in respect of environmental matters;

(b) preparation of emergency contingency plans for coping with environmental hazards and pollution caused by accidents, natural disasters and calamities;

(c) appointment of officers, advisors, experts, consultants and employees;

(d) levy of fees, rates and charges in respect of services rendered, actions taken and schemes implemented;

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[102]Substituted for the words “Federal Agency or Provincial Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.22; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[103]Substituted for the words “Federal Government” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[104]Substituted for the words “Federal Government” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[105]Substituted for the words “Federal Agency” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[106]Substituted for the words “Federal Government” by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.2; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

(e) monitoring and measurement of discharges and emissions;

(f) categorization of projects to which, and the manner in which, section 12 applies;

(g) laying down of guidelines for preparation of initial environmental examination and environmental impact assessment and Development of procedures for their filling, review and approval;

(h) providing procedures for handling hazardous substances; and

(i) installation of devices in, use of fuels by, and maintenance and testing of motor vehicles for control of air and noise pollution.

34. Repeal, savings and succession.– (1) The Pakistan Environmental Protection Ordinance, 1983 (XXXVII of 1983) is hereby repealed.

(2) Notwithstanding the repeal of the Pakistan Environmental Protection Ordinance, 1983 (XXVII of 1983), any rules or regulations or appointments made, orders passed, notifications issued, powers delegated, contracts entered into, proceedings commenced, rights acquired liabilities incurred, penalties, rates, fees or charges levied, things done or action taken under any provisions of that Ordinance shall, so far as they are not inconsistent with the provisions of this Act, be deemed to have been made, passed, issued, delegated, entered into, commenced, acquired, incurred, levied, done or taken under this Act.

[107][(3) * * * * * * * * * * *]

[108][(4) Notwithstanding the omission of section 8 of the Act by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), any rules, regulations or appointments made, orders passed, notifications issued, powers delegated, contracts entered into, proceedings taken, rights acquired, liabilities incurred, penalties imposed, rates, fees or charges levied or other things done or actions taken under the provisions of said section, shall continue to have effect unless recalled withdrawn or cancelled.]

[107]Omitted by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), w.e.f.18.4.2012, s.23; and published in the Punjab Gazette (Extraordinary), pages 41061-41065.

[108]Added by the Punjab Environmental Protection (Amendment) Act 2017 (XIX of 2017), published in the Punjab Gazette (Extraordinary), dated: 08 November 2017, pp 3139 - 3140, s.5; and deemed to have been so added on and from 18 April 2012 when the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012 came into force.

SCHEDULE

(*See* section 31)

1. International Plant Protection Convention, Rome, 1951.
2. Plant Protection Agreement for the South-East Asia and Pacific Region (as amended), Rome, 1956.
3. Agreement for the Establishment of a Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in South-West Asia (as amended), Rome, 1963.
4. Convention on Wetlands of International importance Especially as Waterfowl Habitat, Ramsar, 1971 and its amending Protocol, Paris, 1982.
5. Convention Concerning the Protection of World Cultural and Natural Heritage (World Heritage Convention), Paris, 1972.
6. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Washington, 1973.
7. Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979.
8. Convention on the Law of the Sea, Montego Bay, 1982.
9. Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985.
10. Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1987 and amendments thereto.
11. Agreement on the Network of Aquaculture Centres in Asia and the Pacific, Bangkok, 1988.
12. Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal, Basel, 1989.
13. Convention on Biological Diversity, Rio De Janeiro, 1992.
14. United Nations Framework Convention on Climate Change, Rio De Janeiro, 1992.

The Punjab Gazette
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LAHORE WEDNESDAY NOVEMBER 08, 2017

PROVINCIAL ASSEMBLY OF THE PUNJAB

NOTIFICATION

November 08, 2017

No.PAP/Legis-2(174)/2017/1671. The Punjab Environmental Protection (Amendment) Bill 2017, having been passed by the Provincial Assembly of the Punjab on October 25, 2017, and assented to by the Governor of the Punjab on October 30, 2017, is hereby published as an Act of the Provincial Assembly of the Punjab.

THE PUNJAB ENVIRONMENTAL PROTECTION (AMENDMENT) ACT 2017

ACT XIX OF 2017

[First published, after having received the assent of the Governor of the Punjab, in the Gazette of the Punjab (Extraordinary) dated November 08, 2017.]

An
Act

further to amend the Punjab Environmental Protection Act, 1997.

It is necessary further to amend the Punjab Environmental Protection Act, 1997 *(XXXIV of 1997)* to rationalize the provisions about the delegation of powers of the Director General, filing of complaints and incidental matters.

Be it enacted by the Provincial Assembly of the Punjab as follows:

1. **Short title and commencement** – (1) This Act may be cited as the Punjab Environmental Protection (Amendment) Act 2017.

(2) It shall come into force at once.

2. **Amendment in section 5 of Act XXXIV of 1997.**– In the Punjab Environmental Protection Act, 1997 *(XXXIV of 1997)*, for brevity cited as the Act, in **section 5, for** subsection (5), the following shall be substituted:

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"(5) The Director General may, by general or special order, delegate any of the functions of the Provincial Agency exercised by him under subsection (4) to any other officer appointed under subsection (3)."

3. **Amendment in section 11 of Act XXXIV of 1997.**– In the Act, in section 11, in subsection (1), after the words "standards established under", the words " sub-clause (i) of" shall be omitted.

4. **Amendment in section 21 of Act XXXIV of 1997.**– In the Act, in section 21, in subsection (3), after the words "Provincial Agency", wherever occur, the words "or an officer authorized by it" shall be inserted.

5. **Amendment in section 34 of Act XXXIV of 1997.**– In the Act, in section 34, after subsection (2), the following subsection (3) shall be added and shall be deemed to have been so added on and from 18 April 2012 when the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012) came into force:

"(3) Notwithstanding the omission of section 8 of the Act by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012), any rules, regulations or appointments made, orders passed, notifications issued, powers delegated, contracts entered into, proceedings taken, rights acquired, liabilities incurred, penalties imposed, rates, fees or charges levied or other things done or actions taken under the provisions of said section, shall continue to have effect unless recalled withdrawn or cancelled.".

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Annexure-II

Review of IEE and EIA Regulations, 2022

EXTRA ORDINARY ISSUE

REGISTERED No. L-7532

The Punjab Gazette

PUBLISHED BY AUTHORITY

LAHORE FRIDAY DECEMBER 16, 2022

GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT

NOTIFICATION
(150 of 2022)

16 DECEMBER 2022

Notification No.01/EPA/EIA/MISC/21/4214, dated 16.12.2022 issued by the Environment Protection Department, is hereby published in the Punjab Gazette (Extraordinary) for general information:

"GOVERNMENT OF THE PUNJAB
ENVIRONMENT PROTECTION DEPARTMENT

Dated, Lahore 16 December 2022

NOTIFICATION

No.01/EPA/EIA/MISC/21/4214.- In exercise of the powers conferred under section 33 of the Punjab Environmental Protection Act, 1997 (*XXXIV of 1997*), the Environmental Protection Agency, Punjab, with the approval of the Government, is pleased to make the following regulations:

1. **Short title and commencement.**- (1) These regulations may be cited as the Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations 2022.

(2) They shall come into force at once.

2. **Definitions.**- (1) In the regulations, unless the context or subject otherwise requires:

(a) "Act" means the Punjab Environmental Protection Act, 1997 (XXXIV of 1997);

(b) "Agency" means the Environmental Protection Agency, Punjab;

(c) "Director General" means the Director General of the Agency;

(d) "regulations" means the Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations 2022; and

(e) "Schedule" means the Schedule appended to the regulations.

(2) A word or expression used but not defined in the regulations shall have the same meaning as assigned to it in the Act.

3. **Project requiring an initial environmental examination.**- A proponent of a project falling in any category listed in Schedule-I shall file an initial environmental examination with the Agency and the provisions of section 12 of the Act shall apply to such projects.

4. **Project requiring an environmental impact assessment.**- A proponent of a project falling in any category listed in Schedule-II shall file an environmental impact assessment with the Agency and the provisions of section 12 of the Act shall apply to such projects.

5. **Projects not requiring an initial environmental examination or environmental impact assessment.**- (1) A proponent of a project not falling in any category listed in Schedule-I

and II shall not be required to file an initial environmental examination or environmental impact assessment:

Provided that the proponent shall file:

(a) an environmental impact assessment, if the project is likely to cause an adverse environmental effect; and

(b) an application for projects not listed in Schedule-I and II, in respect of which the Agency has issued guidelines for construction and operation, for approval accompanied by an undertaking, an affidavit and any other document as prescribed in checklist that the aforesaid guidelines shall be fully complied with.

(2) Notwithstanding anything contained in sub-regulation (1), the Agency may direct the proponent of a project, whether or not listed in Schedule-I or II, to file an initial environmental examination or environmental impact assessment, for reasons to be recorded in such direction:

Provided that no such direction shall be issued without the recommendation in writing of the Environmental Assessment Advisory Committee constituted under regulation 22.

6. Review Fee.- The proponent shall pay, at the time of submission of an initial environmental examination or environmental impact assessment, a nonrefundable Review Fee to the Agency as per rates specified in Schedule-III.

7. Filing of initial environmental examination and environmental impact assessment.- (1) Every initial environmental examination or environmental impact assessment shall be accompanied by:

(a) an application, in the form prescribed in Schedule-IV; and

(b) copy of receipt showing payment of the Review Fee.

(2) Five ring bound printed paper copies and one electronic copy (PDF or Word format) of an initial environmental examination or environmental impact assessment shall be filed with the Agency.

8. Preliminary scrutiny.- (1) The Agency, within ten working days of filing of initial environmental examination or environmental impact assessment, shall:

(a) confirm that the initial environmental examination or environmental impact assessment is complete for the purposes of initiation of the review process; or

(b) require the proponent to submit such additional information as may be required; or

(c) return the initial environmental examination or environmental impact assessment to the proponent,

clearly listing the contents requiring further study and discussion.

(2) In case the proponent fails to submit the required documents or conduct further study or discussion after three notices served to him by the Agency, with a gap of not less than seven days, his application shall be closed and he shall be required to submit a fresh application for approval.

(3) In case of closure of application under sub-regulation (2), the Review Fee shall remain valid for a period of six months from the date of closure of application.

(4) Nothing in sub-regulation (1) shall prohibit the Agency from requiring the proponent to submit additional information at any stage during the review process.

9. Public participation.- (1) In the case of an environmental impact assessment, the Agency shall, simultaneously with issuance of confirmation of completeness under clause (a) of sub-regulation (1) of regulation 8, cause to be published in any English or Urdu national newspaper and in a local newspaper of general circulation in the area affected by the project, a public notice mentioning the type of the project, its exact location, the name and address of the proponent, and the places at which the environmental impact assessment of the project can, subject to the restrictions in sub-section (3) of section 12 of the Act, be accessed.

(2) The notice issued under sub-regulation (1) shall fix a date, time, and place for public hearing of any comments on the project or its environmental impact assessment.

(3) The date fixed under sub-regulation (2) shall not be less than seven days from the date of publication of the notice.

(4) The Agency may circulate the environmental impact assessment to concerned Government Agencies, local authority or local council for their comments, if any.

(5) During the public hearing, the proponent shall provide sufficient details of the nature of the project, the adverse environmental impacts of the project and the preventive, mitigatory or compensatory measures to be taken by the proponent to address such impacts.

(6) All comments received by the Agency from the public or any Government Agency, local authority or local council shall be collated, tabulated, and shall be duly considered before a decision on the environmental impact assessment.

10. Review.- (1) The Agency shall make every effort to carry out its review of the initial environmental examination within thirty days, and environmental impact assessment within forty-five days, of issuance of confirmation of completeness under clause (a) of sub-regulation (1) of regulation 8.

(2) In reviewing the initial environmental examination or environmental impact assessment, the Agency may consult such

Committee of Experts as may be constituted for the purpose by the Director General, and may also solicit views of the Sectoral Advisory Committee, if any, constituted by Government under subsection (6) of section 5 of the Act.

(3) The Director General may, where he considers it necessary, constitute a Committee to inspect the site of a project and submit its report on such matters as may be specified.

(4) Depending upon the type of project, the review of the initial environmental examination or environmental impact assessment by the Agency may:

(a) be based on quantitative and qualitative assessment of documents and data furnished by the proponent, comments from public and Government Agencies, local authority or local council received under regulation 9, and views of the depending upon the type of project, Committees under sub-regulations (2) and (3); and

(b) consider the life cycle of the project, best available technologies and any social impacts of the project through its life cycle, assess any relevant measures of reduction, recycling, or re-use that may be employed by the project proponent.

11. Approval.- On completion of review, approval of the Agency shall be communicated to the proponent in the form prescribed in Schedule-V in case of an initial environmental examination, and in the form prescribed in Schedule-VI in case of an environmental impact assessment.

12. Conditions of approval.- (1) Every approval of an initial environmental examination or environmental impact assessment shall, in addition to such conditions as may be imposed by the Agency, be subject to the condition that the project shall be designed and constructed strictly in accordance with the initial environmental examination or environmental impact assessment, unless any variation thereto have been specified in the approval by the Agency.

(2) Where the Agency accords its approval subject to certain conditions, the proponent shall:

(a) before commencing construction of the project, acknowledge acceptance of stipulated conditions by executing an undertaking in the form prescribed in Schedule-VII; and

(b) before commencing operation of the project, obtain from the Agency written confirmation that the conditions of approval, and the requirements in the initial environmental examination or environmental impact assessment, as the case may be, relating to

design, construction, adoption of preventive, mitigatory, compensatory and other measures, and other relevant matters have been duly complied with.

13. Confirmation of compliance.- (1) The request for confirmation of compliance under clause (b) of sub-regulation (2) of regulation 12 shall be accompanied by an Environmental Management Plan indicating the measures and procedures proposed to be taken to manage or mitigate the environmental impacts for the life of the project, including provisions for monitoring, reporting and auditing.

(2) Where a request for confirmation of compliance is received from a proponent, the Agency may carry out such inspection of the site, plant and machinery, and seek such additional information from the proponent as it may deemed fit:

Provided that every effort shall be made by the Agency to provide the requisite confirmation or otherwise within fifteen days of receipt of the request, with complete information, from the proponent.

(3) The Agency may, while issuing the requisite confirmation of compliance, impose such other conditions as to the Environmental Management Plan, and operation, maintenance and monitoring of project as it deemed fit, and such conditions shall be deemed to be included in the conditions to which approval of the project is subject.

14. Deemed approval.- The four months period for communication of the Agency's approval stipulated in subsection (4) of section 12 of the Act shall commence from the completion of preliminary scrutiny under clause (a) of sub-regulation (1) of regulation 8.

15. Extension in review period.- Where the Government in a particular case extends the period of four months for communication of approval prescribed in subsection (5) of section 12 of the Act, it shall, in consultation with the Agency, indicate the various steps of the review process to be taken during the extended period, and the estimated time required for each step.

16. Validity period of approval.- (1) The approval accorded by the Agency under section 12 of the Act read with regulation 11 shall be valid, for commencement of construction, for a period of three years from the date of issue.

(2) After issuance of confirmation of compliance under regulation 13, the approval for the commencement of operation of the project or business shall be valid for a period of three years from the date of issuance of the confirmation of compliance.

(3) The proponent may apply to the Agency for extension in validity periods mentioned in sub-regulations (1) and (2) which may be granted by the Agency in its discretion for such period not exceeding three years at a time, if conditions of environmental approval do not require significant change:

Provided that the Agency may require proponent to submit a fresh initial environmental examination or environmental impact

assessment, if the changes in location, design, construction, and operation of the project so warrant.

17. Entry and inspection.- (1) For the purposes of verification of any matter relating to review or to conditions of approval of an initial environmental examination or environmental impact assessment prior to, during, or after the commencement of construction or operation of a project, duly authorized staff of the Agency shall be entitled to enter and inspect a project site, factory building and plant, and equipment installed therein.

(2) The proponent shall ensure full cooperation of project staff at site to facilitate the inspection and provide such information and documentation as may be required by the Agency for this purpose and pursuant thereto.

18. Monitoring.- (1) After issue of approval, the proponent shall submit a report to the Agency on completion of construction of the project.

(2) After the commencement of operation of the project or business, the proponent shall submit an annual report summarizing the operational performance of the project, with reference to the conditions of approval and maintenance, and preventive, mitigatory or compensatory measures being adopted by the project and compliance with the Environmental Management Plan submitted under regulation 13.

(3) To enable the Agency to effectively monitor compliance with the conditions of approval, the proponent shall furnish such additional information as the Agency may require.

19. Cancellation of approval.- (1) Notwithstanding anything contained in the regulations, if, at any time, on the basis of information or report received or inspection carried out, the Agency is of the opinion that the conditions of approval have not been complied with, or that the information supplied by the proponent in the approved initial environmental examination or environmental impact assessment is incorrect, it shall issue notice to the proponent to show cause within two weeks of its receipt thereof, why the approval should not be cancelled.

(2) If no reply is received or if the reply is considered unsatisfactory, the Agency may, after affording the proponent an opportunity of being heard:

(a) require the proponent to take such measures and to comply with such conditions within such period as it may specify, failing which the approval shall stand cancelled; or

(b) cancel the approval.

(3) On cancellation of the approval, the proponent shall cease construction or operation of the project forthwith.

(4) The Agency may circulate the cancellation of approval of a

project to the concerned Government Agencies.

(5) Action taken under the regulations shall be without prejudice to any other action that may be taken against the proponent under the Act or rules or regulations or any other law for the time being in force.

20. Registers of initial environmental examination and environmental impact assessment projects.- Separate registers (hard or soft) to be maintained by the Agency for initial environmental examination and environmental impact assessment projects under subsection (7) of section 12 of the Act shall be in the form prescribed in Schedule-VIII.

21. Environmentally sensitive areas.- (1) The Agency may, by notification in the official Gazette, designate an area to be an environmentally sensitive area.

(2) For an area to be declared as an environmentally sensitive, the District Administration concerned or any other concerned Government Agency (Wildlife and Parks Department and Forest Department, *etc.*) shall forward the following, in writing, to the Agency:

(a) the specific area along with Khasra and Khewat Nos. to be declared as environmentally sensitive; and
(b) the reasons for declaring as above.

(3) Notwithstanding anything contained in regulations 3, 4 and 5, the proponent of a project situated in an environmentally sensitive area shall be required to file an environmental impact assessment with the Agency.

(4) The Agency may from time-to-time issue guidelines to assist proponents and other persons involved in environmental assessment process to plan and prepare projects located in environmentally sensitive areas.

(5) Where guidelines have been issued under sub-regulation (3), projects shall be planned and prepared, to the extent practicable, in accordance therewith and any departure therefrom justified in environmental impact assessment pertaining to projects.

22. Environmental Assessment Advisory Committee.- For purposes of rendering advice on all aspects of environmental assessment, including guidelines, procedures and categorization of projects, the Director General shall constitute an Environmental Assessment Advisory Committee comprising:

(a)	Director (EIA)	Chairman
(b)	one representative of Industries, Commerce, Investment and Skills Development Department	Member
(c)	one representative of Chamber of Commerce and Industries	Member

(d)	Deputy Director (EIA)	Secretary

23. Other approvals.- Issue of an approval under section 12 of the Act read with regulation 11 shall not absolve a proponent of the duty to obtain any other approval or consent that may be required under any law for the time being in force.

24. Savings.- All orders made, notifications issued, actions taken under the Pakistan Environmental Protection Agency, Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000 shall remain in force until amended, altered or repealed by the provisions of the regulations.

SECRETARY
GOVERNMENT OF THE PUNJAB
ENVIRONMENT PROTECTION DEPARTMENT"

AKHTAR JAVAID
SECRETARY
Government of the Punjab
Law and Parliamentary Affairs Department

SCHEDULE - I

(See Regulation 3)

List of projects requiring an IEE

A: Agriculture, Livestock and Fisheries etc.

1. Controlled Poultry Farms, Hatchery, Livestock, stud and fish farms with total cost more than Rs 10 million
2. Projects involving repacking, formulation or warehousing of agricultural products

B: Energy

1. Hydroelectric power generation *from 1 MW to* 50MW
2. Transmission lines *from* 11 kV *to 132 kV,* and large distribution projects *up to 132 kV*
3. Oil and gas transmission systems
4. Renewable Energy projects (including *wind and solar) greater than 05 MW upto 100MW and* biogas plants *for commercial purposes)*
5. Waste-to-energy generation projects

C. Manufacturing and processing

1. Apparel (including garments and leather stitching units), cotton, spinning mills, woolen mills, weaving mills and manual carpet weaving units;
2. Food processing industries including beverages, milk and dairy products with total cost less than Rs 200 million
3. Synthetic resins, plastics and man-made fibers
4. Flour mill, Rice mills, edible oils, fats and vegetable ghee and Feed Mills
5. Rubber products with total cost less than Rs. 100 million
6. Chemical formulation units
7. Brick Kilns

D. Mining and mineral processing

1. Commercial extraction of sand gravel, limestone, clay, Sulphur and other minerals not included in schedule III with total cost less than 500 million
2. Exploration of coal, gold, copper, Sulphur and precious stones
3. Crushing, grinding and separation processes including stone crushers

E. Transport

Federal or Provincial highways (except the maintenance, rebuilding or reconstruction of existing metalled roads) with total cost less than Rs 50 million

F. Water management, dams, irrigation and flood protection

1. Small Dams and reservoirs

2. Irrigation and drainage projects

G. Water Supply and Treatment

Water supply schemes and treatment plants with total cost less than Rs. 50 million

H. Waste disposal

Non-hazardous scrap yard / warehouse.

I. Urban development and tourism

1. Housing Schemes less than 300 kanals including Land sub-divisions
2. Multistoried buildings, residential apartments, educational institutions, restaurants and hotels with height more than 70 feet and area more than 02 kanals.
3. Medical colleges and universities, research institutes
4. Hospitals less than 50 beds
5. Urban development projects

J. Other projects

Any other project for which filing of an IEE is required by the *Provincial* Agency under sub regulation (2) of Regulation 5

SCHEDULE II
(See Regulation 4)
List of projects requiring an EIA

A. Energy

1. Hydroelectric power generation over 50MW
2. Transmission lines more than 132 kV and grid stations
3. Nuclear power plants
4. Petroleum refineries
5. Oil and gas extraction projects including exploration, production, gathering systems, separation and storage
6. Renewable Energy projects (including wind and solar) more than 100 MW

B. Manufacturing and processing

1. Cement plant
2. Chemical manufacturing units, including pharmaceuticals and cosmetic
3. Sugar mills and Distilleries
4. Food processing industries including, beverages, milk and dairy products with total cost more than Rs 200 million
5. Paper and paperboard, paper pulping, paints and dyes,
6. Textile units comprising of dyeing & printing
8. Pesticides and fertilizer manufacturing units
9. Poultry waste processing units / rendering units
10. Tannery and leather units
11. Rubber projects with total cost more than Rs. 100 million
12. Battery Manufacturing and Recycling Plants
13. Ceramics and glass units
14. Electro plating and nickel/chrome plating including Surgical Units
15. Cutlery units
16. Slaughter House
17. Iron and steel rolling mills
18. Steel Furnaces
19. Smelting plants
20. Auto mobile manufacturing and assembling units
21. Resource Recovery Units

C. Mining and mineral processing

1. Mining and processing of coal, gold, copper, Sulphur and precious stones

2. Mining and processing of major non-ferrous metals.
3. Commercial extraction of sand using dredger

D. Transport

1. Airports
2. Highways, Motorways, Express ways or major roads
3. Ports and harbor development for ships of 500 gross tons and above
4. Railway works
5. Flyovers, underpass and bridges having total length of more than 500 meters

E. Water management, dams, irrigation and flood protection

1. Medium and large Dams and reservoirs

F. Water supply, Sewerage System and treatment

1. Water supply schemes and treatment plants (excluding the Reverse Osmosis, Ultra filtration and such like) with total cost more than Rs. 50 million
2. Wastewater channels / Sewerage System Schemes
3. Combined Wastewater Treatment Plants with treatment capacity greater than 100m^3/hr

G. Waste Storage and Disposal

1. Landfill sites
2. Waste Incinerators and autoclaves
3. Hazardous substance or waste storage warehouse

H. Urban development and tourism

1. Housing Schemes more than 300 kanals
2. Large-scale tourism development projects
3. Hospitals having more than 50 Beds
4. Hotels with more than 100 rooms
5. Industrial estates (including export processing zones)

I. Environmentally Sensitive Areas

All projects situated in environmentally sensitive areas

J. Other projects

Any other project for which filing of an EIA is required by the *Provincial* Agency under sub-regulation (2) of Regulation 5.

SCHEDULE III
[See Regulation 6 & 7(b)]

IEE and EIA Review Fee

Total Project Cost	IEE	EIA
Upto Rs. 5,000,000	NIL	NIL
Rs. 5,000,001 to 10,000,000	Rs. 10,000	Rs. 15,000
Greater than Rs. 10,000,000	Rs. 15,000	Rs. 30,000

SCHEDULE IV
[(See Regulation 7(1)(a)]
Application Form

1.	Proponent details	i. Name of proponent ii. Name of CEO/Partner/MD/Proprietor iii. Office address of proponent iv. Email of proponent
2.	Consultant details	i. Name of consultant ii. Valid certificate of Practice of consultant iii. Letter of authority from proponent in favor of consultant
3.	Project details	i. Location of project _____ ii. Alternative sites, if any_____ iii. Google or scale map of project (and alternative) vicinity clearly showing the distance from nearest settlement, water bodies or other notable geographical features/protected or reserved forests/National Parks/Environmentally Sensitive Areas (Attached) ☐ iv. Objective of project _____ v. Description of project through its life cycle, including details of costs, land required, capacity and production capability, as applicable _____ vi. Project sub-components that fall within list of projects enumerated in Schedule I or II and, if so, details of each_____
4.	Project Category	i. Mention Schedule of Regulations ii. Attached: IEE ☐ EIA ☐
5.	IEE / EIA details	i. Baseline data on meteorology, ambient air quality and groundwater quality ii. Assessment of potential adverse environmental impacts iii. Identification of environmental impacts of the project through its life cycle iv. Assessment of social impacts of project v. Identification and description of preventive, mitigatory and compensatory measures to be adopted vi. Environment Management Plan vii. Monitoring arrangements viii. Project construction labor details_____ ix. Project operation details

Verification. I do solemnly affirm and declare that the information given above and contained in the attached IEE / EIA is true and correct to the best of my knowledge and belief.

Name and designation of proponent ----------
Official stamp/seal) ----------
Signature ----------
Date ----------

SCHEDULE VI
(See Regulation 11)
Decision on IEE

1. Name and Address of Proponent ----------

2. Description of Project ----------

3. Location of Project ----------

4. Date of Filling of IEE ----------

5. After careful review of the IEE, the Provincial Agency has decided –

(a) to accord its approval, subject to the following conditions:

---

or

(b) that the proponent should submit an EIA on the following grounds:

[Delete (a) or (b), whichever is inapplicable]

Dated: ----------

Tracking No. ----------

SCHEDULE VII
[See Regulation 11]

Decision on EIA

1. Name and Address of Proponent ----------
2. Description of Project ----------
3. Location of Project ----------
4. Date of Filling of EIA ----------
5. After careful review of the EIA, and all comments thereon, the Provincial Agency has decided:

(a) to accord its approval, subject to the following conditions:

---or

(b) that the proponent should submit an EIA with the following modifications–

--- or

(c) to reject the project, being contrary to environmental objectives, for the following reasons:

[Delete (a)/(b)/(c), whichever is inapplicable]

Date: ----------

Tracking No. ----------

SCHEDULE VIII
[See Regulation 12(2)(a)]

UNDERTAKING

I, ---------- (full name and address) as proponent for ---------- (name, description and location of project) do hereby solemnly affirm and declare that I fully understand and accept the conditions contained in the approval accorded by the Provincial Agency bearing tracking no. ---------- dated ---------- and undertake to design, construct and operate the project strict in accordance with the said conditions and the IEE/EIA/IEE Checklist.

Date ----------

Signature, ----------
Name and Designation of Proponent

Official stamp/seal ----------

Witnesses
(full names and addresses)
1. ----------
2. ----------

SCHEDULE IX

[See Regulation 20]

FORM OF REGISTERS FOR IEE AND EIA PROJECTS

No.	Description	Relevant Information
1.	Tracking Number	
2.	Category type (as per Schedules I and II)	
3.	Name of Proponent	
4.	Name and designation of contact person	
5.	Description and Category of project	
6.	Location of project	
7.	Project capital cost	
8.	Date of receipt of IEE/EIA/	
9.	Approval granted (Yes/No)	
10.	Date of approval granted or refused	
11.	Date of extension of approval validity	
12.	Date of Issue of confirmation of compliance	
13.	Date of cancellation, if applicable	

Annexure-III

Schedule Implementation Plan

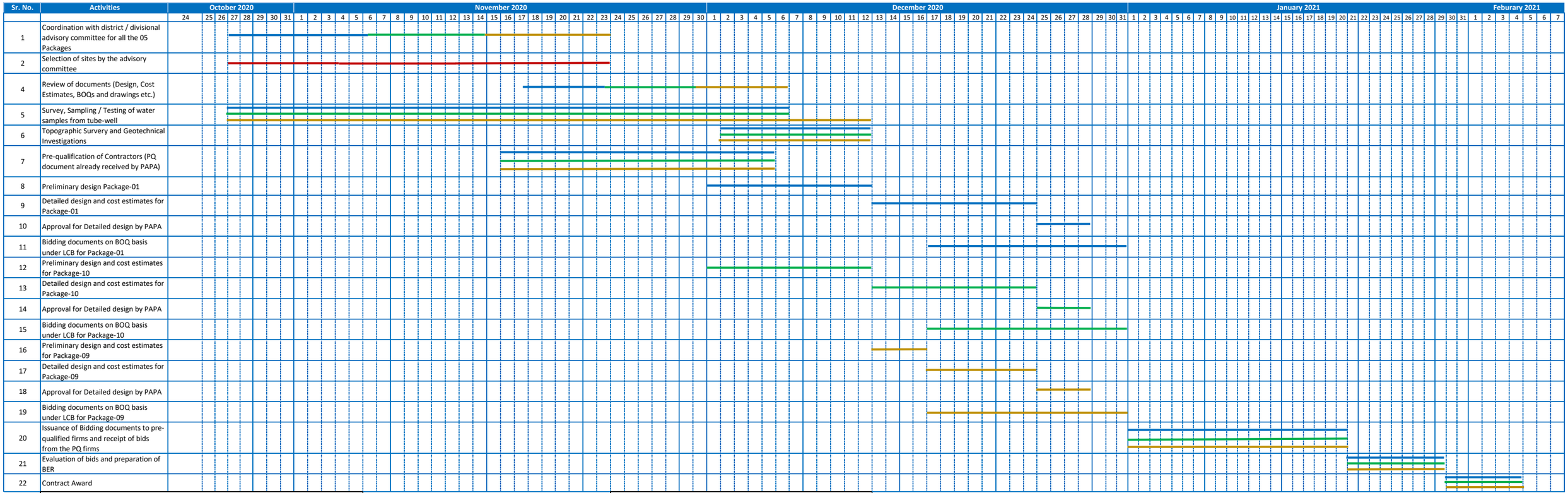
Punjab Aab-e-Pak Authority

Activity Schedule for 03 Contract Packages as per approved PC-I (Stage-I)

1. Package-01 for Rawalpindi Dvision - Direct Supply + UF/RO Plants (Priority Area)

2. Package-10 for Sargodha and Gurjanwala Division (Direct Supply)

3. Package-09 for Sargodha and Gurjanwala Division (UF/RO Plants)



Packages Detail:

Description	Direct Supply	RO Plant	UF Plant
1. Package-01 for Rawalpindi Dvision - D	122	17	8
2. Package-10 for Sargodha and Gurjanv	147	-	-
3. Package-09 for Sargodha and Gurjanv	-	169	14

Legend

1. Package-01
2. Package-09
3. Package-10

Critical

Annexure-IV

Summary of Cost Estimate for Sargodha Division

Package - 9 & 10

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Filtration Plants in Sargodha Division-Package 09

Summary of Cost Estimate-Package 9

Sub Head B- Sargodha Divison

Sr. No.	Description	Quanitity	Unit Rates	Amount (Rs)
Sub Head B-1 : Filtration Plant Room (12' x 12')				
1	Civil Works + Plumbing	124	675,450	83,755,744
2	Electrical Works	124	100,123	12,415,262
	Sub Total B-I			**96,171,006**
Sub Head B-2 : Borehole & Raw water Pump				
1	Boring/drilling up to 60 meter	124	229,361	28440764
	Sub Total B-2			**28,440,764**
Sub Head No. B-3: Injection Well				
1	Boring/drilling up to 300 feet (90 meter)	40	207,391	8295658
	Sub Total B-3			**8,295,658**
Sub Head C : Pre Filtration Plant of 2m^3/hr (Sand & Activated Carbon Filter)				
1	Supply, Installation, testing & commissioning of 2000 L/H Pre Filtration Plant	18	374,400	6,739,200
	Sub Total C			**6,739,200**
Sub Head C-I :Prefiltration Plant of 2m^3/hr with Flouride and Arsenic removal Kit				
1	Supply, Installation, testing & commissioning of 2000 L/H Pre Filtration Plant	2	374,400	748,800
2	Fluoride removal Kit	2	456,000	912,000
3	Arsenic removal Filter	2	421,200	842,400
	Sub Total D			**2,503,200**
Sub Head C-II :Prefiltration Plant of 2m^3/hr with Flouride removal kit				
1	Supply, Installation, testing & commissioning of 2000 L/H Pre Filtration Plant	1	374,400	374,400
2	Fluoride removal Kit	1	456,000	456,000
	Sub Total D			**830,400**

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Filtration Plants in Sargodha Division-Package 09

Summary of Cost Estimate-Package 9

Sub Head B- Sargodha Divison

Sr. No.	Description	Quanitity	Unit Rates	Amount (Rs)
Sub Head C-III :Prefiltration Plant of 2m^3/hr with Flouride removal kit				
1	Supply, Installation, testing & commissioning of 2000 L/H Pre Filtration Plant	3	374,400	1,123,200
	Arsenic removal Kit	3	421,200	1,263,600
	Sub Total D			**2,386,800**
Sub Head No. D: Reverse Osmosis Plant of 2m^3				
1	Supply, Installation, testing & commissioning of 2000 L/H Reverse Osmosis Plant	100	1,932,000	193,200,000
	Sub Total E.			**193,200,000**
Sub Head E : Liquid Chlorination				
1	Liquid Chlorination/Dysinfection	24	59,600	1430400
	Sub Total F			**1,430,400**
			Total	**339,997,428**

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Filtration Plants in Sargodha Division-Package 09

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Sr. No.	Ref	Description	Unit	Quantity	Unit Rate (Rs)	Amount (Rs)
1st BI-Annual-2020 (1st Jan to 30th Jun) Sargodha						
Civil Works						
		Excavation				
1	3/21/b	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and ramming lead upto one chain (30 m) and lift upto 5 ft. (1.5 m)				
		in ordinary soil.	1000Cft	0.72	7,687.15	5,571
		Anti Termite				
2	26/42	Spraying anti-termite liquid mixed with water in the ratio of 1:40.	100Sft	10.37	242.10	2,509
3	3/15	Filling, watering and ramming earth under floors:-				
		i) with surplus earth from foundation, etc.	1000Cft	0.43	3,685.45	1,603
		Cement Concrete				
4	6/3/b	Cement concrete brick or stone ballast 1½ " to 2" (40 mm to 50 mm) gauge, in foundation and plinth:-				
		Ratio 1: 4: 8	100Cft	2.18	14,327.40	31,180
		Brick work in Foundation				
5	7/4/i	Pacca brick work in foundation and plinth in:-				
		Cement, sand mortar:- Ratio 1:5	100Cft	3.85	24,406.10	93,871
		Horizontal D.P.C				
6	6/33	Providing and laying damp proof course of cement concrete 1:2:4 (using cement, sand and shingle), including bitumen coating :-				
		(a) with one coat bitumen and one coat polythene sheet 500gauge				
		i) 1-1/2" thick (40 mm)	100Sft	1.01	5,112.35	5,171
		Vertical DPC				
7	6/35/a/i	Providing and laying vertical damp proof course with cement sand plaster and bitumen coating:-				
		(a) with one coat of bitumen and one coat of polythene sheet 500 gauge:				
		i) Ratio 1: 4				
		b) ¾" thick (20 mm)	100Sft	0.89	3,709.85	3,283
		Brick work in Super Structure				
8	7/5	Pacca brick work in ground floor:-				
		i) Cement, sand mortar:- Ratio 1:5	100Cft	5.28	25,963.15	137,004

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Sr. No.	Ref	Description	Unit	Quantity	Unit Rate (Rs)	Amount (Rs)
		Concrete Work				
9	6/6	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-				
		(a) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-				
		Type C (nominal mix 1: 2: 4)	P.Cft	107.05	381.10	40,796
		Steel Work.				
10	6/9-c	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-				
		Deformed bars (Grade-60)	100kg	3.44	16,454.45	56,643
		Flooring				
		Sand Filling				
11	7/30	Supplying and filling sand under floor; or plugging in wells.	100Cft	0.60	2,043.15	1,226
		Brick ballast				
12	6/2	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	1.20	4,972.45	5,967
		Cement Concrete				
13	6/5/f	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):				
		(f) Ratio 1: 2: 4	100Cft	0.53	22,951.35	12,120

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Sr. No.	Ref	Description	Unit	Quantity	Unit Rate (Rs)	Amount (Rs)
		Topping				
14	10/24	Laying floor of approved coloured glazed tiles ¼ "(6 mm) thick, laid in white cement and pigment on a bed of ¾" (20 mm) thick cement mortar 1:2	100Sft	2.34	15,623.10	36,558
		Skirting				
15	10/36	Providing grey cement skirting or dado 3/8"(10 mm) thick including rounding of corner and straight ening of top edge and finishing to smooth surface after plastering.				
		1:3 cement, sand mortar	100Sft	0.24	4,150.05	996
16	10/15/c	Providing and laying topping of cement concrete 1:2:4, including surface finishing and dividing in panels:-				
		(c) 1½"(40 mm) thick	100Sft	1.43	4,326.20	6,165
		Slab Plaster				
17	11/10/b	Cement plaster 3/8" (10 mm) thick under soffit of RCC. roof slabs only, upto 20' height.				
		b) 1:3	100Sft	1.82	2,450.45	4,466
		Cement Plaster				
18	11/9	Cement plaster 1:4 upto 20' (6.00 m) height:-				
		1/2" (13 mm) thick	100Sft	7.16	2,151.60	15,405
19	11/18	Cement pointing struck joints, on walls, upto 20' (6.00 m) hiehgt:-				
		b) ratio 1:3	100Sft	7.07	2,233.50	15,791
20	11/22	Priming coat of chalk under distemper.	100Sft	8.98	187.75	1,686
		Distempering				
21	11/23	Distempering:-				
		iii) three coats	100Sft	8.98	787.90	7,077
22	11/31	Extra cost of labour and material for red oxide pigment in cement pointing to match with the colour of bricks.	100Sft	7.07	439.40	3,107

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Filtration Plants in Sargodha Division-Package 09

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Sr. No.	Ref	Description	Unit	Quantity	Unit Rate (Rs)	Amount (Rs)
		Steel Door				
23	25-31	Making and fixing steel grated door with 1/16" thick (1.5mm) sheeting, including angle iron frame 2"x2"x 3/8" (50x50x10 mm) and ¾" (20 mm) square bars 4" (100 mm) centre to centre, with locking arrangement.	Sft	49.00	1,252.40	61,368
		Door Lock				
24	12/18/ii	Providing and fixing sliding bolt to doors:-				
		ii) iron sliding bolt, 12" (300 mm) long	Each	1.00	373.25	373
		Paint				
25	13/5/c	Painting new surface:- Preparing surface and painting of doors and windows any type (including edges):-				
		i) priming coat.	100Sft	2.89	858.30	2,476
		ii)Two coat	100Sft	2.89	446.15	1,287
		Steel Window				
26	25/41-b-v	Providing and fixing steel windows with openable glazed panels, using beam section for frame 1½"x1"x5/8"x1/8" (40x25x16x3 mm), Z-section for leaves ¾"x1"x¾"x1/8" (20x25x20x3 mm), T-section sashes 1"x1"x1/8" (25x25x3 mm), glass panes, wooden screed for glazing embedded over a thin layer of putty duly screwed with leaves, brass fittings, holdfast, duly painted, complete in all respects, including all cost of material and labour, etc. as per approved design and as directed by the Engineer-in-charge:-				
		b) fixed with wire gauze, 22 SWG				
		v) glass pane 5 mm thick	Sft	16.00	565.45	9,047
27	26/37	Supplying and laying polythene sheet over D.P.C. under floors and on roofs, etc.				
		i) 300 gauge (.003" thick)	Sft	182.25	3.45	629
		Roof Insulation				
28	9/35	Single layer of tiles 9"x4½"x1½" (225x113x40 mm) laid over 4"(100 mm) earth and 1" (25 mm) mud plaster without Bhoosa, grouted with cement sand 1:3 on top of RCC roof slab, provided with 34 lbs. per %Sft. or 1.72 Kg/Sq.m bitumen coating sand blinded.	100Sft	1.82	7,743.50	14,113
		Khurras				
29	9/15	Khuras on roof 2'x2'x6" (600 x 600 x 150 mm)	Each	1.00	559.95	560

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Sr. No.	Ref	Description	Unit	Quantity	Unit Rate (Rs)	Amount (Rs)
30	9/16	Bottom Khuras of brick masonry in cement mortar 1:6, 4'x2'x4½" (1200x600x113 mm) over 3" (75 mm) cement concrete 1:4:8.	Each	1.00	977.45	977
		Tuff Paver				
31	10/43	Providing and laying Tuff pavers, having 7000PSI ,crushing strength of approved manufacturer, over 2"to3"sand cushion i/c grouting with sand in joints i/c finishing to require slope. complete in all respect. (50% Grey / 50% Coloured)				
		a) 50-mm thick	Sft	72.00	96.30	6,934
		Steel Works				
32	25/10	Fabrication of heavy steel work, with angle, tees, flat iron round iron and sheet iron for making trusses, girders, tanks, etc., including cutting, drilling, revitting, handling, assembling and fixing, but excluding erection in position.	100Kg	2.24	18,116.95	40,571
33	25/11	Erection and fitting in position iron trusses, staging of water tanks, etc.	100Kg	2.24	851.70	1,907
34	21/8	Constructing standard gully grating chamber, 3'x2½' (900x750 mm), with chinaware trap as per PHED Drawing STD/PD No. 3 of 1977, complete in all respects.	Each	1.00	11,207.55	11,208
		Total "A"				**639,646**
		<u>Plumbing Works</u>				
35	9/20-a	Cast iron rain water downpipe fixed in position, excluding heads and shoes, but including painting and clamps, etc:-				
		a) 4" dia (100 mm) cast iron down pipe.	P.Rft	40.00	232.15	9,286
36	9/21	Rain water down pipe cast iron head fixed in place, including cost of clamp holdfast and painting	Each	4.00	588.55	2,354
37	9/22	Shoes, bends or offsets for cast iron rain water down pipe, including fixing and painting.	Each	4.00	339.65	1,359
38	26/23-b	Providing, laying, cutting, jointing, testing and disinfecting P.V.C. pipe line with `B' Class working pressure pipe, in trenches, complete in all respects:-				
		b) 4" i/d (100 mm)	P.Rft	30.00	263.40	7,902

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Filtration Plants in Sargodha Division-Package 09

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Sr. No.	Ref	Description	Unit	Quantity	Unit Rate (Rs)	Amount (Rs)
39	19/26-ii	Providing and fixing chromium plated bib cock:- ii) 1.5 cm (1/2").	Each	6.00	340.60	2,044
40	19/8	Providing and fixing brass ball float valve:-				
		v) 4.0 cm (1½") dia	Each	1.00	559.25	559
		PPRC Pipe				
41	Market Rate	Providing, fixing, jointing and testing Polypropylene Random (PPR) PN20 pressure pipe for cold, hot and hot water return water as per DIN 8077-8078 for pipes and DIN 16962, PN25 for fittings (polyfusion welded joints) inside building including fittings and specials (sockets, tees, elbows, bends, crosses, reducers, adaptor, plugs and union etc.) supported on walls or suspended from roof slab or run in chases including pipe hangers, supports, walls cutting for pipelines, complete in all respect as per specifications and drawings as well as directed by the Engineer.				
		25mm dia	Rft	10.00	86.00	860
		50mm dia	Rft	40.00	286.00	11,440
		Total "B"				**35,804**
		Total "A+B"				**675,450**

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Filtration Plants in Sargodha Division-Package 09

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Electrical Works

Sr. No.	Ref	Description	Unit	Qty.	Unit Rate (Rs)	Amount (Rs)
1st BI-Annual-2020 (1st Jan to 30th Jun) Sargodha						
1	CH-24/3 ii) & iii)	Supply and erection of PVC pipe for wiring recessed in walls, floors, roofs including inspection boxes, pull boxes, hooks, cutting jharries, and repairing surface, etc., complete with all specials.				
		i) 20 mm	Rft	180.00	48.05	8,649
		ii) 25 mm	Rft	25.00	55.3	1,383
2	CH-24/1-a ii)	Supply and erection of G.I. pipes for wiring purposes, including pull boxes, inspection boxes, bends, tees, etc. complete with all specials (on surface, including clamps, etc.)				
		i) 20 mm	Rft	10.00	113.8	1,138
3	CH-24/13-a v)	Supply and erection of PVC insulated, PVC sheathed twin core, 250/440 volts copper conductor cables for service connection, in prelaid pipe/G.I. wire/trenches, etc. (rate for cable only):-				
		i) 7/0.044"	Rft	22.00	70.8	1,558
4	CH-24/11 i), ii), iii) & vi)	Supply and erection of single core PVC insulated, PVC sheathed copper conductor, 250/440 volts grade cable (BSS-2004), in prelaid PVC pipes / M.S. conduit / G.I. pipe / wooden strip batten / wooden casing and capping / trenches, etc. (rate for cable only):-				
		i) 3/0.029"	Rft	220.00	12.3	2,706
		ii) 3/0.036"	Rft	190.00	15.30	2,907
		iii) 7/0.029"	Rft	55.00	19.60	1,078
		vi) 7/0.064"	Rft	18.00	70.95	1,277
5	CH-24/39 i)	Supply and erection of button holder (bakelite large size).	No.	2.00	33.25	67
6	CH-24/31(ii)	Supply and erection of switches 5 Amp Piano type	No.	4.00	38.3	153

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Electrical Works

Sr. No.	Ref	Description	Unit	Qty.	Unit Rate (Rs)	Amount (Rs)
7	CH-24/43 ii)	Supply and erection of Single rod (40 watts) with one choke and one starter tube light, including rod, choke, starter with frame, flexible wire, including connection from ceiling rose, etc., complete.	Set	2.00	737.5	1,475
8	CH-24/49	Supply and erection of 3/8" (10 mm) dia M.S. bar fan hook, placed at the time of casting of slab.	No.	1.00	43.90	44
9	CH-24/30	Supply and erection of ceiling rose, bakelite.	No.	1.00	41.65	42
10	CH-24/79	Supply and fitting of regulator knob with shaft and plat of electric fan regulator.	No.	1.00	126.65	127
11	NS	Supply and erection of Recessed Mounted Fluorescent Light Weather Proof Fixture, complete with 1x36 Watt Fluorescent Rods, complete in all respect as approved by the engineer.	Set	1.00	4,500.00	4,500
12	NS	Supply, installation and commissioning of ceiling fan 56" Sweep complete with capacitor, hanging rod, canopy blades, of approved quality, nuts, bolts, from recommended manufacturer, complete in all respects.	No.	1.00	4,200.00	4,200
13	NS	Supply, installation and commissioning of Exhaust Fans 12" size metallic body, louvers, all necessary fixing accessories, from recommended manufacturer, complete in all respects.	No.	1.00	3,065.00	3,065
14	NS	Supply and erection of 2 Pin switch with socket.	No.	1.00	350.00	350
15	NS	Supply and erection of Recessed Mounted Fluorescent Light Weather Proof Fixture, complete with 2x36 Watt Fluorescent Rods, complete in all respect as approved by the engineer.	Set	1.00	5,526.10	5,526
16	NS	Supply and installation of 4" deep u-PVC concealed switch box for recessed wiring, including making holes for regulators, switches, plugs, etc.	No.	2.00	34.94	70

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Filtration Plants in Sargodha Division-Package 09

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Electrical Works

Sr. No.	Ref	Description	Unit	Qty.	Unit Rate (Rs)	Amount (Rs)
		MDB (MAIN DISTRIBUTION BOARD)				
17	NS	Fabrication, supply, installation, testing and commissioning of Main Distribution Board (MDB) comprising of cubicles, frame made of sheet steel 14 SWG and doors of 16 SWG, with flexible earthing straps, degreased and derusted, finished with electro-static powder coating of 50 micron thickness in approved color, panel housing to comply with protection class IP-54, indoor concealed type, with hinged door, lockable handle, all auxiliaries, internal wiring, designation labels on MCCB, DOL containging Magnetic Contactors, Over load Relay as per motor rating control wiring for ON-OFF Push Buttons, Indication lights, Terminal Blocks for Remote control of Motor or for interlocking purpose, earthing bar, numbering beads on the control wires, panel suitable for system Voltage 230 V, 50Hz, 1Phase and neutral, bus bars of 99.8% purity electrolytic copper, including cost of cable termination lugs, brass cable glands for incoming & outgoing cables, wiring from breakers, indication lamps, instruments and control including. All incoming and outgoing breakers shall be accessible by opening the front door having additional M.S. sheet cover. Gaskets shall also be provided where necessary. MCCB shall be suitable to operate without any de-rating at 50°C ambient temperature and shall be of one make. only and not a mixture of more than one make. The front and back sides of MDB shall also have louvers at bottom and sides of panel for hot air exhaust, complete in all respects as approved by Engineer In charge.				
		<u>Incoming</u> 01 x 16 Amps DP 10 KA MCB 01 x 6 Amps SP MCB 6 KA for Control 01 x Indication Light R, LED Type 01 x Digital Voltmeter 0-500 V.				
		<u>Outgoing</u> 06 x 5 Amps SP MCB 6 KA				

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Filtration Plants in Sargodha Division-Package 09

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Electrical Works

Sr. No.	Ref	Description	Unit	Qty.	Unit Rate (Rs)	Amount (Rs)
		02 x DOL for 1.2kW Motor includes: MCB DP 10A BC 6KA EPC, TP Magnatic Contactor TC-9b 09@Ac3,Thermal over Load relay 2.5~4A,Auto Manual Switch,Push Button ON / OFF,Indication lights ON/OFF/ TRIP, MCB SP 06A for Control, Terminal Block 16mm, Terminal Block 6mm.				
		04 x DOL for 0.2kW Motor includes: MCB DP 2A BC 6KA EPC, TP Magnatic Contactor TC-9b 09@Ac3,Thermal over Load relay 1~1.6A,Auto Manual Switch,Push Button ON /OFF, Indication lights ON / OFF/ TRIP, MCB SP 06A for Control, Terminal Block 16mm, Terminal Block 6mm.	No.	1.00	51,310.00	51,310
18	NS	Supply, Installation, testing and commissioning of Earthing set complete with accessories (Rod length should be 3 meter) as per drawings. To achieve Earthing value less than 1 Ohm, complete in all respects as approved by Engineer In charge.	Set	1.00	8,500.00	8,500
		TOTAL COST OF ELECTRIFICATION WORKS (2)				**100,123**

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Direct Supply in Sargodha Division-Package 10

Summary of Cost Estimate-Package 10

Sub Head B- Sargodha Divison

Sr. No.	Description	Quanitity	Unit Rates	Amount (Rs)
Sub Head B-1 : Filtration Plant Room (12' x 12')				
1	Civil Works + Plumbing	22	675,450	14859890
2	Electrical Works	22	100,123	2202708
	Sub Total A-2.			**17,062,598**
Sub Head B-2 : Borehole & Raw water Pump				
1	Boring/drilling up to 60 meter	1	230,349	230349
	Sub Total A-3.			**230,349**
Sub Head B-3 : HDPE Pipe Line				
1	Providing, laying, cutting, jointing, testing and disinfecting HDPE pipe line 500 Rft in trenches as per specifications complete in all respects:-	21	175,475	3684973
	Sub Total A-4.			**3,684,973**
Sub Head C : Pre Filtration Plant of $2m^3$ (Sand & Activated Carbon Filter)				
1	Supply, Installation, testing & commissioning of 2000 L/H Pre Filtration Plant, carriage, loading / unloading charges inclusive of all taxes, conforming to standard specifications of filtration plants. The specifications along with equipment & accessories properly mounted in the frame/skid, Specifications attached	22	374,400	8,236,800
	Sub Total A-1.			**8,236,800**
Sub Head D : Liquid Chlorination				
1	Liquid Chlorination/Dysinfection Supply and installation of Liqued Dosing Pump with working pressure 5 - 7 Bar Imported, along with 100 liter capacity tank with all repects	22	59,600	1311200
	Sub Total A-5.			**1,311,200**
Sub Head E : Additional Plant Fluoride				
1	Flouride Removal Kit	5	456,000	2280000
	Sub Total A-6.			**2,280,000**
	Total Sub Head B			**32,805,919**

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Direct Supply in Sargodha Division-Package 10

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Sr. No.	Ref	Description	Unit	Quantity	Unit Rate (Rs)	Amount (Rs)
1st BI-Annual-2020 (1st Jan to 30th Jun) Sargodha						
Civil Works						
		Excavation				
1	3/21/b	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and ramming lead upto one chain (30 m) and lift upto 5 ft. (1.5 m)				
		in ordinary soil.	1000Cft	0.72	7,687.15	5,571
		Anti Termite				
2	26/42	Spraying anti-termite liquid mixed with water in the ratio of 1:40.	100Sft	10.37	242.10	2,509
3	3/15	Filling, watering and ramming earth under floors:-				
		i) with surplus earth from foundation, etc.	1000Cft	0.43	3,685.45	1,603
		Cement Concrete				
4	6/3/b	Cement concrete brick or stone ballast 1½ " to 2" (40 mm to 50 mm) gauge, in foundation and plinth:-				
		Ratio 1: 4: 8	100Cft	2.18	14,327.40	31,180
		Brick work in Foundation				
5	7/4/i	Pacca brick work in foundation and plinth in:-				
		Cement, sand mortar:- Ratio 1:5	100Cft	3.85	24,406.10	93,871
		Horizontal D.P.C				
6	6/33	Providing and laying damp proof course of cement concrete 1:2:4 (using cement, sand and shingle), including bitumen coating :-				
		(a) with one coat bitumen and one coat polythene sheet 500gauge				
		i) 1-1/2" thick (40 mm)	100Sft	1.01	5,112.35	5,171
		Vertical DPC				
7	6/35/a/i	Providing and laying vertical damp proof course with cement sand plaster and bitumen coating:-				
		(a) with one coat of bitumen and one coat of polythene sheet 500 gauge:				
		i) Ratio 1: 4				
		b) ¾" thick (20 mm)	100Sft	0.89	3,709.85	3,283
		Brick work in Super Structure				
8	7/5	Pacca brick work in ground floor:-				
		i) Cement, sand mortar:- Ratio 1:5	100Cft	5.28	25,963.15	137,004

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Direct Supply in Sargodha Division-Package 10

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Sr. No.	Ref	Description	Unit	Quantity	Unit Rate (Rs)	Amount (Rs)
		Concrete Work				
9	6/6	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-				
		(a) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-				
		Type C (nominal mix 1: 2: 4)	P.Cft	107.05	381.10	40,796
		Steel Work.				
10	6/9-c	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-				
		Deformed bars (Grade-60)	100kg	3.44	16,454.45	56,643
		Flooring				
		Sand Filling				
11	7/30	Supplying and filling sand under floor; or plugging in wells.	100Cft	0.60	2,043.15	1,226
		Brick ballast				
12	6/2	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	1.20	4,972.45	5,967
		Cement Concrete				
13	6/5/f	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):				
		(f) Ratio 1: 2: 4	100Cft	0.53	22,951.35	12,120

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Sr. No.	Ref	Description	Unit	Quantity	Unit Rate (Rs)	Amount (Rs)
		Topping				
14	10/24	Laying floor of approved coloured glazed tiles ¼ "(6 mm) thick, laid in white cement and pigment on a bed of ¾" (20 mm) thick cement mortar 1:2	100Sft	2.34	15,623.10	36,558
		Skirting				
15	10/36	Providing grey cement skirting or dado 3/8"(10 mm) thick including rounding of corner and straight ening of top edge and finishing to smooth surface after plastering.				
		1:3 cement, sand mortar	100Sft	0.24	4,150.05	996
16	10/15/c	Providing and laying topping of cement concrete 1:2:4, including surface finishing and dividing in panels:-				
		(c) 1½"(40 mm) thick	100Sft	1.43	4,326.20	6,165
		Slab Plaster				
17	11/10/b	Cement plaster 3/8" (10 mm) thick under soffit of RCC. roof slabs only, upto 20' height.				
		b) 1:3	100Sft	1.82	2,450.45	4,466
		Cement Plaster				
18	11/9	Cement plaster 1:4 upto 20' (6.00 m) height:-				
		1/2" (13 mm) thick	100Sft	7.16	2,151.60	15,405
19	11/18	Cement pointing struck joints, on walls, upto 20' (6.00 m) hiehgt:-				
		b) ratio 1:3	100Sft	7.07	2,233.50	15,791
20	11/22	Priming coat of chalk under distemper.	100Sft	8.98	187.75	1,686
		Distempering				
21	11/23	Distempering:-				
		iii) three coats	100Sft	8.98	787.90	7,077
22	11/31	Extra cost of labour and material for red oxide pigment in cement pointing to match with the colour of bricks.	100Sft	7.07	439.40	3,107

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Direct Supply in Sargodha Division-Package 10

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Sr. No.	Ref	Description	Unit	Quantity	Unit Rate (Rs)	Amount (Rs)
		Steel Door				
23	25-31	Making and fixing steel grated door with 1/16" thick (1.5mm) sheeting, including angle iron frame 2"x2"x 3/8" (50x50x10 mm) and ¾" (20 mm) square bars 4" (100 mm) centre to centre, with locking arrangement.	Sft	49.00	1,252.40	61,368
		Door Lock				
24	12/18/ii	Providing and fixing sliding bolt to doors:-				
		ii) iron sliding bolt, 12" (300 mm) long	Each	1.00	373.25	373
		Paint				
25	13/5/c	Painting new surface:- Preparing surface and painting of doors and windows any type (including edges):-				
		i) priming coat.	100Sft	2.89	858.30	2,476
		ii)Two coat	100Sft	2.89	446.15	1,287
		Steel Window				
26	25/41-b-v	Providing and fixing steel windows with openable glazed panels, using beam section for frame 1½"x1"x5/8"x1/8" (40x25x16x3 mm), Z-section for leaves ¾"x1"x¾"x1/8" (20x25x20x3 mm), T-section sashes 1"x1"x1/8" (25x25x3 mm), glass panes, wooden screed for glazing embedded over a thin layer of putty duly screwed with leaves, brass fittings, holdfast, duly painted, complete in all respects, including all cost of material and labour, etc. as per approved design and as directed by the Engineer-in-charge:-				
		b) fixed with wire gauze, 22 SWG				
		v) glass pane 5 mm thick	Sft	16.00	565.45	9,047
27	26/37	Supplying and laying polythene sheet over D.P.C. under floors and on roofs, etc.				
		i) 300 gauge (.003" thick)	Sft	182.25	3.45	629
		Roof Insulation				
28	9/35	Single layer of tiles 9"x4½"x1½" (225x113x40 mm) laid over 4"(100 mm) earth and 1" (25 mm) mud plaster without Bhoosa, grouted with cement sand 1:3 on top of RCC roof slab, provided with 34 lbs. per %Sft. or 1.72 Kg/Sq.m bitumen coating sand blinded.	100Sft	1.82	7,743.50	14,113
		Khurras				
29	9/15	Khuras on roof 2'x2'x6" (600 x 600 x 150 mm)	Each	1.00	559.95	560

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Sr. No.	Ref	Description	Unit	Quantity	Unit Rate (Rs)	Amount (Rs)
30	9/16	Bottom Khuras of brick masonry in cement mortar 1:6, 4'x2'x4½" (1200x600x113 mm) over 3" (75 mm) cement concrete 1:4:8.	Each	1.00	977.45	977
		Tuff Paver				
31	10/43	Providing and laying Tuff pavers, having 7000PSI ,crushing strength of approved manufacturer, over 2"to3"sand cushion i/c grouting with sand in joints i/c finishing to require slope. complete in all respect. (50% Grey / 50% Coloured)				
		a) 50-mm thick	Sft	72.00	96.30	6,934
		Steel Works				
32	25/10	Fabrication of heavy steel work, with angle, tees, flat iron round iron and sheet iron for making trusses, girders, tanks, etc., including cutting, drilling, revitting, handling, assembling and fixing, but excluding erection in position.	100Kg	2.24	18,116.95	40,571
33	25/11	Erection and fitting in position iron trusses, staging of water tanks, etc.	100Kg	2.24	851.70	1,907
34	21/8	Constructing standard gully grating chamber, 3'x2½' (900x750 mm), with chinaware trap as per PHED Drawing STD/PD No. 3 of 1977, complete in all respects.	Each	1.00	11,207.55	11,208
		Total "A"				**639,646**
		<u>Plumbing Works</u>				
35	9/20-a	Cast iron rain water downpipe fixed in position, excluding heads and shoes, but including painting and clamps, etc:-				
		a) 4" dia (100 mm) cast iron down pipe.	P.Rft	40.00	232.15	9,286
36	9/21	Rain water down pipe cast iron head fixed in place, including cost of clamp holdfast and painting	Each	4.00	588.55	2,354
37	9/22	Shoes, bends or offsets for cast iron rain water down pipe, including fixing and painting.	Each	4.00	339.65	1,359
38	26/23-b	Providing, laying, cutting, jointing, testing and disinfecting P.V.C. pipe line with `B' Class working pressure pipe, in trenches, complete in all respects:-				
		b) 4" i/d (100 mm)	P.Rft	30.00	263.40	7,902

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Direct Supply in Sargodha Division-Package 10

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Sr. No.	Ref	Description	Unit	Quantity	Unit Rate (Rs)	Amount (Rs)
39	19/26-ii	Providing and fixing chromium plated bib cock:- ii) 1.5 cm (1/2").	Each	6.00	340.60	2,044
40	19/8	Providing and fixing brass ball float valve:-				
		v) 4.0 cm (1½") dia	Each	1.00	559.25	559
		PPRC Pipe				
41	Market Rate	Providing, fixing, jointing and testing Polypropylene Random (PPR) PN20 pressure pipe for cold, hot and hot water return water as per DIN 8077-8078 for pipes and DIN 16962, PN25 for fittings (polyfusion welded joints) inside building including fittings and specials (sockets, tees, elbows, bends, crosses, reducers, adaptor, plugs and union etc.) supported on walls or suspended from roof slab or run in chases including pipe hangers, supports, walls cutting for pipelines, complete in all respect as per specifications and drawings as well as directed by the Engineer.				
		25mm dia	Rft	10.00	86.00	860
		50mm dia	Rft	40.00	286.00	11,440
		Total "B"				**35,804**
		Total "A+B"				**675,450**

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Direct Supply in Sargodha Division-Package 10

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Electrical Works

Sr. No.	Ref	Description	Unit	Qty.	Unit Rate (Rs)	Amount (Rs)
1st BI-Annual-2020 (1st Jan to 30th Jun) Sargodha						
1	CH-24/3 ii) & iii)	Supply and erection of PVC pipe for wiring recessed in walls, floors, roofs including inspection boxes, pull boxes, hooks, cutting jharries, and repairing surface, etc., complete with all specials.				
		i) 20 mm	Rft	180.00	48.05	8,649
		ii) 25 mm	Rft	25.00	55.3	1,383
2	CH-24/1-a ii)	Supply and erection of G.I. pipes for wiring purposes, including pull boxes, inspection boxes, bends, tees, etc. complete with all specials (on surface, including clamps, etc.)				
		i) 20 mm	Rft	10.00	113.8	1,138
3	CH-24/13-a v)	Supply and erection of PVC insulated, PVC sheathed twin core, 250/440 volts copper conductor cables for service connection, in prelaid pipe/G.I. wire/trenches, etc. (rate for cable only):-				
		i) 7/0.044"	Rft	22.00	70.8	1,558
4	CH-24/11 i), ii), iii) & vi)	Supply and erection of single core PVC insulated, PVC sheathed copper conductor, 250/440 volts grade cable (BSS-2004), in prelaid PVC pipes / M.S. conduit / G.I. pipe / wooden strip batten / wooden casing and capping / trenches, etc. (rate for cable only):-				
		i) 3/0.029"	Rft	220.00	12.3	2,706
		ii) 3/0.036"	Rft	190.00	15.30	2,907
		iii) 7/0.029"	Rft	55.00	19.60	1,078
		vi) 7/0.064"	Rft	18.00	70.95	1,277
5	CH-24/39 i)	Supply and erection of button holder (bakelite large size).	No.	2.00	33.25	67
6	CH-24/31(ii)	Supply and erection of switches 5 Amp Piano type	No.	4.00	38.3	153

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Direct Supply in Sargodha Division-Package 10

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Electrical Works

Sr. No.	Ref	Description	Unit	Qty.	Unit Rate (Rs)	Amount (Rs)
7	CH-24/43 ii)	Supply and erection of Single rod (40 watts) with one choke and one starter tube light, including rod, choke, starter with frame, flexible wire, including connection from ceiling rose, etc., complete.	Set	2.00	737.5	1,475
8	CH-24/49	Supply and erection of 3/8" (10 mm) dia M.S. bar fan hook, placed at the time of casting of slab.	No.	1.00	43.90	44
9	CH-24/30	Supply and erection of ceiling rose, bakelite.	No.	1.00	41.65	42
10	CH-24/79	Supply and fitting of regulator knob with shaft and plat of electric fan regulator.	No.	1.00	126.65	127
11	NS	Supply and erection of Recessed Mounted Fluorescent Light Weather Proof Fixture, complete with 1x36 Watt Fluorescent Rods, complete in all respect as approved by the engineer.	Set	1.00	4,500.00	4,500
12	NS	Supply, installation and commissioning of ceiling fan 56" Sweep complete with capacitor, hanging rod, canopy blades, of approved quality, nuts, bolts, from recommended manufacturer, complete in all respects.	No.	1.00	4,200.00	4,200
13	NS	Supply, installation and commissioning of Exhaust Fans 12" size metallic body, louvers, all necessary fixing accessories, from recommended manufacturer, complete in all respects.	No.	1.00	3,065.00	3,065
14	NS	Supply and erection of 2 Pin switch with socket.	No.	1.00	350.00	350
15	NS	Supply and erection of Recessed Mounted Fluorescent Light Weather Proof Fixture, complete with 2x36 Watt Fluorescent Rods, complete in all respect as approved by the engineer.	Set	1.00	5,526.10	5,526
16	NS	Supply and installation of 4" deep u-PVC concealed switch box for recessed wiring, including making holes for regulators, switches, plugs, etc.	No.	2.00	34.94	70

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Direct Supply in Sargodha Division-Package 10

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Electrical Works

Sr. No.	Ref	Description	Unit	Qty.	Unit Rate (Rs)	Amount (Rs)
		MDB (MAIN DISTRIBUTION BOARD)				
17	NS	Fabrication, supply, installation, testing and commissioning of Main Distribution Board (MDB) comprising of cubicles, frame made of sheet steel 14 SWG and doors of 16 SWG, with flexible earthing straps, degreased and derusted, finished with electro-static powder coating of 50 micron thickness in approved color, panel housing to comply with protection class IP-54, indoor concealed type, with hinged door, lockable handle, all auxiliaries, internal wiring, designation labels on MCCB, DOL containging Magnetic Contactors, Over load Relay as per motor rating control wiring for ON-OFF Push Buttons, Indication lights, Terminal Blocks for Remote control of Motor or for interlocking purpose, earthing bar, numbering beads on the control wires, panel suitable for system Voltage 230 V, 50Hz, 1Phase and neutral, bus bars of 99.8% purity electrolytic copper, including cost of cable termination lugs, brass cable glands for incoming & outgoing cables, wiring from breakers, indication lamps, instruments and control including. All incoming and outgoing breakers shall be accessible by opening the front door having additional M.S. sheet cover. Gaskets shall also be provided where necessary. MCCB shall be suitable to operate without any de-rating at 50°C ambient temperature and shall be of one make. only and not a mixture of more than one make. The front and back sides of MDB shall also have louvers at bottom and sides of panel for hot air exhaust, complete in all respects as approved by Engineer In charge.				
		Incoming 01 x 16 Amps DP 10 KA MCB 01 x 6 Amps SP MCB 6 KA for Control 01 x Indication Light R, LED Type 01 x Digital Voltmeter 0-500 V.				
		Outgoing 06 x 5 Amps SP MCB 6 KA				

(Punjab Aab-e-Pak Project)

Supply Construction, Installation and O&M of Direct Supply in Sargodha Division-Package 10

Sub Head No. B-1 : Filtration Plant Room 12' x 12'

Electrical Works

Sr. No.	Ref	Description	Unit	Qty.	Unit Rate (Rs)	Amount (Rs)
		02 x DOL for 1.2kW Motor includes: MCB DP 10A BC 6KA EPC, TP Magnatic Contactor TC-9b 09@Ac3,Thermal over Load relay 2.5~4A,Auto Manual Switch,Push Button ON / OFF,Indication lights ON/OFF/ TRIP, MCB SP 06A for Control, Terminal Block 16mm, Terminal Block 6mm.				
		04 x DOL for 0.2kW Motor includes: MCB DP 2A BC 6KA EPC, TP Magnatic Contactor TC-9b 09@Ac3,Thermal over Load relay 1~1.6A,Auto Manual Switch,Push Button ON /OFF, Indication lights ON / OFF/ TRIP, MCB SP 06A for Control, Terminal Block 16mm, Terminal Block 6mm.	No.	1.00	51,310.00	51,310
18	NS	Supply, Installation, testing and commissioning of Earthing set complete with accessories (Rod length should be 3 meter) as per drawings. To achieve Earthing value less than 1 Ohm, complete in all respects as approved by Engineer In charge.	Set	1.00	8,500.00	8,500
		TOTAL COST OF ELECTRIFICATION WORKS (2)				**100,123**

WATER TESTING REPORT-PUNJAB AAB-E-PAK PROJECT

For

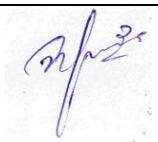
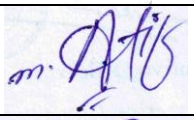
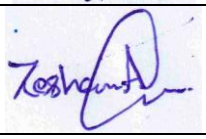
JERS CONSULTANCY (PVT) LTD

Prepared by:

Green Engineering Consultant

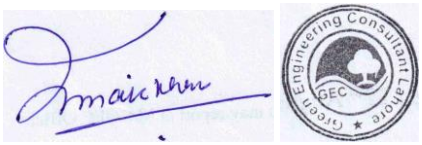
GEC-535, H2- Block, Johar Town Lahore-Pakistan

Green Engineering Team Members

Sr.	Nature	Name	Signature
1	Sample Analyzed BY	Nabila Shabbir	
2	Sample Collected BY	i. Muhammad Atif ii. Muhammad Abdullah iii. Muhammad Imran	
3	Sample Received BY	Zeeshan Ahmad	

Chief Chemist Asma Khalid

Head of Env. Lab Muhammad Umair



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Chapter 1 PROJECT INTRODUCTION

1.1 OBJECTIVES

The primary goal of Aab-e-Pak Authority is to provide safe & clean drinking water to more than 70 million populations in 36 districts of Punjab province mainly in rural, semi-urban and Peri-Urban areas. The project namely "provision of Safe & Clean drinking Water to the People of Punjab" will ensure supply of clean drinking water to a projected population of more than 100 million people till 2040. The design life of the proposed project is 20 years and shall be executed through EPC Mode. The project may include but not limited to construction of Bottled Water Plants, Ultra Filtration Plants, Reverse Osmosis Plant, Hand Pumps, Direct Water Supply, Solar Power UF Plants, Conventional Surface Water Treatment Plants, Rapid sand filtration plants, Water Kiosk (Markaz-e-Aab).

1.2 SCOPE OF WORK

Scope of study covers the following major steps

- Sample collection from Gujranwala and Sargodha
- Transportation of samples to Green Engineering Consultant Laboratory
- Analysis of water samples as per guidelines of Punjab environmental quality standards and WHO standards.
- Preparation & submission of testing reports to JERS.

1.3 LOCATION OF THE PROJECT

The proposed project area covers 36 districts of Punjab with distribution of zones as North zone, central zone, and south zone.

1.4 PROJECT CONTRACTOR/CONSULTANT

Jers Consultancy (Pvt) Ltd. is main consultant of this project. JERS draws on the experience of its Board members and the qualification of the senior executive team and corporate staff to execute every project professionally. As part of our philosophy, we introduce value engineering to all of our projects as early as possible. This process focuses on the elimination or modification of anything that adds to the project cost without contributing to the function of a project, which provides a way of reducing costs whilst maintaining or improving quality and performance. Our principal objective is performance excellence and total client's satisfaction.

1.5 PROJECT MONITORING LAB

For water testing of the proposed project sites, the M/S Jers Consultancy (Pvt) Ltd. has hired the services of EPA Punjab Certified Environmental Monitoring Consultant, M/S Green Engineering Consultant.

Focal Person	Mr. Umer
Address	Green Engineering Consultant, 535, Basement Block H2, Johar Town, Lahore
Contact No.	0331-4038846

1.6 CONCEPTUAL MONITORING FRAMEWORK

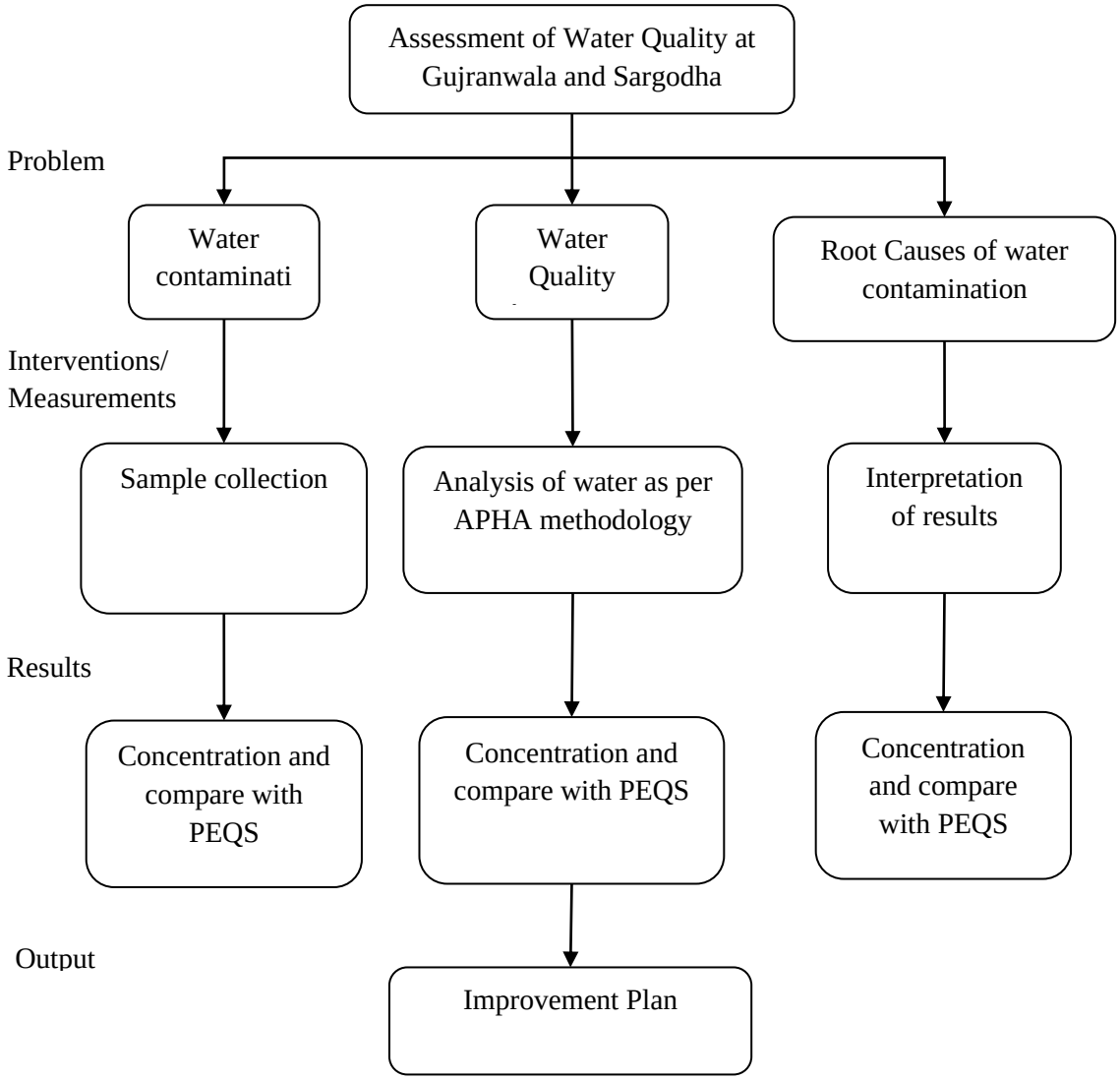

Figure 1: Conceptual Framework of Environmental Compliance Monitoring

Chapter 2 METHODOLOGY

2.1 BRIEF DESCRIPTION OF AREA UNDER STUDY

For water testing the sampling data collection was carried out in one hundred and seventy five (175) selected locations of package 9 (Gujranwala and Sargodha) of this project "Aab-e-PAK".

Following one hundred and seventy five (175) locations of package 9 (Gujranwala and Sargodha) were selected with mutual discussion and site visit of senior and junior environmentalist of consultant.

1. Gunaur	2. Chak No 56 NB
3. Ladhy Walla Cheema	4. Chak No 110 S.B
5. Nangal Mirza	6. Chak No 110 S.B Colony
7. Malokey	8. Chak No 106 S.B
9. Bhular Bajwa	10. Chak No 53 NB
11. Mussa Pur	12. Chak No 102
13. Kot Aga Jajja	14. Chak No 108 S.B
15. Sadagar Pur	16. Chak No 66 NB
17. Manga	18. Chak No 26 NB
19. Chowk Qila Kalar Wala	20. Wegowal
21. Data Zaad Kaa	22. Jalpana
23. Chak 16 NB	24. Sardar Pur
25. Chak 22 NB	26. Chak No 5, 4 JinnahColony
27. Chak 09 NB	28. Hayatpur
29. Purana Phlervan	30. Chak Muzafra Abad Colony
31. Mateela	32. Chahrai Sheerif
33. Tiba Murad	34. Megha Kadhi
35. Chak No 7 SB	36. Chak No 154
37. Chak No 8	38. Chak No 128 SB
39. Chak No 20-SB	40. Chak No 138 SB
41. Thathi Lambi	42. Chak No 162-164 NB
43. Chanra	44. Chak No 50 SB
45. Rabana	46. Chak No 133 SB
47. Kishkan	48. Chak No 152 NB
49. Noor E Wala	50. Chak No 160 NB
51. Noor e wala Colony	52. Chak No 155 NB
53. Baran	54. Bhabra
55. Sajoka	56. Jalla Makhdum
57. Khichi Ala	58. Chak No 9 Lokri
59. Thati Jalal	60. Chaowall
61. Dhirwal	62. Naseer Pur Kalan
63. Chak No 104 Janobi	64. Bucha Kalan
65. Chak No 142 S.B Big	66. Manke Walla
67. Chak No 142 S.B Small	68. Bhat, Essa Khel
69. Barnali, Kharian	70. Dhedian Wala- Dala Mer Wala(Dala Mer Wala), Essa Khel

71. Rehsian, Kharian	72. Dhedian Wala- Dala Mer Wala(Dhedian Wala), Essa Khel
73. Fateh Bhand, Kharian	74. Allah Khel- Pacca Kamar Mushani, Essa Khel
75. Chechian, Kharian	76. Mari Khel- Pacca Kamar Mushani, Essa Khel
77. Dharian, Pindi Bhattian	78. Dhaok Zaman, Mianwali
79. Matteke, Pindi Bhattian	80. Kund-1, Mianwali
81. Ghabrika, Pindi Bhattian	82. Wan Bhachran Janubi, Mianwali
83. Manghat, Mandi Bhauddin	84. Wan Bhachran Shumali, Mianwali
85. Ainowal, Mandi Bhauddin	86. Noor-Ullah Wala, Mianwali
87. Bhakhi, Mandi Bhauddin	88. Chak No.026/D.B, Mianwali
89. Bhalowal, Malikwal	90. Dhok Mohd . Khan, Mianwali
91. Cha Syed Wala, Bhakkar	92. Tibbi, Piplan
93. Khan Pur Shumali, Bhakkar	94. Bala Sharif, Piplan
95. Jhok Mehr Shah, Darya Khan	96. Bani Afghanan, Mianwalli
97. Gadai, Darya Khan	98. Chak 9 SB, Kot Momin
99. Dagar Yaar Shah Gharbi, Darya Khan	100.Vanjari, Mianwalli
101. Haji Hussain Shah Dagar, Darya Khan	102.Ban Mhea- Balo khel, Mianwalli
103. Mehmood Wala, Kalur Kot	104.Nawab Pur, Shah
105. Daily Namdar, Kalur Kot	106.Bochra Kohna, Sahiwal
107. Bitti, Kalur Kot	108.Naoshera Khokhran, , Sahiwal
109. Shaheedan Shumali, Kalur Kot	110.Chak No 49 Nb, Sargodha
111. Kheuo, Mankera	112.Chak No 47 Nb, Sargodha
113. Chamb, Mankera	114.Chak 86_Nb, Sargodha
115. Gohar Wala, Mankera	116.Bajwa Colony, Sargodha
117. Dengana, Mankera	118.Chak No 104 Janobi, Sargodha
119. Chak 73 TDA, Mankera	120.Chak No 97 N.B, Sargodha
121. Hassan Khan walla, Kalourkot	122.Chak No 92 N.B, Sargodha
123. Chak 46, Khushab	124.Chak No 70 Sb, Sargodha
125. Waheer Shumali, Khushab	126.Ck.40 NB, Sargodha
127. Chussu Wala, Khushab	128.Chak No 91 Sb, Sargodha
129. Chak 41, Khushab	130.Ck 101 Sb, Sargodha
131. Chak 52mb, Khushab	132.Chak No 95 Sb, Sargodha
133. Chak 42 Mb, Khushab	134.Chak 99 S.B, Sargodha
135. Jhuggiyaan, Khushab	136.Chak No 51 Nb, Sargodha
137. 48mb, Khushab	138.Chak No#76sb, Sargodha
139. Chak 44 Mb, Khushab	140.Chak No 116 N.B, Sargodha
141. Joiya, Khushab	142.Chak No 85sb, Sargodha
143. Kurpalka, Khushab	144.Say Dowana, Sargodha
145. Chak 43, Khushab	146.100 Sb, Sargodha
147. Butala, Khushab	148.Chak 2 Rakh Dharema, Sargodha
149. Nalli, Khushab	150.Chak No #94sb, Sargodha
151. Gaggh Kalaan, Khushab	152.Chak No 32 Nb, Sargodha
153. Chak 40, Khushab	154.Chak Asaiyanwala, Sargodha

155. Chak 50 Mb, Khushab	156. Chak No 83 Nb, Sargodha
157. Bambool, Noor Pur Thal	158. Chak#1 Rakh Dharema, Sargodha
159. Borana Wala, Noor Pur Thal	160. Chak#3 Rakh Dharema, Sargodha
161. Shah Hussain, Noor Pur Thal	162. Chak No 84 N.B, Sargodha
163. Maikan, Noor Pur Thal	164. Chak No 72 N.B Shazadia Wala, Sargodha
165. Dadu Wala, Noor Pur Thal	166. Chak#58 Nb, Sargodha
167. Chak No#28mb, Quaidabad	168. Godhy Wala, Sargodha
169. Utra Janubi, Quaidabad	170. Jalpanan, Shahpur
171. Chak 36db, Quaidabad	172. Thati Lami, Shahpur
173. Murghan Wala- Pacca Kamar Mushani, Essa Khel	174. Chak 89 Nb, Sargodha
175. Mangalan Wala, Essa Khel	

Table 1: Detail of Coordinates of the sampling sites at Package 9

Village	Latitude	Longitude
1. Gunaur	31°55'19"N	74°18'34"E
2. Ladhy Walla Cheema	32°16'48"N	74°0'57"E
3. Nangal Mirza	32°15'55"N	74°38'27"E
4. Malokey	32°4'42"N	74°34'09"E
5. Bhular Bajwa	32°12'45"N	74°36'52"E
6. Mussa Pur	32°15'33"N	74°39'15"E
7. Kot Aga Jajja	32°6'42"N	74°33'32"E
8. Sadagar Pur	32°5'27"N	74°33'22"E
9. Manga	32°3'58"N	74°34'2"E
10. Chowk Qila Kalar Wala	32°5'33"N	74°35'32"E
11. Data Zaad Kaa	32°5'18"N	74°35'50"E
12. Chak 16 nb	32°17'10.58"N	72°48'01.97"E
13. Chak 22 Nb	32°13'47.03"N	72°51'34.00"E
14. Chak 9 Nb	32°14'10.34"N	72°53'46.93"E
15. Purana Phlervan	32°21'18.69"N	73°00'50.03"E
16. Mateela	32°05'55.84"N	72°57'21.46"E
17. Tiba Murad	32°10'22.36"N	73°01'14.33"E
18. Chak No 7 Sb	32°14'47.51N	73°00'50.03"E
19. Chak No 8	32°16'11.23"N	73°01'10.66"E
20. Chak No. 20/Sb	32°09'21.66"N	72°55'18.09"E
21. Thathi Lambi	32°04'00.35"N	72°19'29.29"E
22. Chanra	31°56'09.77"N	72°22'07.73"E
23. Rabana	31°48'27.49 "N	72°22'28.81"E
24. Kishkan	32°00'46.34"N	72°17'57.64"E
25. Noor E Wala	31°46'06.06"N	72°19'31.69"E
26. Noorewala Colony	31°45'52.12"N	72°19'33.92"E
27. Baran	31°46'42.67"N	72°35'54.94"E
28. Sajoka	31°52'10.00"N	72°24'44.00"E
29. Khichi Ara	31°49'46.83"N	72°24'44.40"E
30. Thati Jalal	31°48'32.98"N	72°23'55.26"E
31. Dhirwal	32°02'311.50"N	72°19'39.35"E
32. Chak No 104 Janobi	31°59'59.12"N	72°41'49.22"E
33. Chak No 142 S.B Big	31°56'57.56"N	72°39'28.98"E
34. Chak No 142 S.B Samal	31°56'50.06"N	72°39'40.66"E
35. Chak No 56 Nb	32°11'21.93"N	72°39'21.93"E
36. Chak No 110 S.B	31°55'08.91"N	72°45'27.49"E
37. Chak No 110 S.B Colony	31°55'25.34"N	72°45'37.27"E
38. Chak No 106 S.B	31°55'11.11 "N	72°46'42.79"E
39. Chak No 53 Nb	31°10'08.08"N	72°41'39.44"E
40. Ck.102	31°56'16.06"N	72°47'02.17"E
41. Chak No 108 Sb	31°59'01.94"N	72°41'12.49"E
42. Chak No 66 Nb	32°09'49.30"N	72°38'22.03"E

43. Chak No 26nb	32°11'40.88"N	72°49'33.72"E
44. Wegowal	32°11'56.25"N	72°32'09.03"E
45. Jalpana	32°15'57.73"N	72°30'59.24"E
46. Sardar Pur	32°12'55.13"N	72°33'03.49"E
47. Chak No 5,4 Jinha Colony	32°11'18.00"N	72°33'20.25"E
48. Hayatpur	32°17'43.58"N	72°38'11.19"E
49. Chak Muzafra Abad Colony	32°16'21.48"N	72°19'56.63"E
50. Chahrai Sheerif	32°20'21.32"N	72°31'01.25"E
51. Megha Kadhi	32°23'07.53"N	72°34'00.26"E
52. Chak No 154	31°40'44.28"N	72°19'53.03"E
53. Chak 128sb	31°51'49.79"N	72°38'45.65"E
54. Chak No 138 Sb	31°49'48.68"N	72°33'21.24"E
55. Chak No 162/164nb	31°36'06.61"N	72°15'50.56"E
56. Chak No 50sb	32°02'13.10"N	72°42'20.16"E
57. Chak 133sb	31°50'23.71"N	72°36'08.50"E
58. Chak 152 Nb	31°42'57.40"N	72°21'10.98"E
59. Chak No 160 Nb	31°37'41.77"N	72°17'26.81"E
60. Chak 155 Nb	31°40'48.91"N	72°19'51.13"E
61. Bhabra	32°13'44.59"N	73°13'14.42"E
62. Jalla Makhdum	32°01'33.43"N	73°04'22.64"E
63. Chak No 9 Lokri	32°13'43.67"N	72°55'09.99"E
64. Chaowall	32°16'46.82"N	73°04'34.89"E
65. Naseer pur Kalan	32°06'50.95"N	73°07'48.98"E
66. Bucha Kalan	32°11'23.64"N	73°08'42.36"E
67. Manke walla	32°17'54.89"N	72°39'49.07"E
68. Barnali, Kharian	32°43'22.7"N	73°50'04.9"E
69. Rehsian, Kharian	32°51'54.6"N	74°04'33.7"E
70. Fateh Bhand, Kharian	32°42'11.00"N	73°43'06.00"E
71. Chechian, Kharian	32°40'09.00"N	74°07'14.00"E
72. Dharian, Pindi Bhattian	32°01'41.0"N	73°24'40.3"E
73. Matteke, Pindi Bhattian	31°59'38.8"N	73°27'33.3"E
74. Ghabrika, Pindi Bhattian	31°49'05.3"N	73°12'09.4"E
75. Manghat, Mandi Bhauddin	32°30'52.2"N	73°30'18.2"E
76. Ainowal, Mandi Bhauddin	32°29'18.8"N	73°25'10.6"E
77. Bhakhi, Mandi Bhauddin	32°30'02.6"N	73°25'30.9"E
78. Bhalowal, Malikwal	32°28'45.6"N	73°14'41.1"E
79. Cha Syed Wala, Bhakkar	31°33'3.00"N	71° 5'48.00"E
80. Khan Pur Shumali, Bhakkar	31°30'27.00"N	71°12'53.00"E
81. Jhok Mehr Shah, Darya Khan	31°55'1.64"N	71° 6'28.74"E
82. Gadai, Darya Khan	31°53'15.84"N	71°18'5.72"E
83. Dagar Yaar Shah Gharbi, Darya Khan	31°54'46.00"N	71°12'48.00"E
84. Haji Hussain Shah Dagar, Darya Khan	31°54'25.78"N	71°16'33.46"E
85. Mehmood Wala, Kalur Kot	32°10'48.00"N	71°28'52.00"E
86. Daily Namdar, Kalur Kot	32° 6'24.92"N	71°31'5.68"E
87. Bitti, Kalur Kot	31°57'2.87"N	71°36'45.39"E

88. Shaheedan Shumali, Kalur Kot	32° 6'56.48"N	71°42'9.41"E
89. Kheuo, Mankera	31°35'8.83"N	71°45'38.82"E
90. Chamb, Mankera	31°12'43.18"N	71°40'51.12"E
91. Gohar Wala, Mankera	31°43'0.32"N	71°34'34.12"E
92. Dengana, Mankera	31°20'3.06"N	71°54'52.79"E
93. Chak 73 TDA, Mankera	31°24'41.00"N	71°09'19.00"E
94. Hassan Khan walla, Kalourkot	32°10'46.98"N	71°26'43.14"E
95. Chak 46, Khushab	32°12'47.00"N	72°13'43.00"E
96. Waheer Shumali, Khushab	32°25'07.00"N	72°17'15.00"E
97. Chussu Wala, Khushab	32°18'27.00"N	71°59'03.00"E
98. Chak 41, Khushab	32°13'31.00"N	72°9'29.00"E
99. Chak 52mb, Khushab	32°14'38.00"N	72°15'58.00"E
100.Chak 42 Mb, Khushab	32°14'26.00"N	72°09'01.00"E
101.Jhuggiyaan, Khushab	32°24'23.00"N	72°31'11.00"E
102.48mb, Khushab	32°14'36.00"N	72°12'09.00"E
103.Chak 44 Mb, Khushab	32°13'18.00"N	72°11'38.00"E
104.Joiya, Khushab	32°11'52"N	72°17'39"E
105.Kurpalka, Khushab	32°14'42.00"N	72°19'08.00"E
106.Chak 43, Khushab	32°14'16.00"N	72°10'16.00"E
107.Butala, Khushab	32°16'07.00"N	72°8'30.00"E
108.Nalli, Khushab	32°25'56.00"N	72°19'42.00"E
109.Gaggh Kalaan, Khushab	32°21'31.00"N	72°26'03.00"E
110.Chak 40, Khushab	32°12'45.00"N	72°9'26.00"E
111.Chak 50 Mb, Khushab	32°13'8.00"N	72°14'35.00"E
112.Bambool, Noor Pur Thal	31°44'8.02"N	71°57'9.90"E
113.Borana Wala, Noor Pur Thal	31°39'53.62"N	71°59'35.10"E
114.Shah Hussain, Noor Pur Thal	31°34'47.51"N	71°57'34.06"E
115.Maikan, Noor Pur Thal	31°47'25.39"N	71°44'29.13"E
116.Dadu Wala, Noor Pur Thal	31°37'33.39"N	71°54'43.46"E
117.Chak No#28mb, Quaidabad	32°6'42.00"N	71°55'24.00"E
118.Utra Janubi, Quaidabad	32°19'22.00"N	71°54'18.00"E
119.Chak 36db, Quaidabad	32°14'58.8"N	71°44'45.7"E
120.Murghan Wala- Pacca Kamar Mushani, Essa Khel	32°51'13.00"N	71°17'47.00"E
121.Mangalan Wala, Essa Khel	32°52'46.00"N	71°19'14.00"E
122.Bhat, Essa Khel	32°50'45.00"N	71°21'29.00"E
123.Dhedian Wala- Dala Mer Wala(Dala Mer Wala), Essa Khel	32°52'56.00"N	71°17'26.00"E
124.Dhedian Wala- Dala Mer Wala(Dhedian Wala), Essa Khel	32°51'46.00"N	71°16'26.00"E
125.Allah Khel- Pacca Kamar Mushani, Essa Khel	32°50'18.00"N	71°20'45.00"E
126.Mari Khel- Pacca Kamar Mushani, Essa Khel	32°51'26.00"N	71°18'44.00"E
127.Dhaok Zaman, Mianwali	32°49'46.00"N	71°49'23.00"E
128.Kund-1, Mianwali	32°42'31.00"N	71°48'18.00"E
129.Wan Bhachran Janubi, Mianwali	32°25'24.00"N	71°42'38.00"E
130.Wan Bhachran Shumali, Mianwali	32°25'13.00"N	71°42'22.00"E

131.Noor-Ullah Wala, Mianwali	32°32'16.00"N	71°36'53.00"E
132.Chak No.026/D.B, Mianwali	32°18'50.00"N	71°39'48.00"E
133.Dhok Mohd . Khan, Mianwali	32°50'28.00"N	71°46'58.00"E
134.Tibbi, Piplan	32°28'30.19"N	71°34'11.17"E
135.Bala Sharif, Piplan	32°13'30.00"N	71°40'21.00"E
136.Bani Afghanan, Mianwalli	32°45'45.00"N	71°51'17.00"E
137.Vanjari, Mianwalli	32°54'11.00"N	71°14'52.00"E
138.Ban Mhea- Balo khel, Mianwalli	32°30'38.3"N	71°15'22.9"E
139.Nawab Pur, Shah	32°13'47.00"N	72°35'42.00"E
140.Bochra Kohna, Sahiwal	32°00'55.7"N	72°28'03.7"E
141.Naoshera Khokhran, , Sahiwal	31°48'31.9"N	72°24'06.6"E
142.Chak No 49 Nb, Sargodha	32° 1'23.47"N	72°41'39.36"E
143.Chak No 47 Nb, Sargodha	32° 3'14.00"N	72°41'41.00"E
144.Chak 86_Nb, Sargodha	32° 2'14.64"N	72°38'36.86"E
145.Bajwa Colony, Sargodha	32° 2'56.54"N	72°38'48.38"E
146.Chak No 104 Janobi, Sargodha	32° 0'04.00"N	72°41'44.00"E
147.Chak No 97 N.B, Sargodha	31° 59'49.00"N	72°37'42.00"E
148.Chak No 92 N.B, Sargodha	32° 4'8.97"N	72°32'6.13"E
149.Chak No 70 Sb, Sargodha	32° 6'11.32"N	72°54'55.73"E
150.Ck.40 NB, Sargodha	32° 6'21.00"N	72°43'51.00"E
151.Chak No 91 Sb, Sargodha	31°03'05.00"N	72°45'14.00"E
152.Ck 101 Sb, Sargodha	31° 58'09.00"N	72°45'30.00"E
153.Chak No 95 Sb, Sargodha	31°59'54.00"N	72°47'22.00"E
154.Chak 99 S.B, Sargodha	32°0'42.00"N	72°43'31.00"E
155.Chak No 51 Nb, Sargodha	32° 1'56.00"N	72°43'48.00"E
156.Chak No#76sb, Sargodha	32° 4'22.04"N	72°51'28.11"E
157.Chak No 116 N.B, Sargodha	31° 55'24.00"N	72°32'34.00"E
158.Chak No 85sb, Sargodha	32°04'0.00"N	72°47'2.00"E
159.Say Dowana, Sargodha	32°2'14.00"N	72°46'14.00"E
160.100 Sb, Sargodha	31°58'10.00"N	72°46'33.00"E
161.Chak 2 Rakh Dharema, Sargodha	32°11'34.00"N	72°35'52.00"E
162.Chak No #94sb, Sargodha	31°59'25.00"N	72°49'04.00"E
163.Chak No 32 Nb, Sargodha	32°05'20.00"N	72°47'20.00"E
164.Chak Asaiyanwala, Sargodha	31°59'46.00"N	72°44'58.00"E
165.Chak No 83 Nb, Sargodha	32° 7'16.00"N	72°30'03.00"E
166.Chak#1 Rakh Dharema, Sargodha	32° 12'37.00"N	72°34'57.00"E
167.Chak#3 Rakh Dharema, Sargodha	32° 11'59.00"N	72°36'27.00"E
168.Chak No 84 N.B, Sargodha	32° 04'56.00"N	72°34'0.00"E
169.Chak No 72 N.B Shazadia Wala, Sargodha	32°07'03.1"N	72°38'56.9"E
170.Chak#58 Nb, Sargodha	32° 13'08.00"N	72°37'31.00"E
171.Godhy Wala, Sargodha	32° 02'26.00"N	72°30'43.00"E
172.Jalpanan, Shahpur	32° 15'52.00"N	72°30'58.00"E
173.Thati Lami, Shahpur	32°04'07.2"N	72°19'28.6"E
174.Chak 89 Nb, Sargodha	32°01'16.00"N	72°36'38.00"E
175.Chak 9 SB, Kot Momin	32°11'49.00"N	72°59'55.00"E

2.2 WATER ANALYSIS METHODOLOGY

Green Engineering Consultant (GEC) has been carried out the "water analysis services for JERS as per scope of work" under Punjab Aab e Pak Project to conform the standards & regulations. The methodology was comprised of these phases i.e., Sample Collection and Sample Preservation, testing of water samples, preparation of monitoring & Analysis reports & Submission of Reports to JERS.

Following steps were involved:

- Formulation of Sample collection & monitoring team for selected sites of Package 9 (Gujranwala and Sargodha)
- Sample collection and Preservation (using different preservatives) along with transportation of testing water samples to the laboratory
- Testing of samples in the Green Engineering Consultant Laboratory using APHA/USEPA methods and interpretation of monitored data for stack and noise
- Preparation of test/Analysis & monitoring reports
- Submission of comprehensive test/Monitoring reports to Client

SAMPLE COLLECTION

The sample collection Team of Green Engineer Consultant has collected the required drinking water sample from the selected points by adopting proper sampling protocol for appropriate measurement of water quality. The proper sampling criteria was adopted to cover the process of sampling, sampling size and volume, number of sampling locations, no of samples, type of sample, time interval, proper sampling containers, avoiding contamination and personal safety of collector. The sample obtained was also representative, reproducible, defensible and useful.

PROPER LABELING

Proper Labelling of samples is also an important factor and ensures the responsibility and accountability of sample collector. Sample containers or sample bottles were properly labelled by attaching appropriate tags/labels or by using water proof markers. Sample containers/tags includes

- Sample code number
- Date and name of sample
- Source and type of sample
- Any special note for analyst
- Sampler's name

SAMPLE PRESERVATION

There is usually a delay between sample collection and analysis so the nature of sample can be changed during this time period. Therefore, proper preservation of samples is required after collection and in laboratory up to when analysis starts. The green Engineering Consultant's sample collection team has preserved samples using different preservatives i.e. pH control, chemical addition, use of amber glass bottles, refrigerator and freezing according to determination to be made.

CHAIN OF CUSTODY PROCESS

Properly designed and executed chain of custody form was used to ensure sample integrity from collection step to test reporting process. This includes ability to trace possession and handling of sample from the time of collection to analysis and reporting. The purpose of chain of custody is that the sample will be considered under the custody of Green Engineering Consultant's authorized person, secured and temper proofed.

SAMPLE ANALYSIS

The samples after reaching in Green Engineering Consultant Laboratory have been analyzed according to requisite parameters (drinking water as per PEQS) by Client following the standard APHA/USEPA methods for required parameters. Laboratory analysis and measurements, mathematical calculations, data processing and results interpretation has been done within the given time period after negotiation with client.

Table 2: PHYSICAL PARAMETER ANALYSIS

Parameter	Unit	PEQS	WHO Standards	Reference Method
Turbidity	NTU	‹ 5	‹ 5	APAHA-2130 B
Total hardness as CaCO3	mg/l	< 500	---	APHA-2340 C
TDS	mg/l	‹ 1000	‹ 1000	APHA-2540 C
TSS	mg/l	-	---	APHA-2540
Odour	-	Acceptable/Non-objectionable	Acceptable/Non-objectionable	In-House
Taste	-	Acceptable/Non-objectionable	Acceptable/Non-objectionable	In-House
Color	TCU	15	15	ASTM D 1209
pH	-	6.5-8.5	6.5-8.5	APHA-4500H^+ B

Table 3: CHEMICAL PARAMETERS ANALYSIS

Parameter	Unit	PEQS	WHO	Method	Reference Method
Arsenic	mg/l	< 0.05	0.01	AAS	APHA-3111B
Fluoride	mg/l	<1.5	1.5	Spectrophotometric	APHA-4500 F-/C
Nitrate	mg/l	<50	50	Spectrophotometric	APHA-4500 NO_3^-

Table 4: MICROBIOLOGICAL PARAMETERS ANALYSIS

Parameter	Unit	PEQS	WHO	Reference
Coli Form	CFU/100ml	Must not be detectable	Must not be detectable	APHA-9222 B
Feacal Coli Form	CFU/100ml	Must not be detectable	Must not be detectable	APHA-9222 D
E Coli	CFU/100ml	Must not be detectable	Must not be detectable	APHA-9222

2.2.1 MICROSOFT EXCEL

The bar graphs of the data collected were generated by using Microsoft Excel to estimate the measured values.

2.3 REFERENCE METHODS USED FOR MONITORING AND ANALYSIS

Standards or Reference methods prescribed in the following published literature were used for sampling, onsite monitoring, mathematical calculations and laboratory analysis regarding various environmental parameters;

- United Sates Environmental Protection Agency (USEPA) Methods
- American Public Health Association (APHA)
- Punjab Environmental Quality Standards (PEQS)
- World Health Organization (WHO)

Chapter 3 RESULTS AND DISCUSSION

3.1 RESULTS & DISCUSSION

In present study water sampling was carried out at one hundred and seventy-five (175) selected locations of Package 9 (Gujranwala and Sargodha). Water sampling was completed from 24th November 2020 to 12th January 2021. The observed results for water quality parameters are compared with the Punjab Environmental Quality Standards (PEQS) and WHO standards.

3.2 CONCENTRATION OF TDS IN DIFFERENT WATER SAMPLES

Table 5: Total Dissolved Solids Level

Village Name	TDS mg/l	PEQS/WHO mg/l
1. Gunaur	202	1000
2. Ladhy Walla. Cheema	214	1000
3. Nangal Mirza	271	1000
4. Malokey	233	1000
5. Bhular Bajwa	246	1000
6. Mussa Pur	262	1000
7. Kot Aga Jajja	146	1000
8. Sadagar Pur	277	1000
9. Manga	197	1000
10. Chowk Qila Kalar Wala	1280	1000
11. Data Zaad Kaa	211	1000
12. Chak 16nb	890	1000
13. Chak 22 Nb	3500	1000
14. Chak 9 Nb	310	1000
15. Purana Phlervan	1380	1000
16. Mateela	1425	1000
17. Tiba Murad	1572	1000
18. Chak No 7 Sb	749	1000
19. Chak No 8	733	1000
20. Chak No. 20/Sb	595	1000
21. Thathi Lambi	480	1000
22. Chanra	618	1000
23. Rabana	2980	1000
24. Kishkan	622	1000
25. Noor E Wala	2210	1000
26. Noorewala Colony	1480	1000
27. Baran	2830	1000
28. Sajoka	510	1000
29. Khichi Ara	690	1000
30. Thati Jalal.	2450	1000
31. Dhirwal	2090	1000
32. Chak No 104 Janobi	680	1000

33. Chak No 142 S.B Big	782	1000
34. Chak No 142 S.B Samal	1057	1000
35. Chak No 56 Nb	1041	1000
36. Chak No 110 S.B	559	1000
37. Chak No 110 S.B Colony	947	1000
38. Chak No 106 S.B	936	1000
39. Chak No 53 Nb	1015	1000
40. Ck.102	1596	1000
41. Chak No 108 Sb	709	1000
42. Chak No 66 Nb	792	1000
43. Chak No 26nb	810	1000
44. Wegowal	1300	1000
45. Jalpana	347	1000
46. Sardar Pur	2135	1000
47. Chak No 5,4 Jinha Colony	1321	1000
48. Hayatpur	2205	1000
49. Chak Muzafra Abad Colony	475	1000
50. Chahrai Sheerif	1100	1000
51. Megha Kadhi	742	1000
52. Chak No 154	1510	1000
53. Chak 128sb	955	1000
54. Chak No 138 Sb	4009	1000
55. Chak No 162/164nb	510	1000
56. Chak No 50sb	1682	1000
57. Chak 133sb	1004	1000
58. Chak 152 Nb	570	1000
59. Chak No 160 Nb	496	1000
60. Chak 155 Nb	1370	1000
61. Bhabra	565	1000
62. Jalla Makhdum	415	1000
63. Chak No 9 Lokri	229	1000
64. Chaowall	810	1000
65. Naseer pur Kalan	380	1000
66. Bucha Kalan	455	1000
67. Manke walla	1311	1000
68. Barnali, Kharian	842	1000
69. Rehsian, Kharian	567	1000
70. Fateh Bhand, Kharian	4245	1000
71. Chechian, Kharian	672	1000
72. Dharian, Pindi Bhattian	1877	1000
73. Matteke, Pindi Bhattian	1141	1000
74. Ghabrika, Pindi Bhattian	1519	1000
75. Manghat, Mandi Bhauddin	1270	1000
76. Ainowal, Mandi Bhauddin	997	1000
77. Bhakhi, Mandi Bhauddin	1153	1000

78. Bhalowal, Malikwal	755	1000
79. Cha Syed Wala, Bhakkar	327	1000
80. Khan Pur Shumali, Bhakkar	895	1000
81. Jhok Mehr Shah, Darya Khan	327	1000
82. Gadai, Darya Khan	310	1000
83. Dagar Yaar Shah Gharbi, Darya Khan	280	1000
84. Haji Hussain Shah Dagar, Darya Khan	618	1000
85. Mehmood Wala, Kalur Kot	610	1000
86. Daily Namdar, Kalur Kot	675	1000
87. Bitti, Kalur Kot	784	1000
88. Shaheedan Shumali, Kalur Kot	1151	1000
89. Kheuo, Mankera	1022	1000
90. Chamb, Mankera	1152	1000
91. Gohar Wala, Mankera	910	1000
92. Dengana, Mankera	710	1000
93. Chak 73 TDA, Mankera	1021	1000
94. Hassan Khan walla, Kalourkot	560	1000
95. Chak 46, Khushab	2346	1000
96. Waheer Shumali, Khushab	4816	1000
97. Chussu Wala, Khushab	4564	1000
98. Chak 41, Khushab	1364	1000
99. Chak 52mb, Khushab	857	1000
100. Chak 42 Mb, Khushab	1870	1000
101. Jhuggiyaan, Khushab	5714	1000
102. 48mb, Khushab	1974	1000
103. Chak 44 Mb, Khushab	1914	1000
104. Joiya, Khushab	1610	1000
105. Kurpalka, Khushab	1800	1000
106. Chak 43, Khushab	1710	1000
107. Butala, Khushab	1280	1000
108. Nalli, Khushab	1784	1000
109. Gaggh Kalaan, Khushab	8117	1000
110. Chak 40, Khushab	810	1000
111. Chak 50 Mb, Khushab	1364	1000
112. Bambool, Noor Pur Thal	3384	1000
113. Borana Wala, Noor Pur Thal	927	1000
114. Shah Hussain, Noor Pur Thal	1675	1000
115. Maikan, Noor Pur Thal	330	1000
116. Dadu Wala, Noor Pur Thal	1574	1000
117. Chak No#28mb, Quaidabad	1180	1000
118. Utra Janubi, Quaidabad	2346	1000
119. Chak 36db, Quaidabad	1009	1000
120. Murghan Wala- Pacca Kamar Mushani, Essa Khel	1660	1000
121. Mangalan Wala, Essa Khel	1732	1000
122. Bhat, Essa Khel	1701	1000

123. Dhedian Wala- Dala Mer Wala(Dala Mer Wala), Essa Khel	808	1000
124. Dhedian Wala- Dala Mer Wala(Dhedian Wala), Essa Khel	1012	1000
125. Allah Khel- Pacca Kamar Mushani, Essa Khel	1660	1000
126. Mari Khel- Pacca Kamar Mushani, Essa Khel	1524	1000
127. Dhaok Zaman, Mianwali	717	1000
128. Kund-1, Mianwali	2560	1000
129. Wan Bhachran Janubi, Mianwali	440	1000
130. Wan Bhachran Shumali, Mianwali	1184	1000
131. Noor-Ullah Wala, Mianwali	1760	1000
132. Chak No.026/D.B, Mianwali	710	1000
133. Dhok Mohd . Khan, Mianwali	1632	1000
134. Tibbi, Piplan	1239	1000
135. Bala Sharif, Piplan	696	1000
136. Bani Afghanan, Mianwalli	3482	1000
137. Vanjari, Mianwalli	644	1000
138. Ban Mhea- Balo khel, Mianwalli	1571	1000
139. Nawab Pur, Shah	2320	1000
140. Bochra Kohna, Sahiwal	1294	1000
141. Naoshera Khokhran, , Sahiwal	1566	1000
142. Chak No 49 Nb, Sargodha	1024	1000
143. Chak No 47 Nb, Sargodha	1935	1000
144. Chak 86_Nb, Sargodha	2977	1000
145. Bajwa Colony, Sargodha	558	1000
146. Chak No 104 Janobi, Sargodha	2257	1000
147. Chak No 97 N.B, Sargodha	1350	1000
148. Chak No 92 N.B, Sargodha	455	1000
149. Chak No 70 Sb, Sargodha	710	1000
150. Ck.40 NB, Sargodha	1472	1000
151. Chak No 91 Sb, Sargodha	799	1000
152. Ck 101 Sb, Sargodha	6214	1000
153. Chak No 95 Sb, Sargodha	5080	1000
154. Chak 99 S.B, Sargodha	5380	1000
155. Chak No 51 Nb, Sargodha	1376	1000
156. Chak No#76sb, Sargodha	2052	1000
157. Chak No 116 N.B, Sargodha	2065	1000
158. Chak No 85sb, Sargodha	5114	1000
159. Say Dowana, Sargodha	4050	1000
160. 100 Sb, Sargodha	4208	1000
161. Chak 2 Rakh Dharema, Sargodha	2316	1000
162. Chak No #94sb, Sargodha	2210	1000
163. Chak No 32 Nb, Sargodha	4322	1000
164. Chak Asaiyanwala, Sargodha	5445	1000
165. Chak No 83 Nb, Sargodha	1284	1000

166. Chak#1 Rakh Dharema, Sargodha	2713	1000
167. Chak#3 Rakh Dharema, Sargodha	1988	1000
168. Chak No 84 N.B, Sargodha	1460	1000
169. Chak No 72 N.B Shazadia Wala, Sargodha	977	1000
170. Chak#58 Nb, Sargodha	1384	1000
171. Godhy Wala, Sargodha	1343	1000
172. Jalpanan, Shahpur	2923	1000
173. Thati Lami, Shahpur	1677	1000
174. Chak 89 Nb, Sargodha	1250	1000
175. Chak 9 SB, Kot Momin	2050	1000

Total dissolved solids result for selected locations of Package 9 (Gujranwala and Sargodha) were as shown in Table 5. Comparison was made for monitored results with PEQs and WHO standards. The comparison shows that TDS level is high in drinking water samples at most of the locations. It is estimated that high level of TDS in some drinking water samples is due to dissolved salts.

3.3 Conclusions

This study was conducted to assess the Water quality at Package 9 (Gujranwala and Sargodha) under Punjab Aab-E-Pak project. Water quality was monitored at one hundred and seventy-five (175) selected locations to conduct a comparison of pollutants/contamination level with respective standards. Results show that the levels of parameters (TDS, Fluoride & Turbidity) were out of limits of their respective standard. TDS and fluorides level were found very high in the tested water samples of package 9 (Gujranwala +Sargodha) Main reason for these higher values is that, these water sources are contaminated and having high quality of soluble salts. Water analysis results show that the hardness, nitrates and microbiological parameters at some locations are within the limit of PEQS/WHO standards. Microbiological parameters testing results show that at some locations microbial contents are high. Hence it was concluded from the analyzed results of collected water samples that this water is contaminated and not suitable for drinking use of public of Gujranwala and Sargodha. Installation and operation of water filtration plants is essential for provision of clean and healthy water for people of Package 9.

Chapter 4 REFERENCES

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***This Report is not valid for Court**

ANNEXURE A

REPORTS

Report 12: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 16 NB, Bhalwal	**GEC Report No:**	GEC-ENV-P-086/20-R-757
Coordinates:	32°17'10.58"N 72°48'01.97"E	**Sample Identification:**	JERS-DW-012 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	160 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.35	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	74.5	< 500	---
	TDS	mg/l	890	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.25	< 1.5	1.5
	Nitrate	mg/l	8.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 13: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 22 NB, Bhalwal	**GEC Report No:**	GEC-ENV-P-086/20-R-758
Coordinates:	32°13'47.03"N 72°51'34.00"E	**Sample Identification:**	JERS-DW-013 A
Sampling Source:	Hand Pump	**Sample Collection Date:**	November 26,2020
Source Depth	80 foot	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	6.82	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	165.5	< 500	---
	TDS	mg/l	3500	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	4.75	< 1.5	1.5
	Nitrate	mg/l	23.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 14: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 09 NB, Bhalwal	**GEC Report No:**	GEC-ENV-P-086/20-R-759
Coordinates:	32°14'10.34"N 72°53'46.93"E	**Sample Identification:**	JERS-DW-014 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	150 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.45	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	45.5	< 500	---
	TDS	mg/l	310	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.0	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.73	< 1.5	1.5
	Nitrate	mg/l	1.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 15: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Purana Phlervan, Bhalwal	**GEC Report No:**	GEC-ENV-P-086/20-R-760
Coordinates:	32°21'18.69"N 73°00'50.03"E	**Sample Identification:**	JERS-DW-015 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	110 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.8	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	84.1	< 500	---
	TDS	mg/l	1380	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.0	15	15
	pH	-	7.0	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	2.02	< 1.5	1.5
	Nitrate	mg/l	3.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TDS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 16: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Mateela, Kot Momin	**GEC Report No:**	GEC-ENV-P-086/20-R-761
Coordinates:	32°05'55.84"N 72°57'21.46"E	**Sample Identification:**	JERS-DW-016 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	110 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.15	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	83.7	< 500	---
	TDS	mg/l	1425	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.0	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.94	< 1.5	1.5
	Nitrate	mg/l	2.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TDS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 17: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Tiba Murad, Kot Momin	**GEC Report No:**	GEC-ENV-P-086/20-R-762
Coordinates:	32°10'22.36"N 73°01'14.33"E	**Sample Identification:**	JERS-DW-017 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	160 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	3.2	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	85.2	< 500	---
	TDS	mg/l	1572	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	3.11	< 1.5	1.5
	Nitrate	mg/l	4.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TDS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 18: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 7 SB, Kot Momin	**GEC Report No:**	GEC-ENV-P-086/20-R-763
Coordinates:	32°14'47.51N 73°00'50.03"E	**Sample Identification:**	JERS-DW-018 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	140 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.25	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	67.5	< 500	---
	TDS	mg/l	749	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.16	< 1.5	1.5
	Nitrate	mg/l	6.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 19: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 8 SB, Kot Momin	**GEC Report No:**	GEC-ENV-P-086/20-R-764
Coordinates:	32°16'11.23"N 73°01'10.66"E	**Sample Identification:**	JERS-DW-019 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	140 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.05	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	66.6	< 500	---
	TDS	mg/l	733	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.15	< 1.5	1.5
	Nitrate	mg/l	5.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 20: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 20/SB, Kot Momin	**GEC Report No:**	GEC-ENV-P-086/20-R-765
Coordinates:	32°09'21.66"N 72°55'18.09"E	**Sample Identification:**	JERS-DW-020 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	160 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.95	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	59.7	< 500	---
	TDS	mg/l	595	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.06	< 1.5	1.5
	Nitrate	mg/l	2.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 21: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Thathi Lambi, Sahiwal	**GEC Report No:**	GEC-ENV-P-086/20-R-766
Coordinates:	32°04'00.35"N 72°19'29.29"E	**Sample Identification:**	JERS-DW-021 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	180 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.84	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	53.9	< 500	---
	TDS	mg/l	480	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	9.0	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.97	< 1.5	1.5
	Nitrate	mg/l	1.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 22: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chanra, Sahiwal	**GEC Report No:**	GEC-ENV-P-086/20-R-767
Coordinates:	31°56'09.77"N 72°22'07.73"E	**Sample Identification:**	JERS-DW-022 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	150 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.25	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	60.9	< 500	---
	TDS	mg/l	618	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	15	15	15
	pH	-	7.0	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.07	< 1.5	1.5
	Nitrate	mg/l	3.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 23: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Rabana, Sahiwal	**GEC Report No:**	GEC-ENV-P-086/20-R-768
Coordinates:	31°48'27.49 "N 72°22'28.81"E	**Sample Identification:**	JERS-DW-023 A
Sampling Source:	Hand Pump	**Sample Collection Date:**	November 26,2020
Source Depth	60 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	5.7	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	145.7	< 500	---
	TDS	mg/l	2980	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	4.6	< 1.5	1.5
	Nitrate	mg/l	14.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 24: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Kishkan, Sahiwal	**GEC Report No:**	GEC-ENV-P-086/20-R-769
Coordinates:	32°00'46.34"N 72°17'57.64"E	**Sample Identification:**	JERS-DW-024 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	150 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.82	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	61.1	< 500	---
	TDS	mg/l	622	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	14	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.08	< 1.5	1.5
	Nitrate	mg/l	3.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 25: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Noor-E-Wala, Sahiwal	**GEC Report No:**	GEC-ENV-P-086/20-R-770
Coordinates:	31°46'06.06"N 72°19'31.69"E	**Sample Identification:**	JERS-DW-025 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	110 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	5.9	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	122.7	< 500	---
	TDS	mg/l	2210	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	4.36	< 1.5	1.5
	Nitrate	mg/l	18.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 26: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Noor-E-Wala Colony, Sahiwal	**GEC Report No:**	GEC-ENV-P-086/20-R-771
Coordinates:	31°45'52.12"N 72°19'33.92"E	**Sample Identification:**	JERS-DW-026 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	120 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	3.8	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	82.3	< 500	---
	TDS	mg/l	1480	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	6.9	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	3.42	< 1.5	1.5
	Nitrate	mg/l	9.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 27: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Baran, Sahiwal	**GEC Report No:**	GEC-ENV-P-086/20-R-772
Coordinates:	31°46'42.67"N 72°35'54.94"E	**Sample Identification:**	JERS-DW-027 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	100 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	4.1	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	140.3	< 500	---
	TDS	mg/l	2830	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	4.45	< 1.5	1.5
	Nitrate	mg/l	13.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 28: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Sajoka, Sahiwal	**GEC Report No:**	GEC-ENV-P-086/20-R-773
Coordinates:	31°52'10.00"N 72°24'44.00"E	**Sample Identification:**	JERS-DW-028 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	160 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.68	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	55.5	< 500	---
	TDS	mg/l	510	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.00	< 1.5	1.5
	Nitrate	mg/l	2.5	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 29: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Khichi Ala, Sahiwal	**GEC Report No:**	GEC-ENV-P-086/20-R-774
Coordinates:	31°49'46.83"N 72°24'44.40"E	**Sample Identification:**	JERS-DW-027 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	140 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.34	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	64.5	< 500	---
	TDS	mg/l	690	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.12	< 1.5	1.5
	Nitrate	mg/l	3.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 30: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Thati Jalal, Sahiwal	**GEC Report No:**	GEC-ENV-P-086/20-R-775
Coordinates:	31°48'32.98"N 72°23'55.26"E	**Sample Identification:**	JERS-DW-030 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	110 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.8	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	132.7	< 500	---
	TDS	mg/l	2450	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	12	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	4.55	< 1.5	1.5
	Nitrate	mg/l	6.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 31: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Dhirwal, Sahiwal	**GEC Report No:**	GEC-ENV-P-086/20-R-776
Coordinates:	32°02'311.50"N 72°19'39.35"E	**Sample Identification:**	JERS-DW-031 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	160 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.7	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	120.4	< 500	---
	TDS	mg/l	2090	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	4.40	< 1.5	1.5
	Nitrate	mg/l	7.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 32: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 104 Janobi, Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-777
Coordinates:	31°59'59.12"N 72°41'49.22"E	**Sample Identification:**	JERS-DW-032 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	150 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.84	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	63.9	< 500	---
	TDS	mg/l	680	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	5.0	15	15
	pH	-	6.9	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.14	< 1.5	1.5
	Nitrate	mg/l	3.4	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

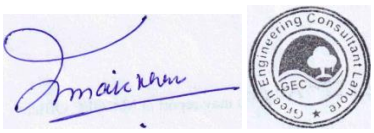
Report 33: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 142 S.B Big, Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-778
Coordinates:	31°56'57.56"N 72°39'28.98"E	**Sample Identification:**	JERS-DW-033 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	120 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.18	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	69.1	< 500	---
	TDS	mg/l	782	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	5.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.17	< 1.5	1.5
	Nitrate	mg/l	6.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
		
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 34: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 142 S.B Small, Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-779
Coordinates:	31°56'50.06"N 72°39'40.66"E	**Sample Identification:**	JERS-DW-034 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	150 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.86	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	82.8	< 500	---
	TDS	mg/l	1057	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	12	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.37	< 1.5	1.5
	Nitrate	mg/l	12.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 35: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 56 NB, Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-780
Coordinates:	32°11'21.93"N 72°39'21.93"E	**Sample Identification:**	JERS-DW-035 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	110 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.94	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	82.1	< 500	---
	TDS	mg/l	1041	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.35	< 1.5	1.5
	Nitrate	mg/l	12.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 36: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 110 S.B, Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-781
Coordinates:	31°55'08.91"N 72°45'27.49"E	**Sample Identification:**	JERS-DW-036 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	180 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.78	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	57.9	< 500	---
	TDS	mg/l	559	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.03	< 1.5	1.5
	Nitrate	mg/l	2.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 37: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 110 S.B Colony, Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-782
Coordinates:	31°55'25.34"N 72°45'37.27"E	**Sample Identification:**	JERS-DW-037 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	120 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.54	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	77.3	< 500	---
	TDS	mg/l	947	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.29	< 1.5	1.5
	Nitrate	mg/l	10.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 38: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 106 S.B, Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-783
Coordinates:	31°55'11.11 "N 72°46'42.79"E	**Sample Identification:**	JERS-DW-038 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	120 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.25	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	76.8	< 500	---
	TDS	mg/l	936	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	5.0	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.28	< 1.5	1.5
	Nitrate	mg/l	10.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 39: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 53 NB, Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-784
Coordinates:	31°10'08.08"N 72°41'39.44"E	**Sample Identification:**	JERS-DW-039 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	130 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.74	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	80.8	< 500	---
	TDS	mg/l	1015	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.34	< 1.5	1.5
	Nitrate	mg/l	11.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within except TDS limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 40: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 102, Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-785
Coordinates:	31°56'16.06"N 72°47'02.17"E	**Sample Identification:**	JERS-DW-040 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	110 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.82	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	86.6	< 500	---
	TDS	mg/l	1596	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	5.0	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	3.26	< 1.5	1.5
	Nitrate	mg/l	10.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 41: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 108 S.B, Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-786
Coordinates:	31°59'01.94"N 72°41'12.49"E	**Sample Identification:**	JERS-DW-041 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	140 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.12	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	65.4	< 500	---
	TDS	mg/l	709	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	5.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.13	< 1.5	1.5
	Nitrate	mg/l	5.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within except odour limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 42: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 66 NB, Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-787
Coordinates:	32°09'49.30"N 72°38'22.03"E	**Sample Identification:**	JERS-DW-042 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	140 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.32	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	69.6	< 500	---
	TDS	mg/l	792	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.18	< 1.5	1.5
	Nitrate	mg/l	7.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 43: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 26 NB, Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-788
Coordinates:	32°11'40.88"N 72°49'33.72"E	**Sample Identification:**	JERS-DW-043 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	120 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.21	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	70.5	< 500	---
	TDS	mg/l	810	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.21	< 1.5	1.5
	Nitrate	mg/l	7.4	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 44: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Wegowal, Shah Pur	**GEC Report No:**	GEC-ENV-P-086/20-R-789
Coordinates:	32°11'56.25"N 72°32'09.03"E	**Sample Identification:**	JERS-DW-044 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	100 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	3.11	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	84.3	< 500	---
	TDS	mg/l	1300	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	2.57	< 1.5	1.5
	Nitrate	mg/l	11.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within except TDS limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 45: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Jalpana , Shah Pur	**GEC Report No:**	GEC-ENV-P-086/20-R-790
Coordinates:	32°15'57.73"N 72°30'59.24"E	**Sample Identification:**	JERS-DW-045 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	130 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.49	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	47.3	< 500	---
	TDS	mg/l	347	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.0	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.74	< 1.5	1.5
	Nitrate	mg/l	1.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within except odour limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 46: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Sardar Pur, Shah Pur	**GEC Report No:**	GEC-ENV-P-086/20-R-791
Coordinates:	32°12'55.13"N 72°33'03.49"E	**Sample Identification:**	JERS-DW-046 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	150 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	4.19	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	122.3	< 500	---
	TDS	mg/l	2135	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.0	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	4.33	< 1.5	1.5
	Nitrate	mg/l	6.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 47: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 5, 4 Jinnah Colony, Shah Pur	**GEC Report No:**	GEC-ENV-P-086/20-R-792
Coordinates:	32°11'18.00"N 72°33'20.25"E	**Sample Identification:**	JERS-DW-047 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	150 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.92	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	83.3	< 500	---
	TDS	mg/l	1321	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	2.08	< 1.5	1.5
	Nitrate	mg/l	7.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 48: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Hayatpur, Shah Pur	**GEC Report No:**	GEC-ENV-P-086/20-R-793
Coordinates:	32°17'43.58"N 72°38'11.19"E	**Sample Identification:**	JERS-DW-048 A
Sampling Source:	Hand Pump	**Sample Collection Date:**	November 26,2020
Source Depth	80 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	3.12	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	118.9	< 500	---
	TDS	mg/l	2205	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	4.11	< 1.5	1.5
	Nitrate	mg/l	10.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 49: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak Muzafra Abad Colony, Shah Pur	**GEC Report No:**	GEC-ENV-P-086/20-R-794
Coordinates:	32°16'21.48"N 72°19'56.63"E	**Sample Identification:**	JERS-DW-049 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	140 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.72	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	53.7	< 500	---
	TDS	mg/l	475	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.0	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.96	< 1.5	1.5
	Nitrate	mg/l	2.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 50: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chahrai Sheerif, Shah Pur	**GEC Report No:**	GEC-ENV-P-086/20-R-795
Coordinates:	32°20'21.32"N 72°31'01.25"E	**Sample Identification:**	JERS-DW-050 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	120 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.96	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	84.9	< 500	---
	TDS	mg/l	1100	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.39	< 1.5	1.5
	Nitrate	mg/l	13.4	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within except TDS of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 51: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Megha Kadhi, Shah Pur	**GEC Report No:**	GEC-ENV-P-086/20-R-796
Coordinates:	32°23'07.53"N 72°34'00.26"E	**Sample Identification:**	JERS-DW-051 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	130 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.65	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	67.1	< 500	---
	TDS	mg/l	742	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.0	15	15
	pH	-	7.7	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.16	< 1.5	1.5
	Nitrate	mg/l	6.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 52: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 154, Sillanwali	**GEC Report No:**	GEC-ENV-P-086/20-R-797
Coordinates:	31°40'44.28"N 72°19'53.03"E	**Sample Identification:**	JERS-DW-052 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	150 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.13	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	83.4	< 500	---
	TDS	mg/l	1510	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	2.61	< 1.5	1.5
	Nitrate	mg/l	3.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 53: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 128 SB, Sillanwali	**GEC Report No:**	GEC-ENV-P-086/20-R-798
Coordinates:	31°51'49.79"N 72°38'45.65"E	**Sample Identification:**	JERS-DW-053 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	140 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.62	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	77.7	< 500	---
	TDS	mg/l	955	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	5.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.3	< 1.5	1.5
	Nitrate	mg/l	10.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 54: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 138 SB, Sillanwali	**GEC Report No:**	GEC-ENV-P-086/20-R-799
Coordinates:	31°49'48.68"N 72°33'21.24"E	**Sample Identification:**	JERS-DW-054 A
Sampling Source:	Hand Pump	**Sample Collection Date:**	November 26,2020
Source Depth	60 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	6.7	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	150.4	< 500	---
	TDS	mg/l	4009	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.7	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	4.16	< 1.5	1.5
	Nitrate	mg/l	19.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 55: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 162/ 164 NB, Sillanwali	**GEC Report No:**	GEC-ENV-P-086/20-R-800
Coordinates:	31°36'06.61"N 72°15'50.56"E	**Sample Identification:**	JERS-DW-055 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	130 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.83	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	55.5	< 500	---
	TDS	mg/l	510	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.04	< 1.5	1.5
	Nitrate	mg/l	2.5	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by: Nabila Shabbir

Chief Chemist: Asma Khalid

Head of Env Lab: Muhammad Umair

Report 56: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 50 SB, Sillanwali	**GEC Report No:**	GEC-ENV-P-086/20-R-801
Coordinates:	32°02'13.10"N 72°42'20.16"E	**Sample Identification:**	JERS-DW-056 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	110 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.84	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	74.5	< 500	---
	TDS	mg/l	1682	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	11	15	15
	pH	-	7.9	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.74	< 1.5	1.5
	Nitrate	mg/l	7.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 57: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 133 SB, Sillanwali	**GEC Report No:**	GEC-ENV-P-086/20-R-802
Coordinates:	31°50'23.71"N 72°36'08.50"E	**Sample Identification:**	JERS-DW-057 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	120 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.73	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	80.2	< 500	---
	TDS	mg/l	1004	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	5.0	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.33	< 1.5	1.5
	Nitrate	mg/l	11.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within except TDS limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 58: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 152 NB, Sillanwali	**GEC Report No:**	GEC-ENV-P-086/20-R-803
Coordinates:	31°42'57.40"N 72°21'10.98"E	**Sample Identification:**	JERS-DW-058 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	140 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.46	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	58.5	< 500	---
	TDS	mg/l	570	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.04	< 1.5	1.5
	Nitrate	mg/l	2.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 59: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 160 NB, Sillanwali	**GEC Report No:**	GEC-ENV-P-086/20-R-804
Coordinates:	31°37'41.77"N 72°17'26.81"E	**Sample Identification:**	JERS-DW-059 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	160 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.25	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	54.8	< 500	---
	TDS	mg/l	496	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.98	< 1.5	1.5
	Nitrate	mg/l	2.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within except TDS limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 60: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 155 NB, Sillanwali	**GEC Report No:**	GEC-ENV-P-086/20-R-805
Coordinates:	31°40'48.91"N 72°19'51.13"E	**Sample Identification:**	JERS-DW-060 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	150 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.92	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	78.3	< 500	---
	TDS	mg/l	1370	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	2.62	< 1.5	1.5
	Nitrate	mg/l	8.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 61: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 155 NB, Sillanwali	**GEC Report No:**	GEC-ENV-P-086/20-R-806
Coordinates:	32°13'44.59"N 73°13'14.42"E	**Sample Identification:**	JERS-DW-061 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	130 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.92	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	78.3	< 500	---
	TDS	mg/l	1370	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	2.62	< 1.5	1.5
	Nitrate	mg/l	8.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 62: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Jalla Makhdum, Kot Momin	**GEC Report No:**	GEC-ENV-P-086/20-R-807
Coordinates:	32°01'33.43"N 73°04'22.64"E	**Sample Identification:**	JERS-DW-062 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	160 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.63	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	50.7	< 500	---
	TDS	mg/l	415	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.0	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.86	< 1.5	1.5
	Nitrate	mg/l	1.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 63: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 9 Lokri, Kot Momin	**GEC Report No:**	GEC-ENV-P-086/20-R-808
Coordinates:	32°13'43.67"N 72°55'09.99"E	**Sample Identification:**	JERS-DW-063 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	150 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.45	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	41.4	< 500	---
	TDS	mg/l	229	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.66	< 1.5	1.5
	Nitrate	mg/l	0.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within except odour limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 64: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chaowall, Kot Momin	**GEC Report No:**	GEC-ENV-P-086/20-R-809
Coordinates:	32°16'46.82"N 73°04'34.89"E	**Sample Identification:**	JERS-DW-064 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	150 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.85	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	70.5	< 500	---
	TDS	mg/l	810	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.21	< 1.5	1.5
	Nitrate	mg/l	7.4	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 65: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Naseer Pur Kalan, Kot Momin	**GEC Report No:**	GEC-ENV-P-086/20-R-810
Coordinates:	32°06'50.95"N 73°07'48.98"E	**Sample Identification:**	JERS-DW-065 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	140 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.56	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	48.9	< 500	---
	TDS	mg/l	380	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.79	< 1.5	1.5
	Nitrate	mg/l	1.4	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 66: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Bucha Kalan, Kot Momin	**GEC Report No:**	GEC-ENV-P-086/20-R-811
Coordinates:	32°11'23.64"N 73°08'42.36"E	**Sample Identification:**	JERS-DW-066 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	170 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.62	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	52.7	< 500	---
	TDS	mg/l	455	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.92	< 1.5	1.5
	Nitrate	mg/l	1.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within except odour limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 67: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Manke Walla, Shah Pur	**GEC Report No:**	GEC-ENV-P-086/20-R-812
Coordinates:	32°17'54.89"N 72°39'49.07"E	**Sample Identification:**	JERS-DW-067 A
Sampling Source:	Field Tube well	**Sample Collection Date:**	November 26,2020
Source Depth	110 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.65	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	85.1	< 500	---
	TDS	mg/l	1311	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.0	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	2.61	< 1.5	1.5
	Nitrate	mg/l	8.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within except TDS limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

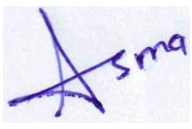
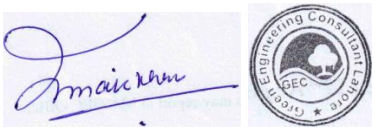
Report 78: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Bhalowal, Malikwall	**GEC Report No:**	GEC-ENV-P-086/20-R-1517
Coordinates:	32°28'45.6"N 73°14'41.1"E	**Sample Identification:**	JERS-DW-225
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 10,2021
Source Depth	60 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	3.56	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	167.3	< 500	---
	TDS	mg/l	755	‹ 1000	‹ 1000
	TSS	mg/l	4	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	12	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.04	< 0.05	0.01
	Fluoride	mg/l	1.02	< 1.5	1.5
	Nitrate	mg/l	6.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	32	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	13	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	8	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
		
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 79: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Cha Syed Wala, Bhakkar	**GEC Report No:**	GEC-ENV-P-086/20-R-1518
Coordinates:	31°33'3.00"N 71° 5'48.00"E	**Sample Identification:**	JERS-DW-226
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 09,2021
Source Depth	30 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.36	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	45.7	< 500	---
	TDS	mg/l	327	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.6	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.006	< 0.05	0.01
	Fluoride	mg/l	0.21	< 1.5	1.5
	Nitrate	mg/l	0.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 80: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Khan Pur Shumali, Bhakkar	**GEC Report No:**	GEC-ENV-P-086/20-R-1519
Coordinates:	31°30'27.00"N 71°12'53.00"E	**Sample Identification:**	JERS-DW-227
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 08,2021
Source Depth	20 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.68	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	188.4	< 500	---
	TDS	mg/l	895	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.1	15	15
	pH	-	7.7	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.007	< 0.05	0.01
	Fluoride	mg/l	1.6	< 1.5	1.5
	Nitrate	mg/l	7.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 81: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Jhok Mehr Shah, Darya Khan	**GEC Report No:**	GEC-ENV-P-086/20-R-1520
Coordinates:	31°55'1.64"N 71° 6'28.74"E	**Sample Identification:**	JERS-DW-228
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 09,2021
Source Depth	20 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.77	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	38.5	< 500	---
	TDS	mg/l	327	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.2	15	15
	pH	-	7.5	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.005	< 0.05	0.01
	Fluoride	mg/l	0.23	< 1.5	1.5
	Nitrate	mg/l	0.15	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 82: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Gadai, Darya Khan	**GEC Report No:**	GEC-ENV-P-086/20-R-1521
Coordinates:	31°53'15.84"N 71°18'5.72"E	**Sample Identification:**	JERS-DW-229
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 09,2021
Source Depth	25 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.62	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	41.5	< 500	---
	TDS	mg/l	310	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.1	15	15
	pH	-	8.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.005	< 0.05	0.01
	Fluoride	mg/l	0.18	< 1.5	1.5
	Nitrate	mg/l	0.42	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 83: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Dagar Yaar Shah Gharbi, Darya Khan	**GEC Report No:**	GEC-ENV-P-086/20-R-1522
Coordinates:	31°54'46.00"N 71°12'48.00"E	**Sample Identification:**	JERS-DW-230
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 09,2021
Source Depth	35 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.86	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	35.2	< 500	---
	TDS	mg/l	280	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.3	15	15
	pH	-	7.7	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.13	< 1.5	1.5
	Nitrate	mg/l	0.21	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	11	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	4	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 84: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Haji Hussain Shah Dagar, Darya Khan	**GEC Report No:**	GEC-ENV-P-086/20-R-1523
Coordinates:	31°54'25.78"N 71°16'33.46"E	**Sample Identification:**	JERS-DW-231
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 09,2021
Source Depth	50 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.68	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	72.6	< 500	---
	TDS	mg/l	618	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.5	15	15
	pH	-	8.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.012	< 0.05	0.01
	Fluoride	mg/l	0.29	< 1.5	1.5
	Nitrate	mg/l	1.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 85: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Mehmood Wala, Kalur Kot	**GEC Report No:**	GEC-ENV-P-086/20-R-1524
Coordinates:	32°10'48.00"N 71°28'52.00"E	**Sample Identification:**	JERS-DW-232
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 09,2021
Source Depth	20 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.78	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	68.3	< 500	---
	TDS	mg/l	610	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.6	15	15
	pH	-	7.7	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.009	< 0.05	0.01
	Fluoride	mg/l	1.32	< 1.5	1.5
	Nitrate	mg/l	2.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 86: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Daily Namdar, Kalur Kot	**GEC Report No:**	GEC-ENV-P-086/20-R-1525
Coordinates:	32° 6'24.92"N 71°31'5.68"E	**Sample Identification:**	JERS-DW-233
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 09,2021
Source Depth	40 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.52	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	56.4	< 500	---
	TDS	mg/l	675	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.6	15	15
	pH	-	7.7	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.005	< 0.05	0.01
	Fluoride	mg/l	0.85	< 1.5	1.5
	Nitrate	mg/l	1.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 87: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Bitti, Kalur Kot	**GEC Report No:**	GEC-ENV-P-086/20-R-1526
Coordinates:	31°57'2.87"N 71°36'45.39"E	**Sample Identification:**	JERS-DW-234
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 11,2021
Source Depth	20 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.83	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	112.6	< 500	---
	TDS	mg/l	784	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.7	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.007	< 0.05	0.01
	Fluoride	mg/l	0.63	< 1.5	1.5
	Nitrate	mg/l	3.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	19	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	6	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	3	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 88: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Shaheedan Shumali Kalur Kot	**GEC Report No:**	GEC-ENV-P-086/20-R-1527
Coordinates:	32° 6'56.48"N 71°42'9.41"E	**Sample Identification:**	JERS-DW-235
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 09,2021
Source Depth	35 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.64	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	348.8	< 500	---
	TDS	mg/l	1151	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.5	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.019	< 0.05	0.01
	Fluoride	mg/l	1.57	< 1.5	1.5
	Nitrate	mg/l	15.4	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	5	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	2	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	1	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 89: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Kheuo Mankera	**GEC Report No:**	GEC-ENV-P-086/20-R-1528
Coordinates:	31°35'8.83"N 71°45'38.82"E	**Sample Identification:**	JERS-DW-236
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 08,2021
Source Depth	18 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.66	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	289.5	< 500	---
	TDS	mg/l	1022	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.2	15	15
	pH	-	7.8	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.03	< 0.05	0.01
	Fluoride	mg/l	2.2	< 1.5	1.5
	Nitrate	mg/l	13.5	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 90: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chamb Mankera	**GEC Report No:**	GEC-ENV-P-086/20-R-1529
Coordinates:	31°12'43.18"N 71°40'51.12"E	**Sample Identification:**	JERS-DW-237
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 08,2021
Source Depth	30 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.38	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	267.5	< 500	---
	TDS	mg/l	1152	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.8	15	15
	pH	-	7.8	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.007	< 0.05	0.01
	Fluoride	mg/l	1.43	< 1.5	1.5
	Nitrate	mg/l	16.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 91: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Gohar Wala Mankera	**GEC Report No:**	GEC-ENV-P-086/20-R-1530
Coordinates:	31°43'0.32"N 71°34'34.12"E	**Sample Identification:**	JERS-DW-238
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 08,2021
Source Depth	25 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.42	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	189.5	< 500	---
	TDS	mg/l	910	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.5	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.009	< 0.05	0.01
	Fluoride	mg/l	0.79	< 1.5	1.5
	Nitrate	mg/l	11.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 92: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Dengana Mankera	**GEC Report No:**	GEC-ENV-P-086/20-R-1531
Coordinates:	31°20'3.06"N 71°54'52.79"E	**Sample Identification:**	JERS-DW-239
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 08,2021
Source Depth	40 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.76	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	134.6	< 500	---
	TDS	mg/l	710	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.3	15	15
	pH	-	7.9	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.005	< 0.05	0.01
	Fluoride	mg/l	0.42	< 1.5	1.5
	Nitrate	mg/l	1.03	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 93: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 73 TDA Mankera	**GEC Report No:**	GEC-ENV-P-086/20-R-1532
Coordinates:	31°24'41.00"N 71°09'19.00"E	**Sample Identification:**	JERS-DW-240
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 09,2021
Source Depth	50 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.64	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	265.7	< 500	---
	TDS	mg/l	1021	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.3	15	15
	pH	-	7.5	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.021	< 0.05	0.01
	Fluoride	mg/l	1.6	< 1.5	1.5
	Nitrate	mg/l	9.35	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 94: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Hassan Khan Walla Kalourkot	**GEC Report No:**	GEC-ENV-P-086/20-R-1533
Coordinates:	32°10'46.98"N 71°26'43.14"E	**Sample Identification:**	JERS-DW-241
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 09,2021
Source Depth	40 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.49	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	67.5	< 500	---
	TDS	mg/l	560	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.3	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.51	< 1.5	1.5
	Nitrate	mg/l	4.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 95: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 46 Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1534
Coordinates:	32°12'47.00"N 72°13'43.00"E	**Sample Identification:**	JERS-DW-242
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 10,2021
Source Depth	100 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.87	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	645.9	< 500	---
	TDS	mg/l	2346	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.2	15	15
	pH	-	7.5	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.06	< 0.05	0.01
	Fluoride	mg/l	4.9	< 1.5	1.5
	Nitrate	mg/l	22.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	2	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	2	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

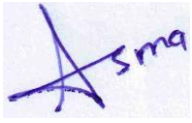
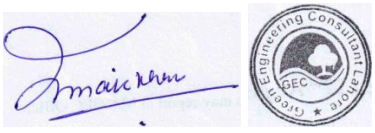
Report 96: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Waheer Shumali Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1535
Coordinates:	32°25'07.00"N 72°17'15.00"E	**Sample Identification:**	JERS-DW-243
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 10,2021
Source Depth	230 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.16	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	850.6	< 500	---
	TDS	mg/l	4816	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.2	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.09	< 0.05	0.01
	Fluoride	mg/l	6.7	< 1.5	1.5
	Nitrate	mg/l	27.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	14	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	5	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	3	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
		
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 97: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chussu Wala Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1536
Coordinates:	32°18'27.00"N 71°59'03.00"E	**Sample Identification:**	JERS-DW-244
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 09,2021
Source Depth	200 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.78	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	911.5	< 500	---
	TDS	mg/l	4564	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.5	15	15
	pH	-	7.8	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.023	< 0.05	0.01
	Fluoride	mg/l	4.3	< 1.5	1.5
	Nitrate	mg/l	17.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	11	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	3	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 98: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 41 Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1537
Coordinates:	32°13'31.00"N 72°9'29.00"E	**Sample Identification:**	JERS-DW-245
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 09,2021
Source Depth	100 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.44	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	344.3	< 500	---
	TDS	mg/l	1364	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.4	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.008	< 0.05	0.01
	Fluoride	mg/l	2.2	< 1.5	1.5
	Nitrate	mg/l	10.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 99: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 52mb Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1538
Coordinates:	32°14'38.00"N 72°15'58.00"E	**Sample Identification:**	JERS-DW-246
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 10,2021
Source Depth	80 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.26	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	142.7	< 500	---
	TDS	mg/l	857	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.8	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.005	< 0.05	0.01
	Fluoride	mg/l	0.69	< 1.5	1.5
	Nitrate	mg/l	8.12	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	7	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	2	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	1	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 100: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 42 Mb Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1539
Coordinates:	32°14'26.00"N 72°09'01.00"E	**Sample Identification:**	JERS-DW-247
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 09,2021
Source Depth	90 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.88	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	221.6	< 500	---
	TDS	mg/l	1870	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.5	15	15
	pH	-	7.9	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.013	< 0.05	0.01
	Fluoride	mg/l	2.5	< 1.5	1.5
	Nitrate	mg/l	12.5	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	35	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	12	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	8	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 101: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Jhuggiyaan Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1540
Coordinates:	32°24'23.00"N 72°31'11.00"E	**Sample Identification:**	JERS-DW-248
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 10,2021
Source Depth	150 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	5.66	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	840.2	< 500	---
	TDS	mg/l	5714	‹ 1000	‹ 1000
	TSS	mg/l	3	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.4	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.05	< 0.05	0.01
	Fluoride	mg/l	5.1	< 1.5	1.5
	Nitrate	mg/l	26.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	17	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	6	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	3	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 102: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	48mb Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1541
Coordinates:	32°14'36.00"N 72°12'09.00"E	**Sample Identification:**	JERS-DW-249
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 09,2021
Source Depth	25 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.05	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	636.1	< 500	---
	TDS	mg/l	1974	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.2	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.007	< 0.05	0.01
	Fluoride	mg/l	1.82	< 1.5	1.5
	Nitrate	mg/l	11.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 103: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 44 Mb Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1542
Coordinates:	32°13'18.00"N 72°11'38.00"E	**Sample Identification:**	JERS-DW-250
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 09,2021
Source Depth	50 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.38	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	355.7	< 500	---
	TDS	mg/l	1914	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	5.8	15	15
	pH	-	7.5	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.005	< 0.05	0.01
	Fluoride	mg/l	1.46	< 1.5	1.5
	Nitrate	mg/l	12.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 104: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Joiya Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1543
Coordinates:	32°11'52"N 72°17'39"E	**Sample Identification:**	JERS-DW-251
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 10,2021
Source Depth	80 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.42	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	266.8	< 500	---
	TDS	mg/l	1610	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.4	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.006	< 0.05	0.01
	Fluoride	mg/l	1.7	< 1.5	1.5
	Nitrate	mg/l	6.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	11	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	4	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 105: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Kurpalka Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1544
Coordinates:	32°14'42.00"N 72°19'08.00"E	**Sample Identification:**	JERS-DW-252
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 09,2021
Source Depth	90 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.68	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	198.4	< 500	---
	TDS	mg/l	1800	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.3	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.011	< 0.05	0.01
	Fluoride	mg/l	2.3	< 1.5	1.5
	Nitrate	mg/l	9.5	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	13	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	5	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 106: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 43 Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1545
Coordinates:	32°14'16.00"N 72°10'16.00"E	**Sample Identification:**	JERS-DW-253
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 09,2021
Source Depth	80 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.55	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	211.5	< 500	---
	TDS	mg/l	1710	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6	15	15
	pH	-	7.7	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.008	< 0.05	0.01
	Fluoride	mg/l	1.6	< 1.5	1.5
	Nitrate	mg/l	12.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

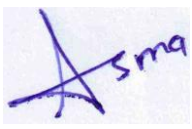
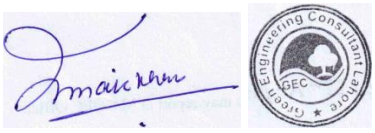
Report 107: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Butala Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1546
Coordinates:	32°16'07.00"N 72°8'30.00"E	**Sample Identification:**	JERS-DW-254
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 09,2021
Source Depth	100 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.85	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	125.6	< 500	---
	TDS	mg/l	1280	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.8	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.023	< 0.05	0.01
	Fluoride	mg/l	2.5	< 1.5	1.5
	Nitrate	mg/l	13.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	2	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	2	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
		
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 108: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Nalli Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1547
Coordinates:	32°25'56.00"N 72°19'42.00"E	**Sample Identification:**	JERS-DW-255
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 10,2021
Source Depth	200 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.72	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	188.4	< 500	---
	TDS	mg/l	1784	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.8	15	15
	pH	-	7.5	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.042	< 0.05	0.01
	Fluoride	mg/l	3.9	< 1.5	1.5
	Nitrate	mg/l	15.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	9	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	4	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 109: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Gaggh Kalaan Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1548
Coordinates:	32°21'31.00"N 72°26'03.00"E	**Sample Identification:**	JERS-DW-256
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 10,2021
Source Depth	20 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.89	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	1025	< 500	---
	TDS	mg/l	8117	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.2	15	15
	pH	-	7.7	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.07	< 0.05	0.01
	Fluoride	mg/l	2.3	< 1.5	1.5
	Nitrate	mg/l	16.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	11	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	4	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 110: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 40 Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1549
Coordinates:	32°12'45.00"N 72°9'26.00"E	**Sample Identification:**	JERS-DW-257
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 09,2021
Source Depth	70 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.85	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	225.6	< 500	---
	TDS	mg/l	810	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.5	15	15
	pH	-	7.8	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.009	< 0.05	0.01
	Fluoride	mg/l	1.05	< 1.5	1.5
	Nitrate	mg/l	7.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	17	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	6	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	3	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 111: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 50 Mb Khushab	**GEC Report No:**	GEC-ENV-P-086/20-R-1550
Coordinates:	32°13'8.00"N 72°14'35.00"E	**Sample Identification:**	JERS-DW-258
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 10,2021
Source Depth	80 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.12	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	331.6	< 500	---
	TDS	mg/l	1364	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.8	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.02	< 0.05	0.01
	Fluoride	mg/l	2.8	< 1.5	1.5
	Nitrate	mg/l	12.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 112: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Bambool Noor Pur Thal	**GEC Report No:**	GEC-ENV-P-086/20-R-1551
Coordinates:	31°44'8.02"N 71°57'9.90"E	**Sample Identification:**	JERS-DW-259
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 11,2021
Source Depth	20 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	5.86	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	567.3	< 500	---
	TDS	mg/l	3384	‹ 1000	‹ 1000
	TSS	mg/l	3	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.7	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.019	< 0.05	0.01
	Fluoride	mg/l	3.3	< 1.5	1.5
	Nitrate	mg/l	17.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 113: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Borana Wala Noor Pur Thal	**GEC Report No:**	GEC-ENV-P-086/20-R-1552
Coordinates:	31°39'53.62"N 71°59'35.10"E	**Sample Identification:**	JERS-DW-260
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 11,2021
Source Depth	22 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	22.67	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	422.1	< 500	---
	TDS	mg/l	927	‹ 1000	‹ 1000
	TSS	mg/l	10	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.5	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.006	< 0.05	0.01
	Fluoride	mg/l	0.82	< 1.5	1.5
	Nitrate	mg/l	10.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	22	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	7	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	5	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 114: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Shah Hussain Noor Pur Thal	**GEC Report No:**	GEC-ENV-P-086/20-R-1553
Coordinates:	31°34'47.51"N 71°57'34.06"E	**Sample Identification:**	JERS-DW-261
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 11,2021
Source Depth	30 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.44	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	186.4	< 500	---
	TDS	mg/l	1675	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.8	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.009	< 0.05	0.01
	Fluoride	mg/l	1.4	< 1.5	1.5
	Nitrate	mg/l	13.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

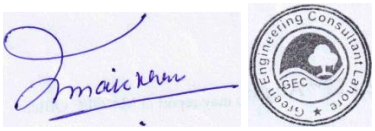
Report 115: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Maikan Noor Pur Thal	**GEC Report No:**	GEC-ENV-P-086/20-R-1554
Coordinates:	31°47'25.39"N 71°44'29.13"E	**Sample Identification:**	JERS-DW-262
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 11,2021
Source Depth	35 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.66	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	35.7	< 500	---
	TDS	mg/l	330	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.5	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.16	< 1.5	1.5
	Nitrate	mg/l	0.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	17	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	6	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	3	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
		
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 116: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Dadu Wala Noor Pur Thal	**GEC Report No:**	GEC-ENV-P-086/20-R-1555
Coordinates:	31°37'33.39"N 71°54'43.46"E	**Sample Identification:**	JERS-DW-263
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	25 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	3.48	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	145.7	< 500	---
	TDS	mg/l	1574	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.1	15	15
	pH	-	6.9	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.01	< 0.05	0.01
	Fluoride	mg/l	1.8	< 1.5	1.5
	Nitrate	mg/l	7.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 117: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No#28mb Quaidabad	**GEC Report No:**	GEC-ENV-P-086/20-R-1556
Coordinates:	32°6'42.00"N 71°55'24.00"E	**Sample Identification:**	JERS-DW-264
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 09,2021
Source Depth	100 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.95	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	139.5	< 500	---
	TDS	mg/l	1180	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.2	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.02	< 0.05	0.01
	Fluoride	mg/l	2.5	< 1.5	1.5
	Nitrate	mg/l	11.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	9	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	3	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	1	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 118: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Utra Janubi Quaidabad	**GEC Report No:**	GEC-ENV-P-086/20-R-1557
Coordinates:	32°19'22.00"N 71°54'18.00"E	**Sample Identification:**	JERS-DW-265
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 09,2021
Source Depth	150 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	4.65	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	233.7	< 500	---
	TDS	mg/l	2346	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.3	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.04	< 0.05	0.01
	Fluoride	mg/l	4.1	< 1.5	1.5
	Nitrate	mg/l	22.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	11	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	4	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 119: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 36db Quaidabad	**GEC Report No:**	GEC-ENV-P-086/20-R-1558
Coordinates:	32°14'58.8"N 71°44'45.7"E	**Sample Identification:**	JERS-DW-266
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 09,2021
Source Depth	100 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.16	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	109.6	< 500	---
	TDS	mg/l	1009	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.4	15	15
	pH	-	7.8	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.01	< 0.05	0.01
	Fluoride	mg/l	1.3	< 1.5	1.5
	Nitrate	mg/l	9.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	14	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	5	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	3	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 120: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Murghan Wala- Pacca Kamar Mushani Essa Khel	**GEC Report No:**	GEC-ENV-P-086/20-R-1559
Coordinates:	32°51'13.00"N 71°17'47.00"E	**Sample Identification:**	JERS-DW-267
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 06,2021
Source Depth	200 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.85	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	138.5	< 500	---
	TDS	mg/l	1660	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.6	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.008	< 0.05	0.01
	Fluoride	mg/l	2.6	< 1.5	1.5
	Nitrate	mg/l	12.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 121: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Manglan Wala Essa Khel	**GEC Report No:**	GEC-ENV-P-086/20-R-1560
Coordinates:	32°52'46.00"N 71°19'14.00"E	**Sample Identification:**	JERS-DW-268
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 06,2021
Source Depth	170 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.53	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	188.5	< 500	---
	TDS	mg/l	1732	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.4	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.005	< 0.05	0.01
	Fluoride	mg/l	1.9	< 1.5	1.5
	Nitrate	mg/l	19.4	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 122: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Bhat Essa Khel	**GEC Report No:**	GEC-ENV-P-086/20-R-1561
Coordinates:	32°50'45.00"N 71°21'29.00"E	**Sample Identification:**	JERS-DW-269
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 06,2021
Source Depth	210 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.33	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	205.4	< 500	---
	TDS	mg/l	1701	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.7	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.016	< 0.05	0.01
	Fluoride	mg/l	3.9	< 1.5	1.5
	Nitrate	mg/l	17.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 123: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Dala Mer Wala Essa Khel	**GEC Report No:**	GEC-ENV-P-086/20-R-1562
Coordinates:	32°52'56.00"N 71°17'26.00"E	**Sample Identification:**	JERS-DW-270
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 06,2021
Source Depth	270 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.11	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	113.8	< 500	---
	TDS	mg/l	808	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.4	15	15
	pH	-	7.8	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.007	< 0.05	0.01
	Fluoride	mg/l	0.62	< 1.5	1.5
	Nitrate	mg/l	5.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 124: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Dhedian Wala Essa Khel	**GEC Report No:**	GEC-ENV-P-086/20-R-1563
Coordinates:	32°51'46.00"N 71°16'26.00"E	**Sample Identification:**	JERS-DW-271
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 06,2021
Source Depth	200 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.67	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	150.6	< 500	---
	TDS	mg/l	1012	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.2	15	15
	pH	-	7.7	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.015	< 0.05	0.01
	Fluoride	mg/l	1.2	< 1.5	1.5
	Nitrate	mg/l	6.5	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 125: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Allah Khel- Pacca Kamar Mushani Essa Khel	**GEC Report No:**	GEC-ENV-P-086/20-R-1564
Coordinates:	32°50'18.00"N 71°20'45.00"E	**Sample Identification:**	JERS-DW-272
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 06,2021
Source Depth	115 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.62	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	202.6	< 500	---
	TDS	mg/l	1660	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.3	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.009	< 0.05	0.01
	Fluoride	mg/l	2.04	< 1.5	1.5
	Nitrate	mg/l	7.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 126: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Mari Khel- Pacca Kamar Mushani Essa Khel	**GEC Report No:**	GEC-ENV-P-086/20-R-1565
Coordinates:	32°51'26.00"N 71°18'44.00"E	**Sample Identification:**	JERS-DW-273
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 06,2021
Source Depth	200 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	3.65	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	211.5	< 500	---
	TDS	mg/l	1524	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.3	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.008	< 0.05	0.01
	Fluoride	mg/l	1.6	< 1.5	1.5
	Nitrate	mg/l	10.5	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 127: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Dhoke Zaman Mianwali	**GEC Report No:**	GEC-ENV-P-086/20-R-1566
Coordinates:	32°49'46.00"N 71°49'23.00"E	**Sample Identification:**	JERS-DW-274
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 07,2021
Source Depth	350 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	3.17	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	91.5	< 500	---
	TDS	mg/l	717	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.2	15	15
	pH	-	7.8	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.005	< 0.05	0.01
	Fluoride	mg/l	0.8	< 1.5	1.5
	Nitrate	mg/l	9.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 128: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Kund-1 Mianwali	**GEC Report No:**	GEC-ENV-P-086/20-R-1567
Coordinates:	32°42'31.00"N 71°48'18.00"E	**Sample Identification:**	JERS-DW-275
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 07,2021
Source Depth	200 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.55	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	444.7	< 500	---
	TDS	mg/l	2560	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.5	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.013	< 0.05	0.01
	Fluoride	mg/l	3.4	< 1.5	1.5
	Nitrate	mg/l	16.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 129: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Wan Bhachran Janubi Mianwali	**GEC Report No:**	GEC-ENV-P-086/20-R-1568
Coordinates:	32°25'24.00"N 71°42'38.00"E	**Sample Identification:**	JERS-DW-276
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 08,2021
Source Depth	120 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.39	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	56.4	< 500	---
	TDS	mg/l	440	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.5	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.55	< 1.5	1.5
	Nitrate	mg/l	4.12	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 130: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Wan Bhachran Shumali Mianwali	**GEC Report No:**	GEC-ENV-P-086/20-R-1569
Coordinates:	32°25'13.00"N 71°42'22.00"E	**Sample Identification:**	JERS-DW-277
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 08,2021
Source Depth	100 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.63	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	285.3	< 500	---
	TDS	mg/l	1184	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.3	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.006	< 0.05	0.01
	Fluoride	mg/l	1.7	< 1.5	1.5
	Nitrate	mg/l	13.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 131: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Noor-Ullah Wala Mianwali	**GEC Report No:**	GEC-ENV-P-086/20-R-1570
Coordinates:	32°32'16.00"N 71°36'53.00"E	**Sample Identification:**	JERS-DW-278
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 08,2021
Source Depth	100 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.85	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	186.4	< 500	---
	TDS	mg/l	1760	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.8	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.009	< 0.05	0.01
	Fluoride	mg/l	2.3	< 1.5	1.5
	Nitrate	mg/l	8.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 132: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No.026/D.B Mianwali	**GEC Report No:**	GEC-ENV-P-086/20-R-1571
Coordinates:	32°18'50.00"N 71°39'48.00"E	**Sample Identification:**	JERS-DW-279
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 08,2021
Source Depth	100 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.94	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	115.4	< 500	---
	TDS	mg/l	710	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.4	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.005	< 0.05	0.01
	Fluoride	mg/l	0.62	< 1.5	1.5
	Nitrate	mg/l	3.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 133: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Dhok Mohd . Khan Mianwali	**GEC Report No:**	GEC-ENV-P-086/20-R-1572
Coordinates:	32°50'28.00"N 71°46'58.00"E	**Sample Identification:**	JERS-DW-280
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 07,2021
Source Depth	150 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	3.22	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	226.8	< 500	---
	TDS	mg/l	1632	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.6	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.016	< 0.05	0.01
	Fluoride	mg/l	1.2	< 1.5	1.5
	Nitrate	mg/l	7.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 134: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Tibbi Mianwali	**GEC Report No:**	GEC-ENV-P-086/20-R-1573
Coordinates:	32°28'30.19"N 71°34'11.17"E	**Sample Identification:**	JERS-DW-281
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 10,2021
Source Depth	40 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.76	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	188.6	< 500	---
	TDS	mg/l	1239	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.8	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.02	< 0.05	0.01
	Fluoride	mg/l	1.4	< 1.5	1.5
	Nitrate	mg/l	10.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 135: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Bala Sharif Mianwali	**GEC Report No:**	GEC-ENV-P-086/20-R-1574
Coordinates:	32°13'30.00"N 71°40'21.00"E	**Sample Identification:**	JERS-DW-282
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 08,2021
Source Depth	100 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.66	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	56.3	< 500	---
	TDS	mg/l	696	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.5	15	15
	pH	-	7.8	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.05	< 0.05	0.01
	Fluoride	mg/l	1.6	< 1.5	1.5
	Nitrate	mg/l	9.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 136: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Bani Afghanan Mianwali	**GEC Report No:**	GEC-ENV-P-086/20-R-1575
Coordinates:	32°45'45.00"N 71°51'17.00"E	**Sample Identification:**	JERS-DW-283
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 07,2021
Source Depth	100 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.37	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	742.7	< 500	---
	TDS	mg/l	3482	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.5	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.07	< 0.05	0.01
	Fluoride	mg/l	2.3	< 1.5	1.5
	Nitrate	mg/l	18.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 137: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Vanjari Mianwali	**GEC Report No:**	GEC-ENV-P-086/20-R-1576
Coordinates:	32°54'11.00"N 71°14'52.00"E	**Sample Identification:**	JERS-DW-284
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 06,2021
Source Depth	300 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.44	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	58.9	< 500	---
	TDS	mg/l	644	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.2	15	15
	pH	-	7.8	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.005	< 0.05	0.01
	Fluoride	mg/l	0.12	< 1.5	1.5
	Nitrate	mg/l	1.5	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 138: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Ban Mhea- Balo Khel Mianwali	**GEC Report No:**	GEC-ENV-P-086/20-R-1577
Coordinates:	32°30'38.3"N 71°15'22.9"E	**Sample Identification:**	JERS-DW-285
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 10,2021
Source Depth	200 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.33	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	144.7	< 500	---
	TDS	mg/l	1571	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.3	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.006	< 0.05	0.01
	Fluoride	mg/l	0.22	< 1.5	1.5
	Nitrate	mg/l	2.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 139: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Nawab Pur	**GEC Report No:**	GEC-ENV-P-086/20-R-1578
Coordinates:	32°13'47.00"N 72°35'42.00"E	**Sample Identification:**	JERS-DW-286
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	45 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	3.77	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	489.5	< 500	---
	TDS	mg/l	2320	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.5	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.07	< 0.05	0.01
	Fluoride	mg/l	2.6	< 1.5	1.5
	Nitrate	mg/l	12.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	17	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	5	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	3	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 140: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Bochra Kohna Sahiwal	**GEC Report No:**	GEC-ENV-P-086/20-R-1579
Coordinates:	32°00'55.7"N 72°28'03.7"E	**Sample Identification:**	JERS-DW-287
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	70 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.64	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	256.5	< 500	---
	TDS	mg/l	1294	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.3	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.009	< 0.05	0.01
	Fluoride	mg/l	0.77	< 1.5	1.5
	Nitrate	mg/l	3.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	9	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	3	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	1	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TSS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

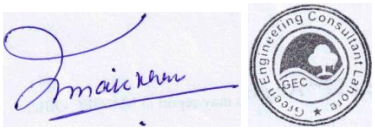
Report 141: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Naoshera Khokhran Sahiwal	**GEC Report No:**	GEC-ENV-P-086/20-R-1580
Coordinates:	31°48'31.9"N 72°24'06.6"E	**Sample Identification:**	JERS-DW-288
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	40 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.44	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	149.6	< 500	---
	TDS	mg/l	1566	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.7	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.009	< 0.05	0.01
	Fluoride	mg/l	0.55	< 1.5	1.5
	Nitrate	mg/l	10.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	5	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	2	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	1	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
		
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 142: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 49 Nb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1581
Coordinates:	32° 1'23.47"N 72°41'39.36"E	**Sample Identification:**	JERS-DW-289
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 12,2021
Source Depth	32 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.51	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	149.6	< 500	---
	TDS	mg/l	1024	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.2	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.008	< 0.05	0.01
	Fluoride	mg/l	0.71	< 1.5	1.5
	Nitrate	mg/l	7.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TDS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 143: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 47 Nb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1582
Coordinates:	32° 3'14.00"N 72°41'41.00"E	**Sample Identification:**	JERS-DW-290
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	150 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.74	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	344.5	< 500	---
	TDS	mg/l	1935	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.5	15	15
	pH	-	7.5	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.01	< 0.05	0.01
	Fluoride	mg/l	2.2	< 1.5	1.5
	Nitrate	mg/l	11.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TDS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

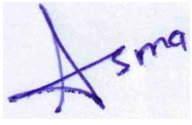
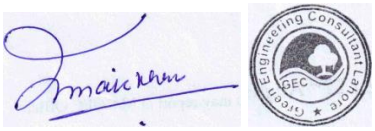
Report 144: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 86_Nb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1583
Coordinates:	32° 2'14.64"N 72°38'36.86"E	**Sample Identification:**	JERS-DW-291
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 12,2021
Source Depth	22 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.62	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	670.7	< 500	---
	TDS	mg/l	2977	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.5	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.025	< 0.05	0.01
	Fluoride	mg/l	4.1	< 1.5	1.5
	Nitrate	mg/l	19.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	20	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	7	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	4	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
		
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 145: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Bajwa Colony Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1584
Coordinates:	32° 2'56.54"N 72°38'48.38"E	**Sample Identification:**	JERS-DW-292
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 12,2021
Source Depth	30 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.94	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	62.3	< 500	---
	TDS	mg/l	558	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.3	15	15
	pH	-	7	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.15	< 1.5	1.5
	Nitrate	mg/l	5.4	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 146: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 104 Janobi Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1585
Coordinates:	32° 0'04.00"N 72°41'44.00"E	**Sample Identification:**	JERS-DW-293
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	50 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.12	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	348.7	< 500	---
	TDS	mg/l	2257	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.1	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.01	< 0.05	0.01
	Fluoride	mg/l	0.88	< 1.5	1.5
	Nitrate	mg/l	11.5	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TDS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 147: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 97 N.B Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1586
Coordinates:	31° 59'49.00"N 72°37'42.00"E	**Sample Identification:**	JERS-DW-294
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 12,2021
Source Depth	40 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.82	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	193.4	< 500	---
	TDS	mg/l	1350	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.3	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.009	< 0.05	0.01
	Fluoride	mg/l	0.97	< 1.5	1.5
	Nitrate	mg/l	8.5	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TDS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 148: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 92 N.B Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1587
Coordinates:	32° 4'8.97"N 72°32'6.13"E	**Sample Identification:**	JERS-DW-295
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 12,2021
Source Depth	35 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.62	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	48.3	< 500	---
	TDS	mg/l	455	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.7	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	0.44	< 1.5	1.5
	Nitrate	mg/l	3.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 149: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 70 Sb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1588
Coordinates:	32° 6'11.32"N 72°54'55.73"E	**Sample Identification:**	JERS-DW-296
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	30 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.48	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	94.6	< 500	---
	TDS	mg/l	710	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.5	15	15
	pH	-	7.7	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.029	< 0.05	0.01
	Fluoride	mg/l	0.38	< 1.5	1.5
	Nitrate	mg/l	1.06	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	17	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	6	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	3	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 150: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Ck.40 NB Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1589
Coordinates:	32° 6'21.00"N 72°43'51.00"E	**Sample Identification:**	JERS-DW-297
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	50 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.69	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	177.3	< 500	---
	TDS	mg/l	1472	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.4	15	15
	pH	-	7.9	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.014	< 0.05	0.01
	Fluoride	mg/l	1.5	< 1.5	1.5
	Nitrate	mg/l	9.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 151: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 91 Sb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1590
Coordinates:	31°03'05.00"N 72°45'14.00"E	**Sample Identification:**	JERS-DW-298
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	30 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	6.93	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	79.3	< 500	---
	TDS	mg/l	799	‹ 1000	‹ 1000
	TSS	mg/l	4	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	18	15	15
	pH	-	7.9	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.03	< 0.05	0.01
	Fluoride	mg/l	0.52	< 1.5	1.5
	Nitrate	mg/l	6.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	29	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	13	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	8	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 152: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Ck 101 Sb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1591
Coordinates:	31° 58'09.00"N 72°45'30.00"E	**Sample Identification:**	JERS-DW-299
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	35 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.88	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	745.3	< 500	---
	TDS	mg/l	6214	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.9	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.018	< 0.05	0.01
	Fluoride	mg/l	4.3	< 1.5	1.5
	Nitrate	mg/l	8.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	7	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	3	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	1	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 153: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 95 Sb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1592
Coordinates:	31°59'54.00"N 72°47'22.00"E	**Sample Identification:**	JERS-DW-300
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	25 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	4.39	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	693.5	< 500	---
	TDS	mg/l	5080	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.8	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.05	< 0.05	0.01
	Fluoride	mg/l	2.7	< 1.5	1.5
	Nitrate	mg/l	13.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	9	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	4	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	1	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 154: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 99 S.B Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1593
Coordinates:	32°0'42.00"N 72°43'31.00"E	**Sample Identification:**	JERS-DW-301
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	30 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	2.68	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	705.4	< 500	---
	TDS	mg/l	5380	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.1	15	15
	pH	-	7.5	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.042	< 0.05	0.01
	Fluoride	mg/l	5.1	< 1.5	1.5
	Nitrate	mg/l	20.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	15	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	5	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

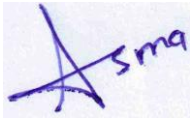
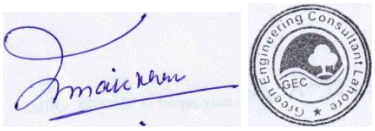
Report 155: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 51 Nb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1594
Coordinates:	32° 1'56.00"N 72°43'48.00"E	**Sample Identification:**	JERS-DW-302
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	45 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.33	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	239.4	< 500	---
	TDS	mg/l	1376	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.8	15	15
	pH	-	7.8	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.009	< 0.05	0.01
	Fluoride	mg/l	2.3	< 1.5	1.5
	Nitrate	mg/l	16.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	15	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	5	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	3	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
		
Nabila Shabbir	Asma Khalid	Muhammad Umair

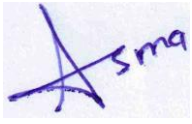
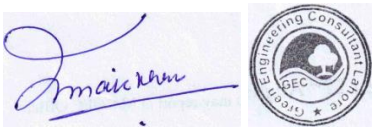
Report 156: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No#76sb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1595
Coordinates:	32° 4'22.04"N 72°51'28.11"E	**Sample Identification:**	JERS-DW-303
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	35 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.88	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	205.7	< 500	---
	TDS	mg/l	2052	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	8.1	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.017	< 0.05	0.01
	Fluoride	mg/l	3.8	< 1.5	1.5
	Nitrate	mg/l	20.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	7	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	2	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	1	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
		
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 157: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 116 N.B Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1596
Coordinates:	31° 55'24.00"N 72°32'34.00"E	**Sample Identification:**	JERS-DW-304
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	60 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.45	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	388.4	< 500	---
	TDS	mg/l	2065	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.9	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.008	< 0.05	0.01
	Fluoride	mg/l	1.6	< 1.5	1.5
	Nitrate	mg/l	12.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TDS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 158: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 85sb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1597
Coordinates:	32°04'0.00"N 72°47'2.00"E	**Sample Identification:**	JERS-DW-305
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	30 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.66	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	770.9	< 500	---
	TDS	mg/l	5114	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.1	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.042	< 0.05	0.01
	Fluoride	mg/l	2.9	< 1.5	1.5
	Nitrate	mg/l	23.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	7	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	3	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	1	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 159: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Say Dowana Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1598
Coordinates:	32°2'14.00"N 72°46'14.00"E	**Sample Identification:**	JERS-DW-306
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	45 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	3.48	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l		< 500	---
	TDS	mg/l	4050	‹ 1000	‹ 1000
	TSS	mg/l	2	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.5	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.07	< 0.05	0.01
	Fluoride	mg/l	7.3	< 1.5	1.5
	Nitrate	mg/l	21.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	13	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	5	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

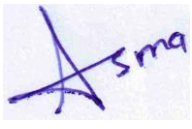
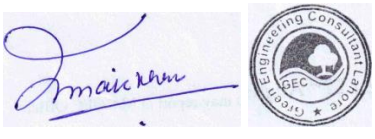
Report 160: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	100 Sb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1599
Coordinates:	31°58'10.00"N 72°46'33.00"E	**Sample Identification:**	JERS-DW-307
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	25 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.77	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	654.1	< 500	---
	TDS	mg/l	4208	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.6	15	15
	pH	-	7.5	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.009	< 0.05	0.01
	Fluoride	mg/l	5.4	< 1.5	1.5
	Nitrate	mg/l	17.4	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TDS & Hardness according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
		
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 161: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 2 Rakh Dharema Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1600
Coordinates:	32°11'34.00"N 72°35'52.00"E	**Sample Identification:**	JERS-DW-308
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	45 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.64	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	378.4	< 500	---
	TDS	mg/l	2316	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.8	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.022	< 0.05	0.01
	Fluoride	mg/l	4.5	< 1.5	1.5
	Nitrate	mg/l	22.5	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	9	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	3	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 162: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No #94sb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1601
Coordinates:	31°59'25.00"N 72°49'04.00"E	**Sample Identification:**	JERS-DW-309
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	30 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.57	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	278.6	< 500	---
	TDS	mg/l	2210	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7	15	15
	pH	-	7.6	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.005	< 0.05	0.01
	Fluoride	mg/l	1.08	< 1.5	1.5
	Nitrate	mg/l	8.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TDS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 163: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 32 Nb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1602
Coordinates:	32°05'20.00"N 72°47'20.00"E	**Sample Identification:**	JERS-DW-310
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	40 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.22	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	745.3	< 500	---
	TDS	mg/l	4322	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.5	15	15
	pH	-	7.4	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.035	< 0.05	0.01
	Fluoride	mg/l	2.6	< 1.5	1.5
	Nitrate	mg/l	18.6	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	7	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	2	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	1	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 164: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak Asaiyanwala Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1603
Coordinates:	31°59'46.00"N 72°44'58.00"E	**Sample Identification:**	JERS-DW-311
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	40 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.64	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	866.4	< 500	---
	TDS	mg/l	5445	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.9	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.012	< 0.05	0.01
	Fluoride	mg/l	5.8	< 1.5	1.5
	Nitrate	mg/l	21.5	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	18	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	6	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	3	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 165: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 83 Nb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1604
Coordinates:	32° 7'16.00"N 72°30'03.00"E	**Sample Identification:**	JERS-DW-312
Sampling Source:	Hand Pump	**Sample Collection Date:**	January 12,2021
Source Depth	30 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.21	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	389.5	< 500	---
	TDS	mg/l	1284	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.4	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.007	< 0.05	0.01
	Fluoride	mg/l	2.9	< 1.5	1.5
	Nitrate	mg/l	9.1	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	11	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	4	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

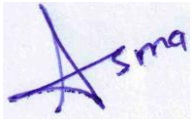
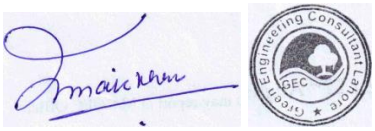
Report 166: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak#1 Rakh Dharema Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1605
Coordinates:	32° 12'37.00"N 72°34'57.00"E	**Sample Identification:**	JERS-DW-313
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	35 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.89	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	421.4	< 500	---
	TDS	mg/l	2713	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.5	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.034	< 0.05	0.01
	Fluoride	mg/l	4.7	< 1.5	1.5
	Nitrate	mg/l	22.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	9	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	3	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
		
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 167: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak#3 Rakh Dharema Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1606
Coordinates:	32° 11'59.00"N 72°36'27.00"E	**Sample Identification:**	JERS-DW-314
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	100 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.19	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	321.2	< 500	---
	TDS	mg/l	1988	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.2	15	15
	pH	-	7.3	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.011	< 0.05	0.01
	Fluoride	mg/l	1.8	< 1.5	1.5
	Nitrate	mg/l	16.8	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	17	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	5	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	4	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 168: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 84 N.B Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1607
Coordinates:	32° 04'56.00"N 72°34'0.00"E	**Sample Identification:**	JERS-DW-315
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	30 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.83	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	212.7	< 500	---
	TDS	mg/l	1460	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.7	15	15
	pH	-	7.7	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.008	< 0.05	0.01
	Fluoride	mg/l	0.93	< 1.5	1.5
	Nitrate	mg/l	10.4	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TDS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 169: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak No 72 N.B Shazadia Wala Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1608
Coordinates:	32°07'03.1"N 72°38'56.9"E	**Sample Identification:**	JERS-DW-316
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	40 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.59	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	156.4	< 500	---
	TDS	mg/l	977	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.3	15	15
	pH	-	7.8	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.042	< 0.05	0.01
	Fluoride	mg/l	0.76	< 1.5	1.5
	Nitrate	mg/l	6.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 170: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak#58 Nb Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1619
Coordinates:	32° 13'08.00"N 72°37'31.00"E	**Sample Identification:**	JERS-DW-317
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	80 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.17	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	123.8	< 500	---
	TDS	mg/l	1384	‹ 1000	‹ 1000
	TSS	mg/l	1	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.1	15	15
	pH	-	7.8	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.021	< 0.05	0.01
	Fluoride	mg/l	1.2	< 1.5	1.5
	Nitrate	mg/l	7.5	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	9	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	4	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 171: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Godhy Wala Sargodha	**GEC Report No:**	GEC-ENV-P-086/20-R-1610
Coordinates:	32° 02'26.00"N 72°30'43.00"E	**Sample Identification:**	JERS-DW-318
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	35 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.06	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	131.6	< 500	---
	TDS	mg/l	1343	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.3	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.005	< 0.05	0.01
	Fluoride	mg/l	1.3	< 1.5	1.5
	Nitrate	mg/l	6.9	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TDS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 172: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Jalpanan Shah Pur	**GEC Report No:**	GEC-ENV-P-086/20-R-1611
Coordinates:	32° 15'52.00"N 72°30'58.00"E	**Sample Identification:**	JERS-DW-319
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	100 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.98	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	322.4	< 500	---
	TDS	mg/l	2923	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.8	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.007	< 0.05	0.01
	Fluoride	mg/l	0.92	< 1.5	1.5
	Nitrate	mg/l	11.4	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: All the parameters are within limit except TDS according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 173: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Thati Lami Shah Pur	**GEC Report No:**	GEC-ENV-P-086/20-R-1612
Coordinates:	32°04'07.2"N 72°19'28.6"E	**Sample Identification:**	JERS-DW-320
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 11,2021
Source Depth	80 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.67	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	288.3	< 500	---
	TDS	mg/l	1677	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	6.8	15	15
	pH	-	7.2	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.008	< 0.05	0.01
	Fluoride	mg/l	0.66	< 1.5	1.5
	Nitrate	mg/l	12.3	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 174: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 89 Nb	**GEC Report No:**	GEC-ENV-P-086/20-R-1613
Coordinates:	32°01'16.00"N 72°36'38.00"E	**Sample Identification:**	JERS-DW-321
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	35 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	4.76	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	142.7	< 500	---
	TDS	mg/l	1250	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	9.3	15	15
	pH	-	7.5	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.009	< 0.05	0.01
	Fluoride	mg/l	2.1	< 1.5	1.5
	Nitrate	mg/l	7.4	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	19	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	6	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	4	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 175: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	Chak 9 SB	**GEC Report No:**	GEC-ENV-P-086/20-R-1614
Coordinates:	32°11'49.00"N 72°59'55.00"E	**Sample Identification:**	JERS-DW-322
Sampling Source:	Electric Pump	**Sample Collection Date:**	January 12,2021
Source Depth	40 Feet	**Report Issue Date:**	January 27, 2021

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	0.94	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	207.5	< 500	---
	TDS	mg/l	2050	‹ 1000	‹ 1000
	TSS	mg/l	0	-	---
	Odour	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Taste	-	Non-Acceptable	Acceptable/Non-objectionable	Acceptable/Non-objectionable
	Color	TCU	7.2	15	15
	pH	-	7.5	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	0.015	< 0.05	0.01
	Fluoride	mg/l	1.04	< 1.5	1.5
	Nitrate	mg/l	11.2	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	13	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	5	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	2	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	Chief Chemist:	Head of Env Lab:
Nabila Shabbir	Asma Khalid	Muhammad Umair

Report 45: Drinking Water Analysis Report

Client Name:	Jers Consultancy Pvt. Ltd	**GEC Job Reference:**	P-GEC-ENV-086/2020
Village Name:	RWSS Deowal, Bhalwal	**GEC Report No:**	GEC-ENV-P-086/20-R-857
Coordinates:	32°15'23.79"N 72°57'37.05"E	**Sample Identification:**	JERS-DW-112 A
Sampling Source:	Hand Pump	**Sample Collection Date:**	November 26,2020
Source Depth	80 feet	**Report Issue Date:**	December 03, 2020

Analysis Results

Type	Parameter	Unit	Result	PEQS	WHO Standards
Physical Parameter	Turbidity	NTU	1.14	‹ 5	‹ 5
	Total hardness as CaCO3	mg/l	154.6	< 500	---
	TDS*	mg/l	1244	‹ 1000	‹ 1000
	TSS	mg/l	0.0	-	---
	Odour	-	Acceptable	Acceptable/Non-Acceptable	Acceptable/Non-Acceptable
	Taste	-	Acceptable	Acceptable/Non-Acceptable	Acceptable/Non-Acceptable
	Color	TCU	6.0	15	15
	pH	-	7.1	6.5-8.5	6.5-8.5
Chemical Parameters	Arsenic	mg/l	BDL	< 0.05	0.01
	Fluoride	mg/l	1.27	< 1.5	1.5
	Nitrate	mg/l	4.7	< 50	50
Microbiological Parameters	Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	Feacal Coli Form	Cfu/100ml	0.0	Must not be detectable	Must not be detectable
	E Coli	Cfu/100ml	0.0	Must not be detectable	Must not be detectable

APHA: American Public Health Association
BDL: Below Detection Limit
ND: Not Detectable
PEQS: Punjab Environmental Quality Standards
Remarks: Some of the parameters are out of limit according to Punjab Environmental Quality Standards.
Note: This report is not valid for court.

Sample Analyzed by:	**Chief Chemist:**	**Head of Env Lab:**
Nabila Shabbir	Asma Khalid	Muhammad Umair

ANNEXURE B

SAMPLING SITES

Figure 14: Sampling Point Location at 22 NB, Bhalwal

Figure 15: Sampling Point Location at 09 NB, Bhalwal

Figure 16: Sampling Point Location at Purana Phlervan, Bhalwal

Figure 17: Sampling Point Location at Mateela, Kot Momin

Figure 18: Sampling Point Location at Tiba Murad, Kot Momin

Figure 19: Sampling Point Location at Chak No 07 SB, Kot Momin

Figure 20: Sampling Point Location at Chak No 08, Kot Momin

Figure 21: Sampling Point Location at Chak No 20 SB, Kot Momin

Figure 22: Sampling Point Location at Thathi Lambi, Sahiwal

Figure 23: Sampling Point Location at Chanra, Sahiwal

Figure 24: Sampling Point Location at Rabana, Sahiwal

Figure 25: Sampling Point Location at Kishkan, Sahiwal

Figure 26: Sampling Point Location at Noor e Wala, Sahiwal

Figure 27: Sampling Point Location at Noor e Wala Colony, Sahiwal

Figure 28: Sampling Point Location at Barana, Sahiwal

Figure 29: Sampling Point Location at Sajoka, Sahiwal

Figure 30: Sampling Point Location at Khichi Ala, Sahiwal

Figure 31: Sampling Point Location at Thathi Jalal, Sahiwal

Figure 32: Sampling Point Location at Dherowal, Sahiwal

Figure 33: Sampling Point Location at Chak No 104 Janobi

Figure 34: Sampling Point Location at Chak No 142 SB Big

Figure 35: Sampling Point Location at Chak 142 SB Small, Sargodha

Figure 36: Sampling Point Location at Chak 56 NB, Sargodha

Figure 37: Sampling Point Location at Chak 110 SB, Sargodha

Figure 38: Sampling Point Location at Chak 110 SB Colony, Sargodha

Figure 39: Sampling Point Location at Chak 106 SB, Sargodha

Figure 40: Sampling Point Location at Chak 53 NB, Sargodha

Figure 41: Sampling Point Location at Chak 102 SB, Sargodha

Figure 42: Sampling Point Location at Chak 108 SB, Sargodha

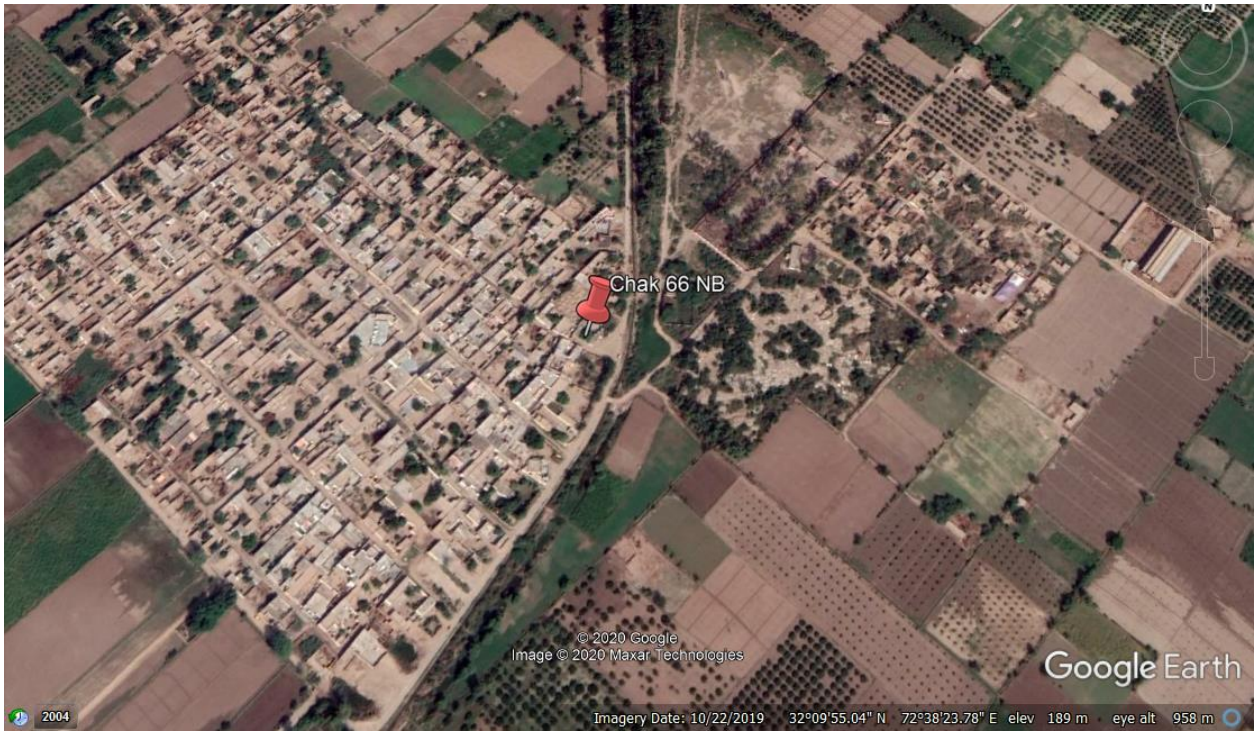


Figure 43: Sampling Point Location at Chak 66 NB, Sargodha

Figure 44: Sampling Point Location at Chak 26 NB, Sargodha

Figure 45: Sampling Point Location at Wegowal, Shahpur

Figure 46: Sampling Point Location at Jalpana, Shahpur

Figure 47: Sampling Point Location at Sardar Pur, Shahpur

Figure 48: Sampling Point Location at Chak No 5, 4 Jinhah Colony, Shahpur

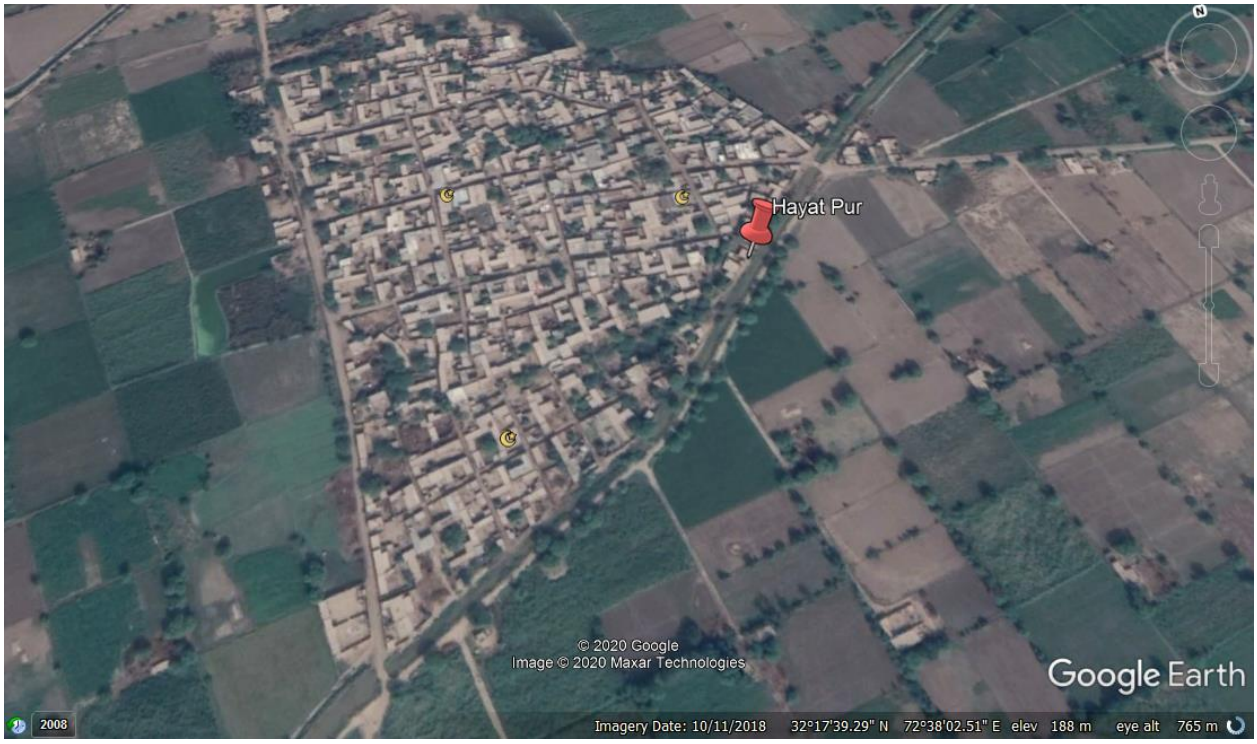


Figure 49: Sampling Point Location at Hayat Pur, Shahpur

Figure 50: Sampling Point Location at Chak Muzaffarabad Colony, Shahpur

Figure 51: Sampling Point Location at Chahrai Sharif, Shahpur

Figure 52: Sampling Point Location at Megha Khadi, Shahpur

Figure 53: Sampling Point Location at Chak 154 NB, Silanwali

Figure 54: Sampling Point Location at Chak 128 SB, Silanwali

Figure 55: Sampling Point Location at Chak 138 SB, Silanwali

Figure 56: Sampling Point Location at Chak 162/ 164 NB, Silanwali

Figure 57: Sampling Point Location at Chak 50 SB, Silanwali

Figure 58: Sampling Point Location at Chak 133 SB, Silanwali

Figure 59: Sampling Point Location at Chak 152 NB, Silanwali

Figure 60: Sampling Point Location at Chak 160 NB, Silanwali

Figure 61: Sampling Point Location at Chak 155 NB, Silanwali

Figure 62: Sampling Point Location at Bhabhra, Kot Momin

Figure 63: Sampling Point Location at Jalla Makhdum, Kot Momin

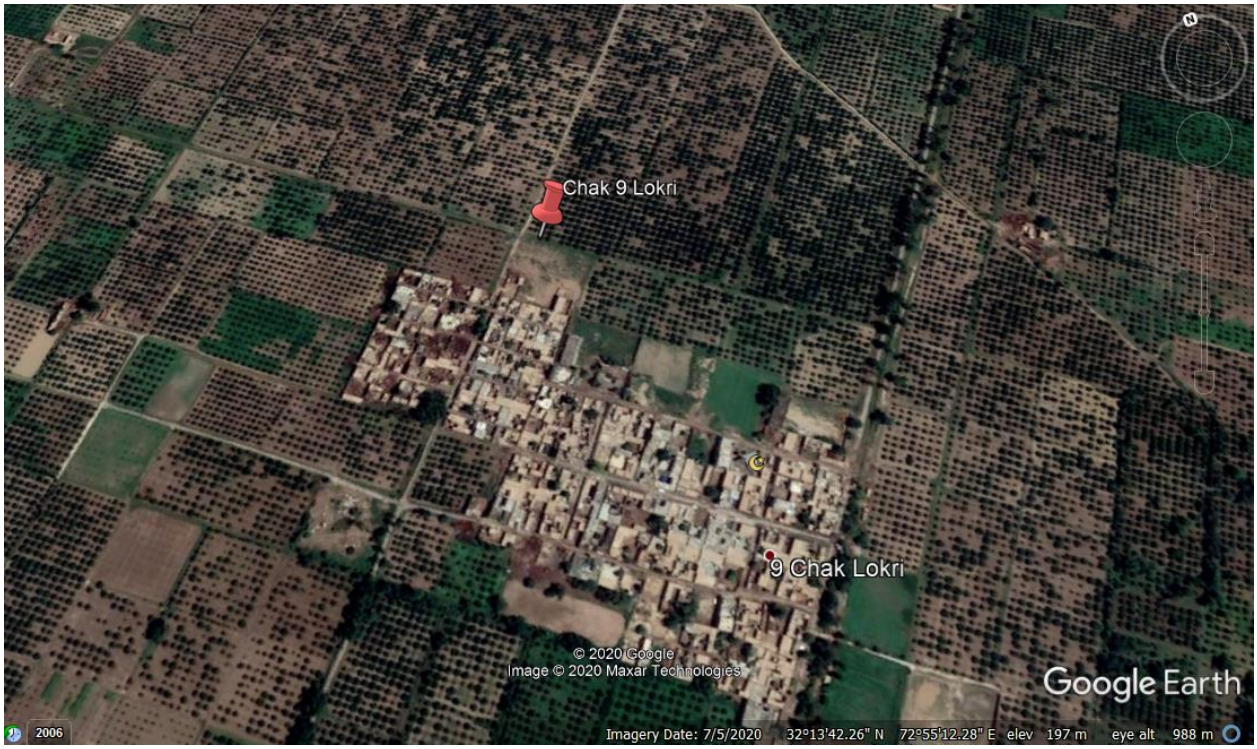


Figure 64: Sampling Point Location at Chak No 09 Lokri, Kot Momin

Figure 65: Sampling Point Location at Chaowal, Kot Momin

Figure 66: Sampling Point Location at Naseer Pur Kalan, Kot Momin

Figure 67: Sampling Point Location at Bucha Kalan, Kot Momin

Figure 68: Sampling Point Location at Manke Walla, Shahpur

ANNEXURE C

PHOTOGRAOHS

Figure 69:: Onsite Sample Testing at Gunaur, Kamoke

Figure 70: Onsite Sample Testing at Ladhy Walla Cheema, Waziabad

Figure 71: Onsite Sample Testing at Nangal Mirza, Pasroor

Figure 72: Onsite Sample Testing at Malokey, Pasroor

Figure 73: Onsite Sample Testing at Bhular Bajwa, Pasroor

Figure 74: Onsite Sample Testing at Mussa Pur, Pasroor

Figure 75: Onsite Sample Testing at Nangal Mirza, Pasroor

Figure 76: Onsite Sample Testing at Sadagar Pur, Pasroor

Figure 77: Onsite Sample Testing at Manga, Pasroor

Figure 78: Onsite Sample Testing at Chok Qila Kalar Wala, Pasroor

Figure 79: Onsite Sample Testing at Data Zaad Kaa, Pasroor

Figure 80: Onsite sample Testing at Chak 16 NB, Bhalwal

Figure 81: Onsite Sample Testing at Chak 22 NB, Bhalwal

Figure 82: Onsite sample Testing at Chak 09 NB, Bhalwal

Figure 83: Onsite Sample Testing at Purana Phlervan, Bhalwal

Figure 84: Sampling Point Location at Mateela, Kot Momin

Figure 85: Onsite Sample Testing at Tiba Murad, Kot Momin

Figure 86: Onsite Sample Testing at Chak No 07 SB, Kot Momin

Figure 87: Onsite Sample Testing at Chak No 08, Kot Momin

Figure 88: Onsite Sample Testing at Chak No 20 SB, Kot Momin

Figure 89: Onsite Sample Testing at Thathi Lambi, Sahiwal

Figure 90: Onsite Sample Testing at Chanra, Sahiwal

Figure 91: Onsite Sample Testing at Rabana, Sahiwal

Figure 92: Onsite sample testing at Kishkan, Sahiwal

Figure 93: Onsite sample Testing at Noor e Wala, Sahiwal

Figure 94: Onsite sample Testing at Noor e Wala Colony, Sahiwal

Figure 95: Onsite sample Testing at Barana, Sahiwal

Figure 96: Onsite sample Testing at Sajoka, Sahiwal

Figure 97: Onsite Sample Testing at Khichi Ala, Sahiwal

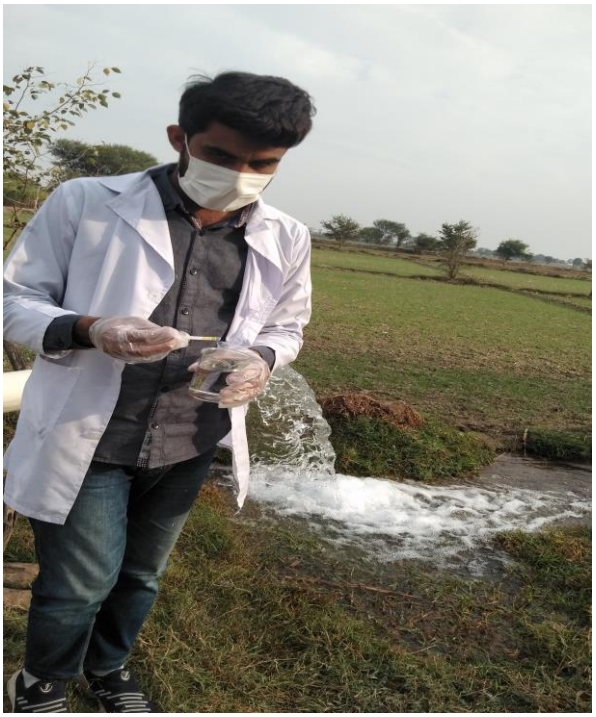


Figure 98: Onsite Sample testing at Thathi Jalal, Sahiwal

Figure 99: Onsite Sample Testing at Dherowal, Sahiwal

Figure 100: Onsite Sample Testing at Chak No 104 Janobi

Figure 101: Onsite Sample Testing at Chak No 142 SB Big

Figure 102: Onsite sample Testing at Chak 142 SB Small, Sargodha

Figure 103: Onsite Sample testing at Chak 56 NB, Sargodha

Figure 104: Onsite Sample Testing at Chak 110 SB, Sargodha

Figure 105: Onsite sample Testing at Chak 110 SB Colony, Sargodha

Figure 106: Onsite Sample Testing at Chak 106 SB, Sargodha

Figure 107: Onsite Sample Testing at Chak 53 NB, Sargodha

Figure 108: Onsite sample Testing at Chak 102 SB, Sargodha

Figure 109: Onsite sample Testing at Chak 108 SB, Sargodha

Figure 110: Onsite Sample Testing at Chak 66 NB, Sargodha

Figure 111: Onsite Sample Testing at Chak 26 NB, Sargodha

Figure 112: Onsite Sample testing at Wegowal, Shahpur

Figure 113: Onsite Sample Testing at Jalpana, Shahpur

Figure 114: Onsite sample Testing at Sardar Pur, Shahpur

Figure 115: Onsite Sample testing at Chak No 5, 4 Jinhah Colony, Shahpur

Figure 116: Onsite Sample Testing at Hayat Pur, Shahpur

Figure 117: Sampling at Chak Muzaffarabad Colony, Shahpur

Figure 118: Onsite sample Testing at Chahrai Sharif, Shahpur

Figure 119: Onsite sample Testing at Megha Khadi, Shahpur

Figure 120: Onsite Sample Testing at Chak 154 NB, Silanwali

Figure 121: Onsite Sample Testing at Chak 128 SB, Silanwali

Figure 122: Onsite Sample Testing at Chak 138 SB, Silanwali

Figure 123: Onsite Sample Testing at Chak 162/ 164 NB, Silanwa

Figure 124: Onsite Sample Testing at Chak 50 SB, Silanwali

Figure 125: Onsite Sample Testing at Chak 133 SB, Silanwali

Figure 126: Onsite Sample Testing at Chak 152 NB, Silanwali

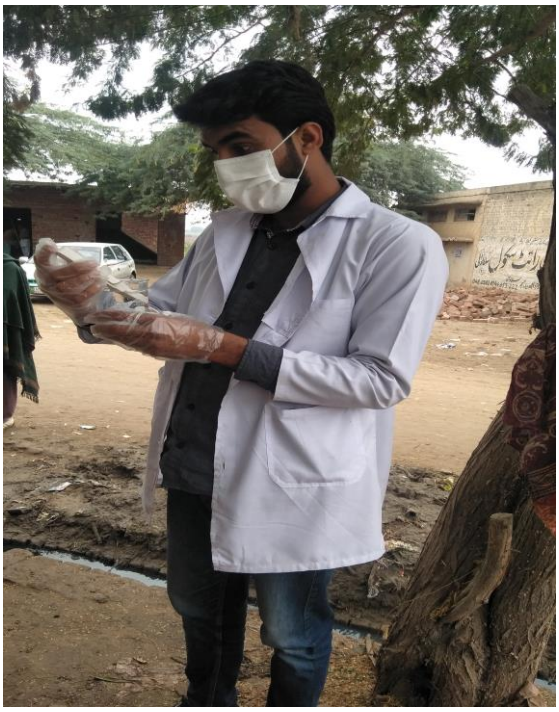


Figure 127: Onsite Sample Testing at Chak 160 NB, Silanwali

Figure 128: Onsite Sample Testing at Chak 155 NB, Silanwali

Figure 129: Onsite Sample Testing at Bhabhra, Kot Momin

Figure 130: Onsite sample Testing at Jalla Makhdum, Kot Momin

Figure 131: Onsite Sample Testing at Chak No 09 Lokri, Kot Momin

Figure 132: Onsite Sample Testing at Chaowal, Kot Momin

Figure 133: Onsite Sample Testing Naseer Pur Kalan, Kot Momin

Figure 134: Onsite Sample Testing at Bucha Kalan, Kot Momin

Figure 135: Onsite Sample Testing at Manke Walla, Shahpur

Figure 136: Sample Collection at Barnali, Kharian

Figure 137: Sample Collection at Rehsian, Kharian

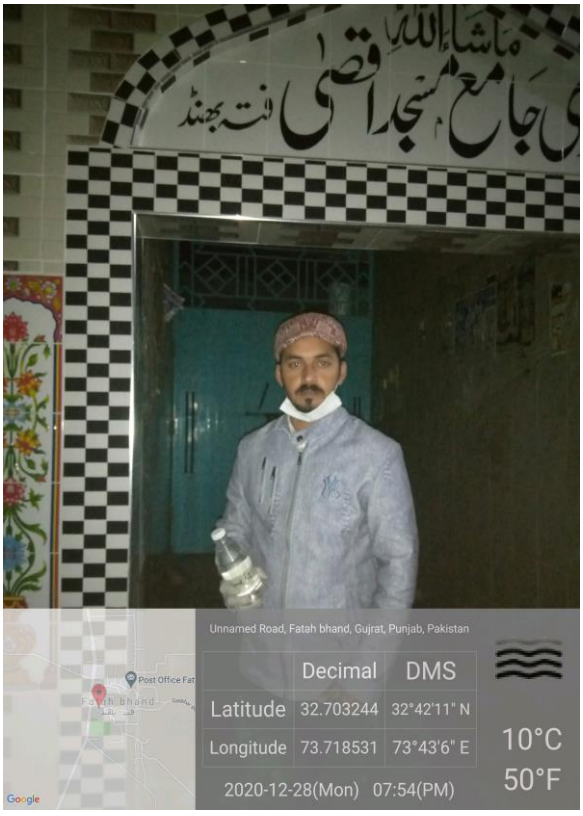


Figure 138: Sample Collection at Fateh Bhand, Kharian

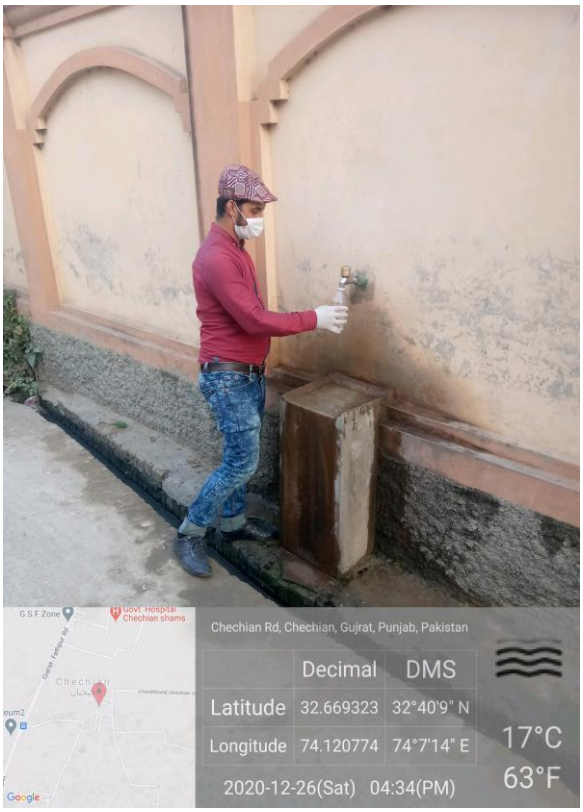


Figure 139: Sample Collection at Chechian, Kharian

Figure 140: Sample Collection at Dharian, Pindi Bhattian

Figure 141: Sample Collection at Matteke, Pindi Bhattian

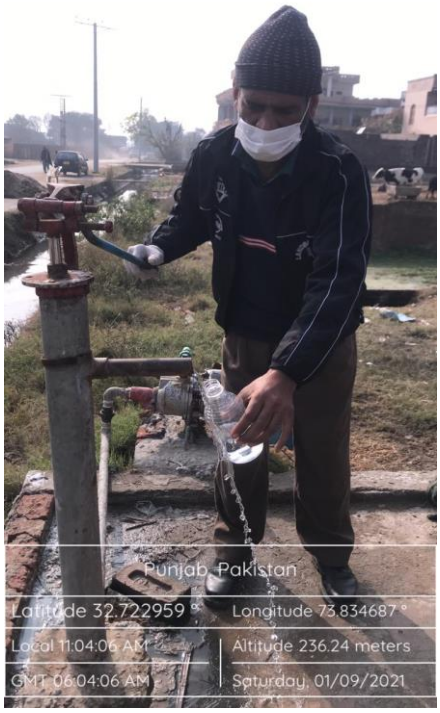


Figure 142: Sample Collection at Ghabrika, Pindi Bhattian

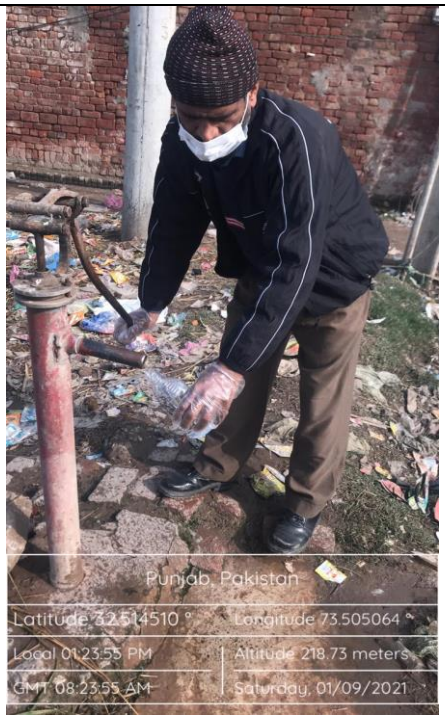


Figure 143: Sample Collection at Manghat, Mandi Bhauddin

Figure 144: Sample Collection at Ainowal, Mandi Bhauddin

Figure 145: Sample Collection at Bhakhi, Mandi Bhauddin

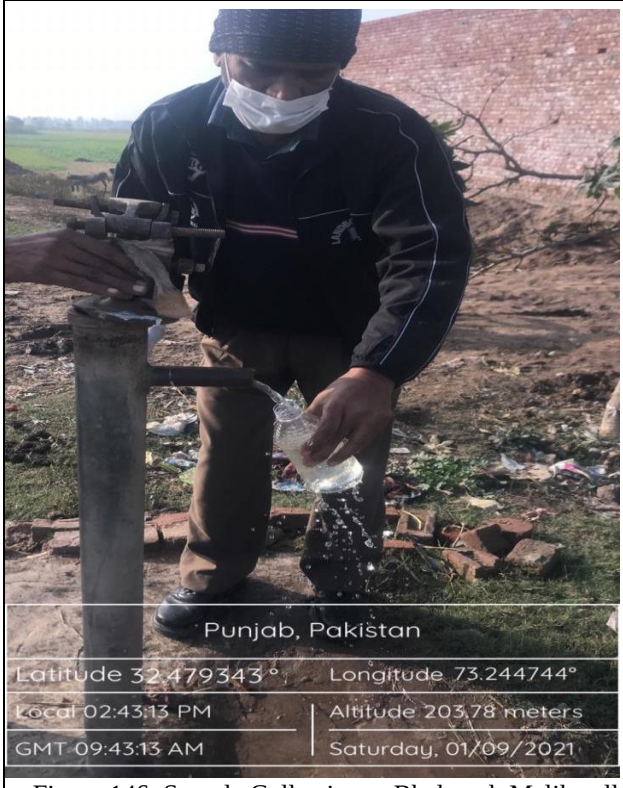


Figure 146: Sample Collection at Bhalowal, Malikwall

Figure 147: Sample Collection at Cha Syed Wala, Bhakkar

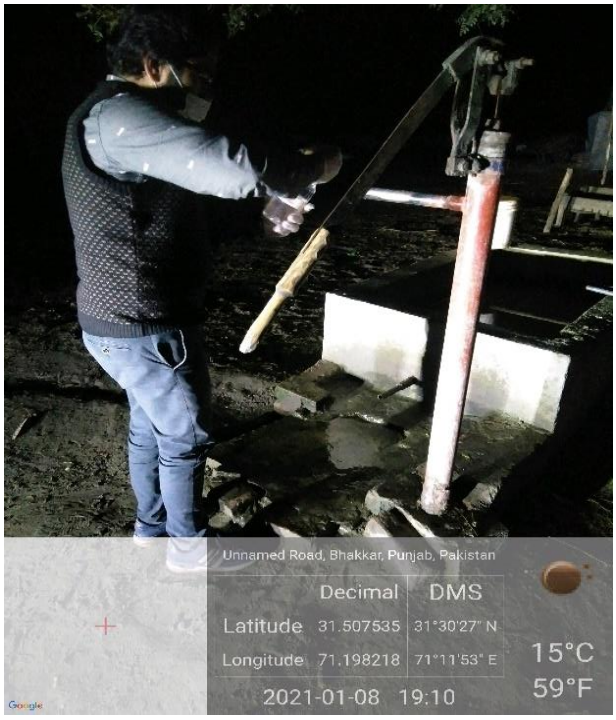


Figure 148: Sample Collection at Khan Pur Shumali, Bhakkar

Figure 149: Sample Collection at Jhok Mehr Shah, Darya Khan

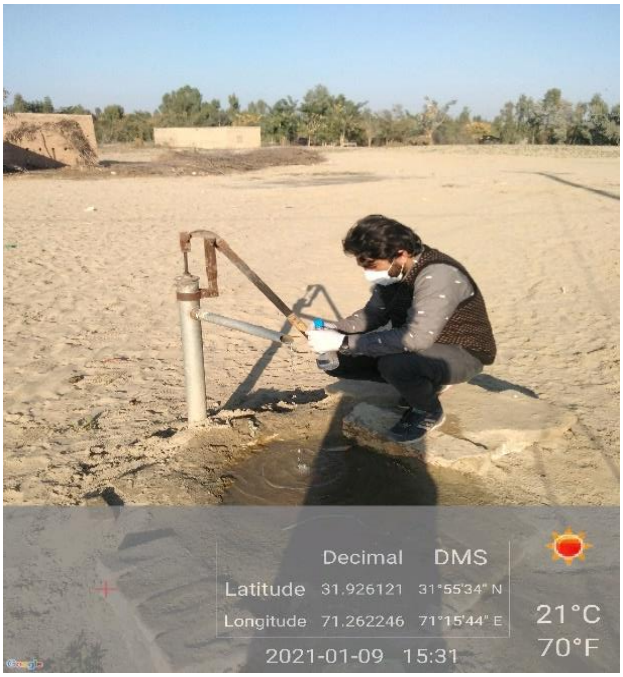


Figure 150: Sample Collection at Gadai, Darya Khan

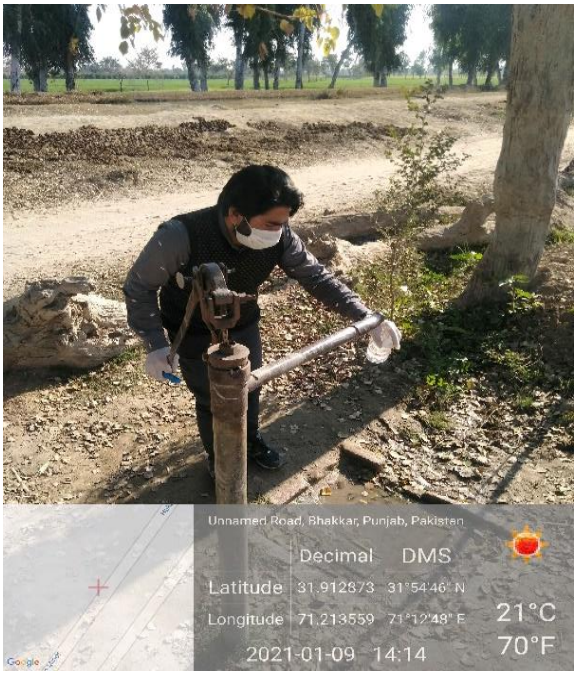


Figure 151: Sample Collection at Dagar Yaar Shah Gharbi, Darya Khan

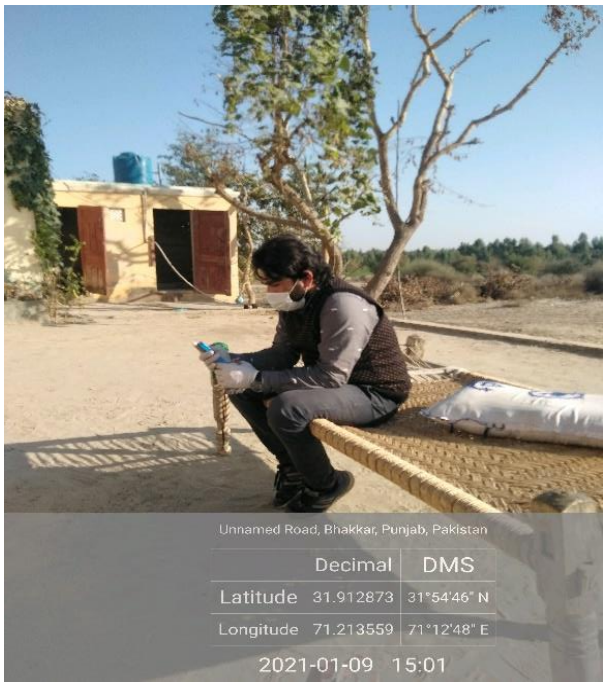


Figure 152: Sample Collection at Haji Hussain Shah Dagar, Darya Khan

Figure 153: Sample Collection at Mehmood Wala, Kalur Kot

Figure 154: Sample Collection at Daily Namdar, Kalur Kot

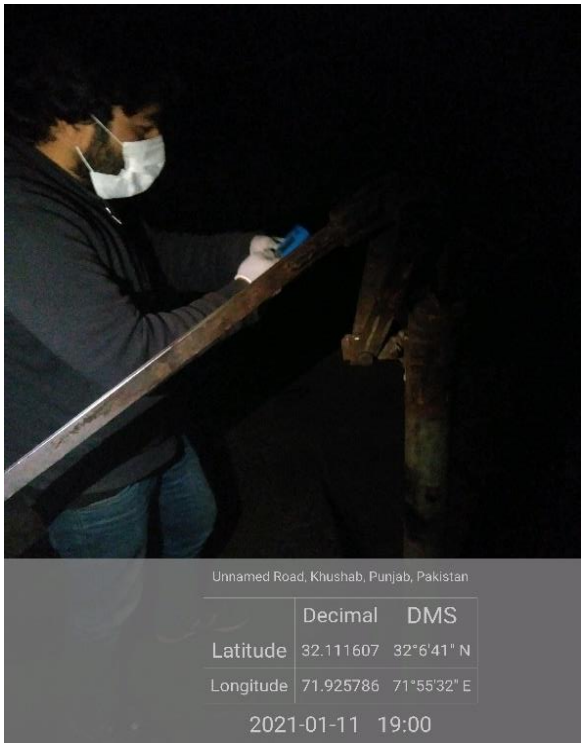


Figure 155: Sample Collection at Bitti, Kalur Kot

Figure 156: Sample Collection at Shaheedan Shumali, Kalur Kot

Figure 157: Sample Collection at Kheuo, Mankera

Figure 158: Sample Collection at Chamb, Mankera

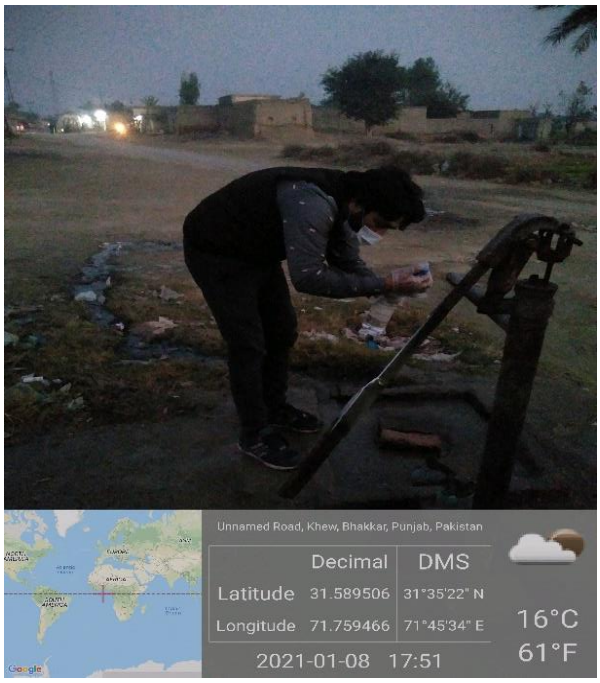


Figure 159: Sample Collection at Gohar Wala, Mankera

Figure 160: Sample Collection at Dengana, Mankera

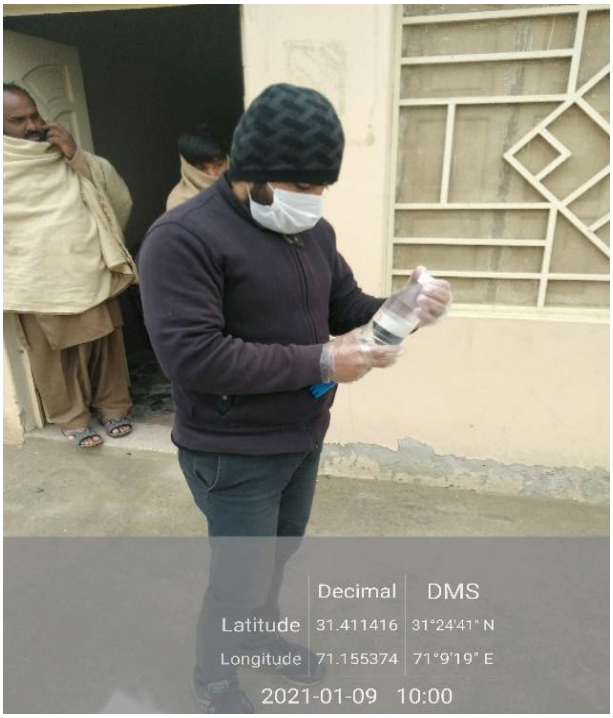


Figure 161: Sample Collection at Chak 73 TDA Mankera

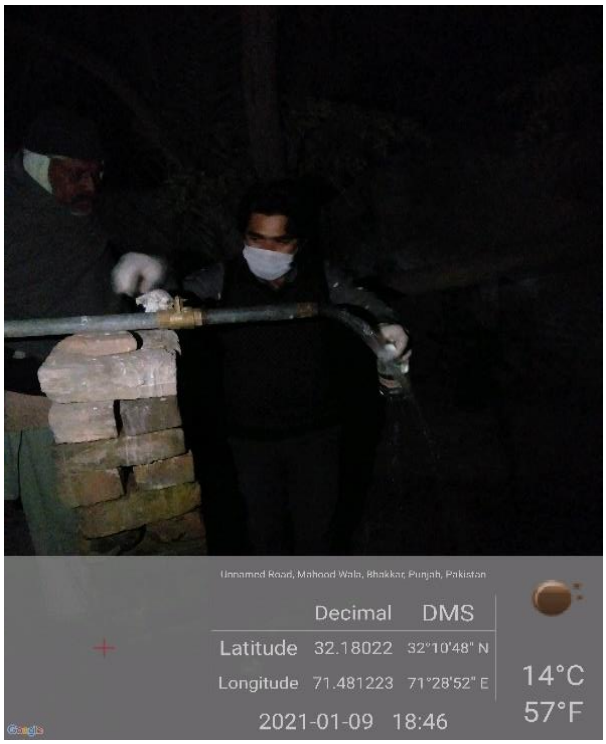


Figure 162: Sample Collection at Hassan Khan Walla, Kalourkot

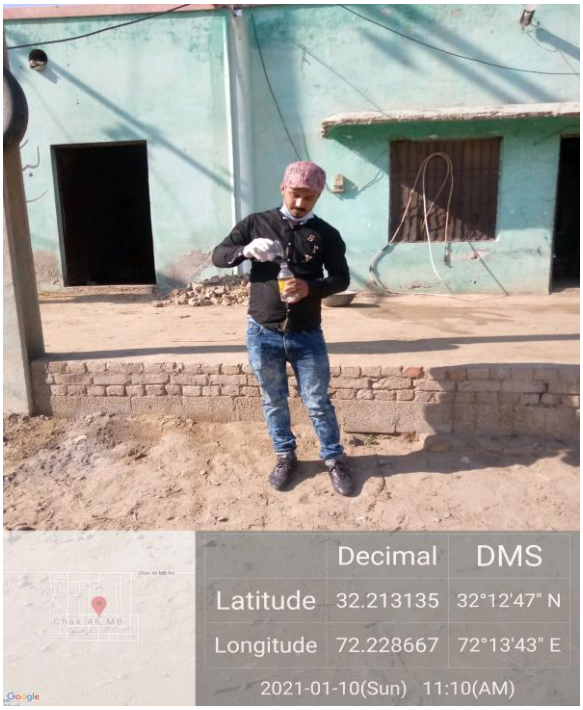


Figure 163: Sample Collection at Chak 46, Khushab

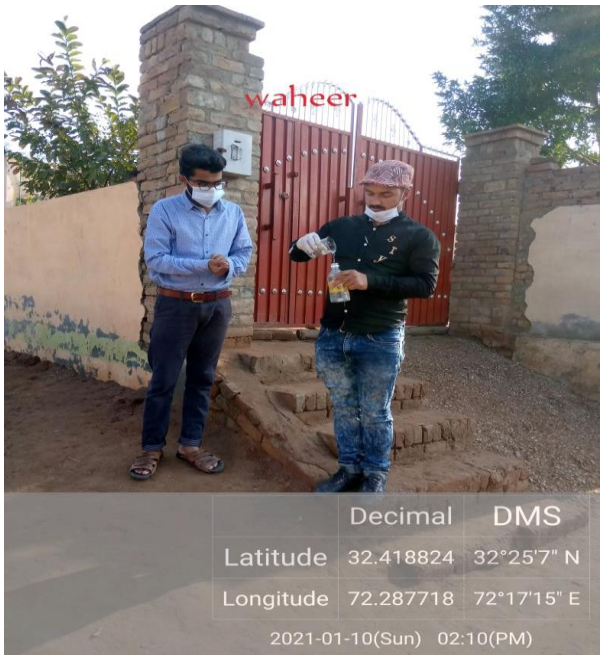


Figure 164: Sample Collection at Waheer Shumali, Khushab

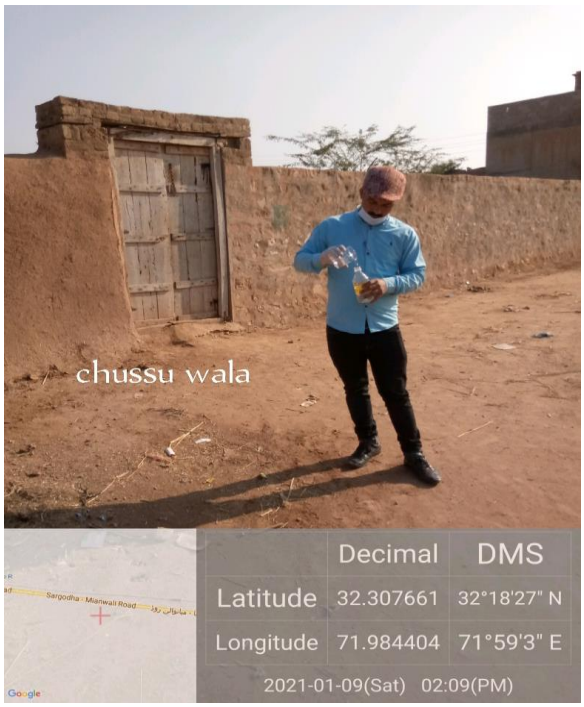


Figure 165: Sample Collection at Chussu Wala, Khushab

Figure 166: Sample Collection at Chak 41, Khushab

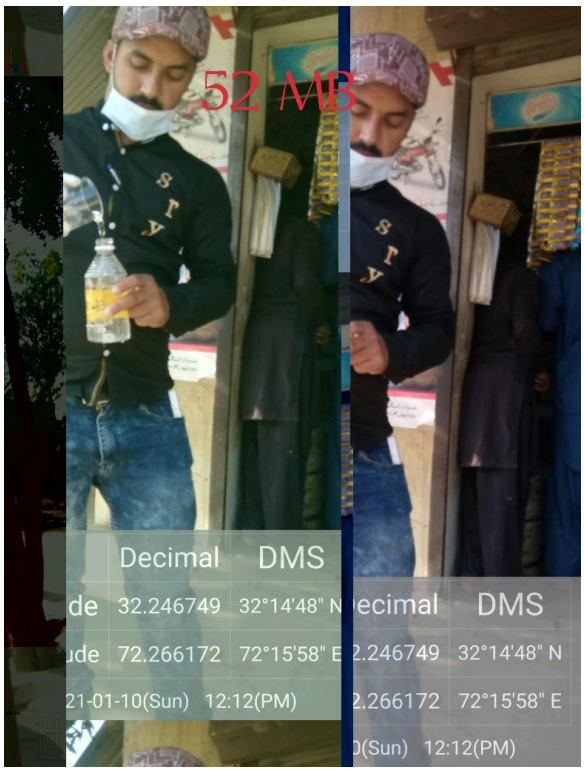


Figure 167: Sample Collection at Chak 52 Mb Khushab

Figure 168: Sample Collection at Chak 42Mb, Khushab

Figure 169: Sample Collection at Jhuggiyaan, Khushab

Figure 170: Sample Collection at Chak 48mb, Khushab

Figure 171: Sample Collection at Chak 44 Mb, Khushab

Figure 172: Sample Collection at Joiya, Khushab

Figure 173: Sample Collection at Kurpalka, Khushab

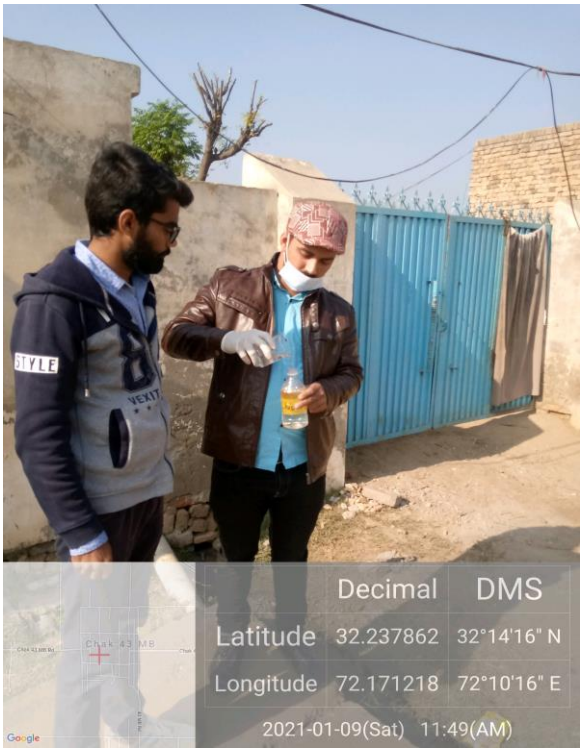


Figure 174: Sample Collection at Chak 43, Khushab

Figure 175: Sample Collection at Butala, Khushab

Figure 176: Sample Collection at Nalli, Khushab

Figure 177: Sample Collection at Gaggh Kalaan, Khushab

Figure 178: Sample Collection at Chak 40, Khushab

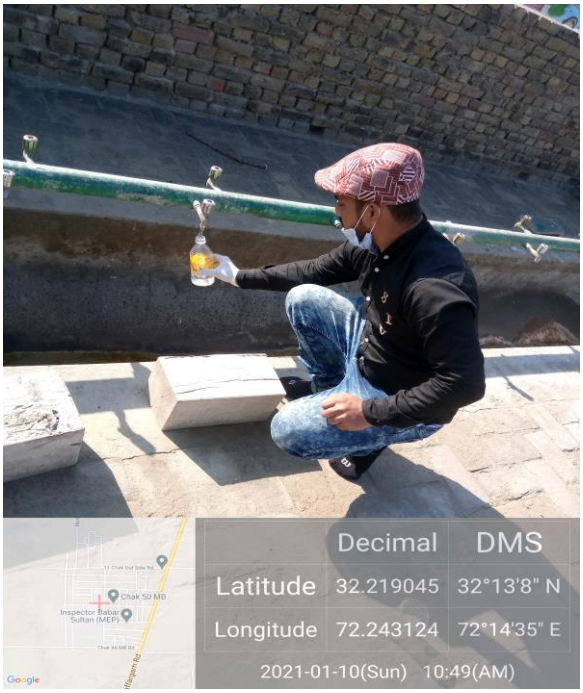


Figure 179: Sample Collection at Chak 50 Mb, Khushab

Figure 180: Sample Collection at Bambool, Noor Pur Thal

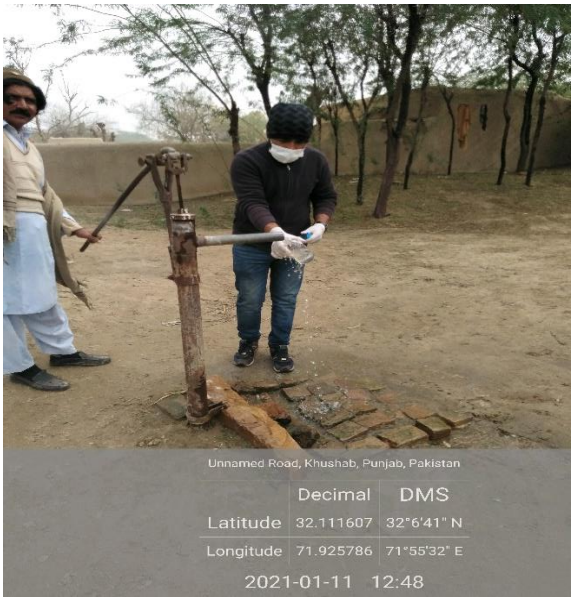


Figure 181: Sample Collection at Borana Wala, Noor Pur Thal

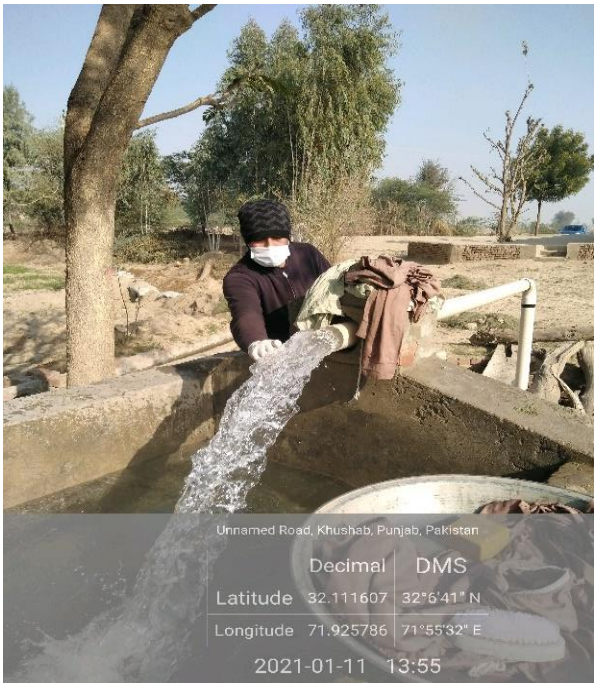


Figure 182: Sample Collection at Shah Hussain, Noor Pur Thal

Figure 183: Sample Collection at Maikan, Noor Pur Thal

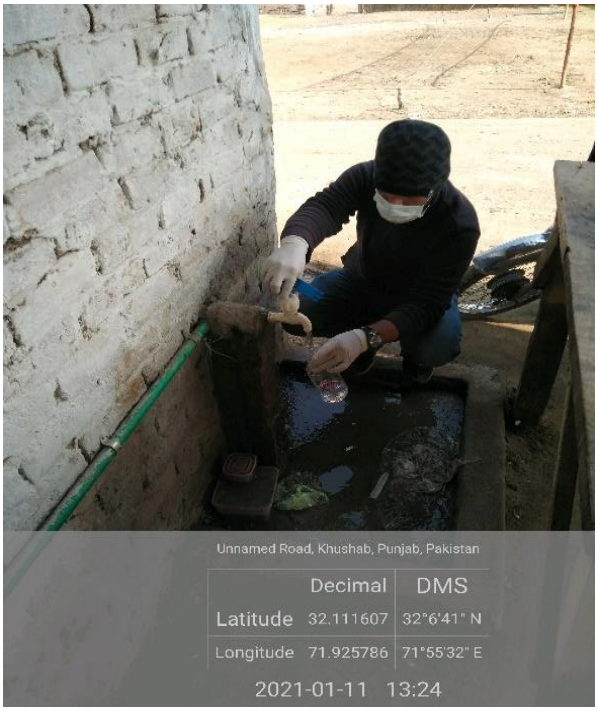


Figure 184: Sample Collection at Dadu Wala, Noor Pur Thal

Figure 185: Sample Collection at Chak 28mb, Quaidabad

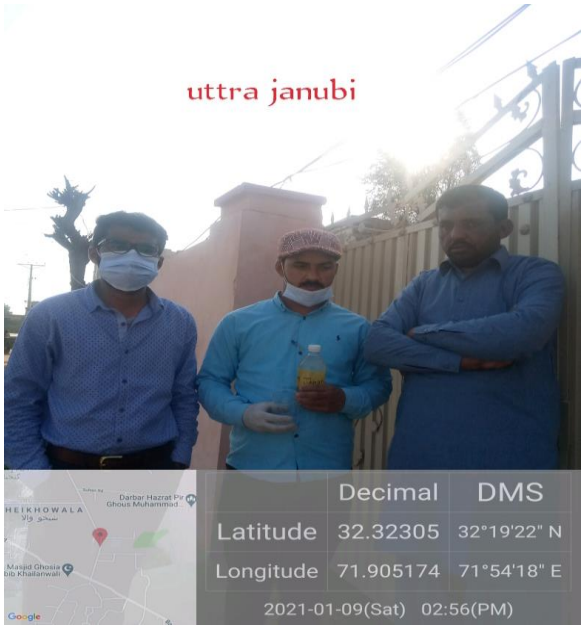


Figure 186: Sample Collection at Utra Janubi, Quaidabad

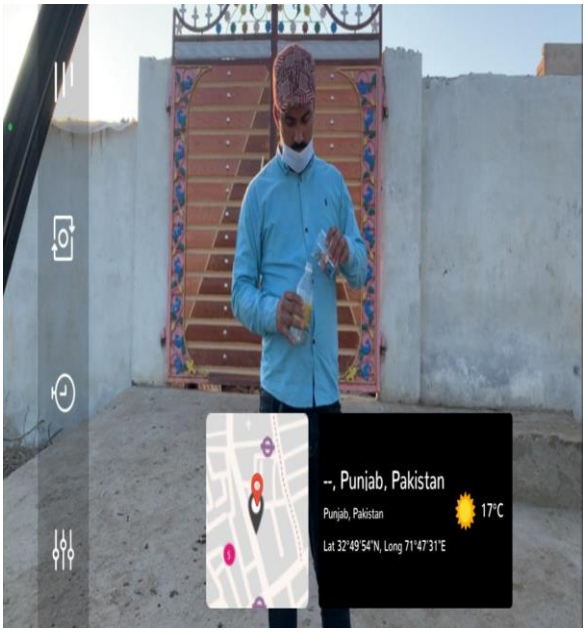


Figure 187: Sample Collection at Chak 36db, Quaidabad

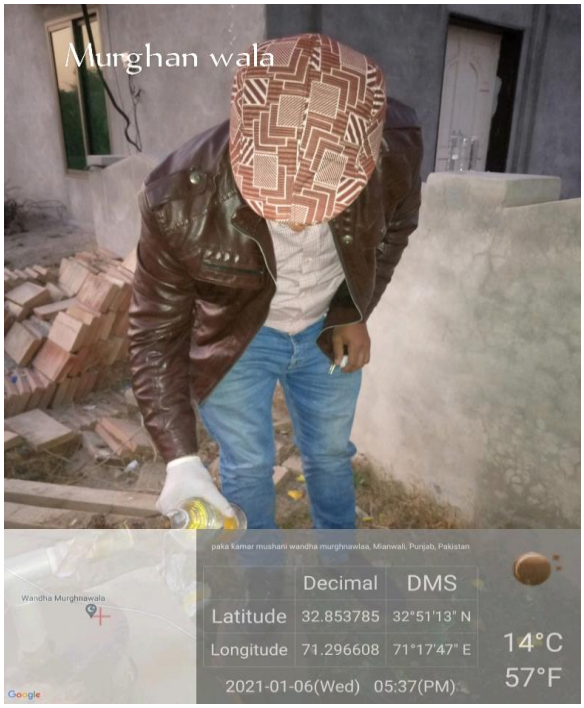
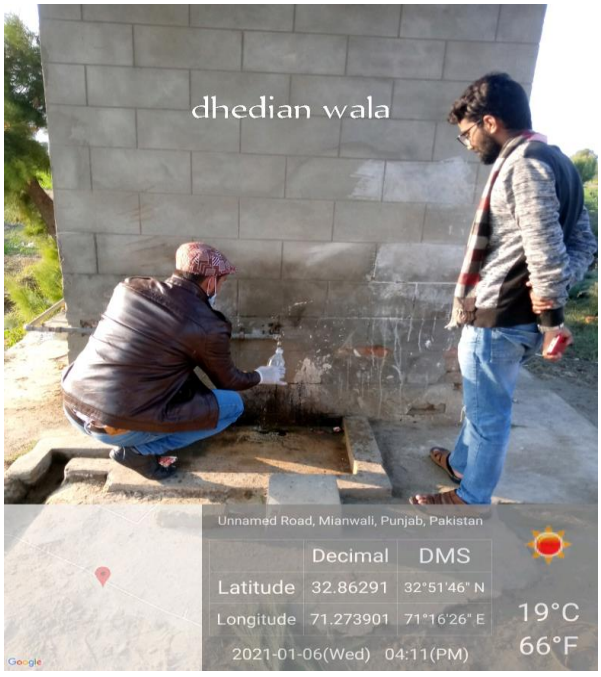


Figure 188: Sample Collection at Murghan Wala, Essa Khel

Figure 189: Sample Collection at Bhat, Essa Khel

Figure 190: Sample Collection at Dala Mer Wala, Essa Khel

Figure 191: Sample Collection at Dhedian Wala, Essa Khel



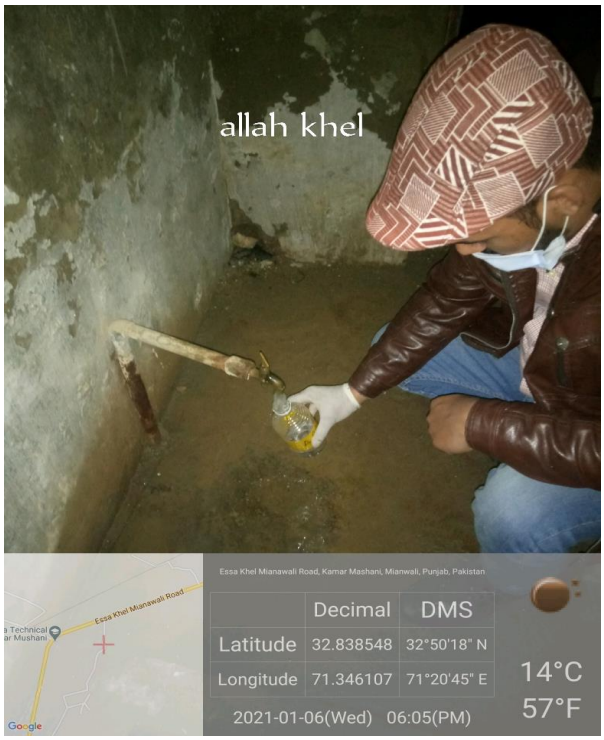


Figure 192: Sample Collection at Allah Khel, Essa Khel

Figure 193: Sample Collection at Mari Khel, Essa Khel

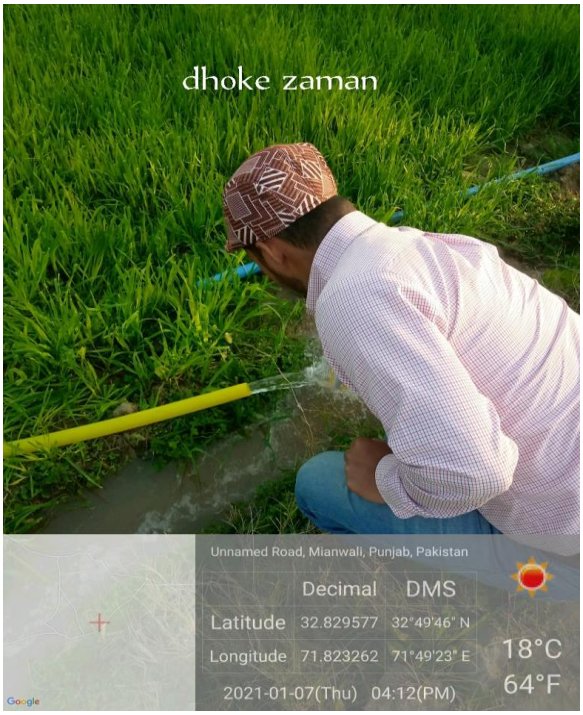


Figure 194: Sample Collection at Dhoke Zaman, Mianwali

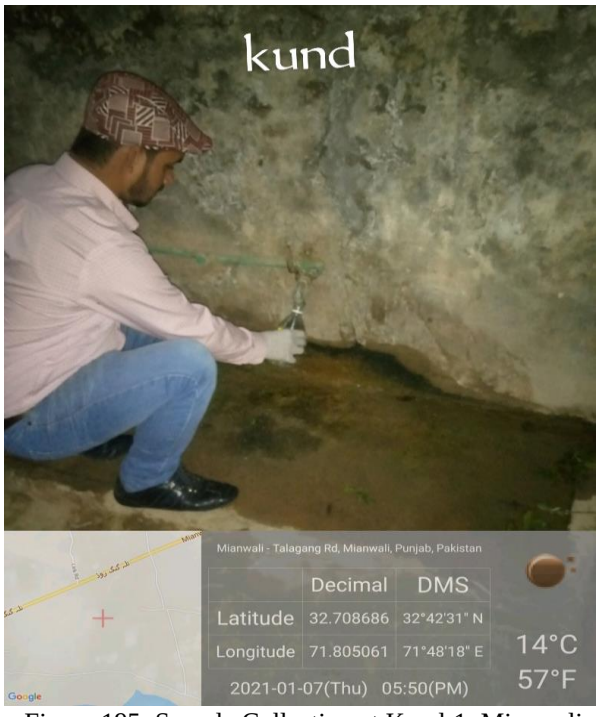


Figure 195: Sample Collection at Kund-1, Mianwali

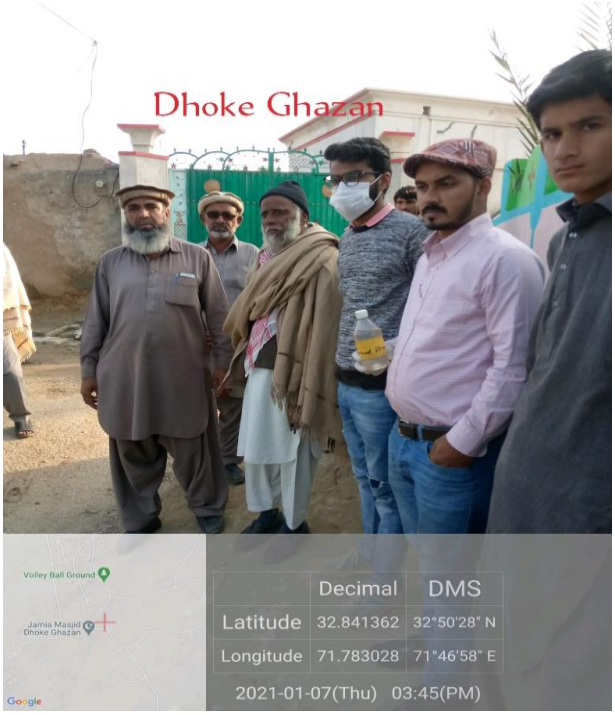
Figure 196: Sample Collection at Wan Bhachran Janubi, Mianwali

Figure 197: Sample Collection at Wan Bhachran Shumali, Mianwali

Figure 198: Sample Collection at Noor-Ullah Wala, Mianwali

Figure 199: Sample Collection at Chak No.026/D.B, Mianwali

Figure 200: Sample Collection at Dhok Mohd. Khan, Mianwali



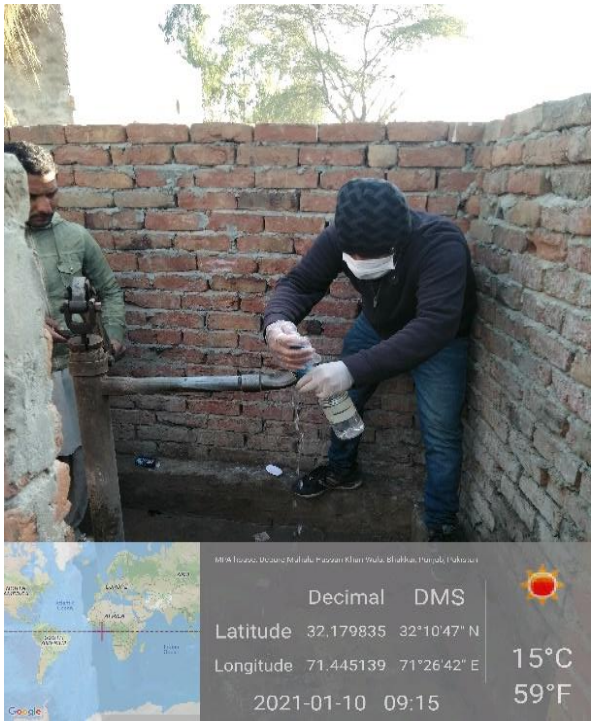


Figure 201: Sample Collection at Tibbi, Piplan

Figure 202: Sample Collection at Bala Sharif, Piplan

Figure 203: Sample Collection at Bani Afghanan, Mianwali

Figure 204: Sample Collection at Vanjari, Mianwali

Figure 205: Sample Collection at Ban Mhea- Balo khel, Mianwali

Figure 206: Sample Collection at Nawab Pur, Bhalwal

Figure 207: Sample Collection at Bochra Kohna, Sahiwal

Figure 208: Sample Collection at Naoshera Khokhran, Sahiwal

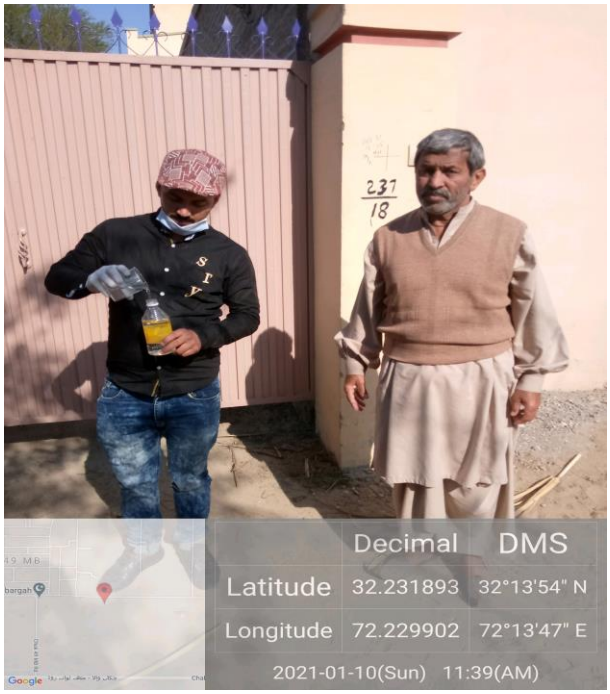


Figure 209: Sample Collection at Chak No 49 Nb, Sargodha

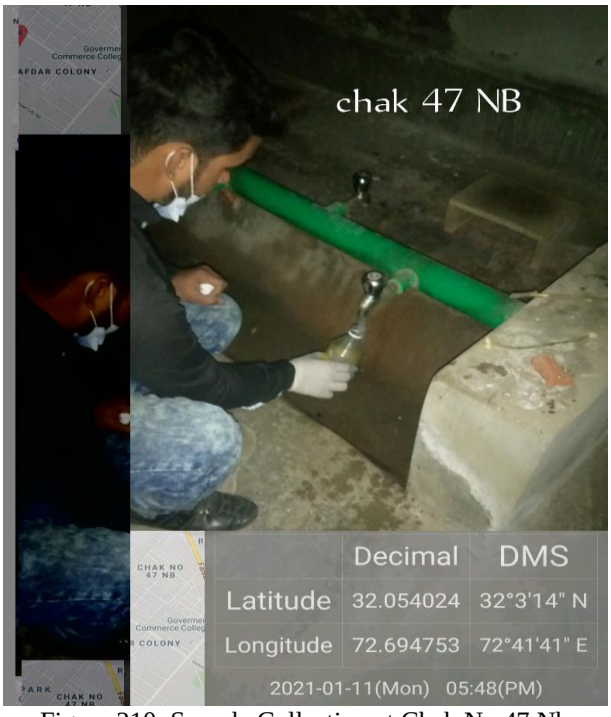


Figure 210: Sample Collection at Chak No 47 Nb, Sargodha

Figure 211: Sample Collection at Chak 86_Nb, Sargodha

Figure 212: Sample Collection at Bajwa Colony, Sargodha

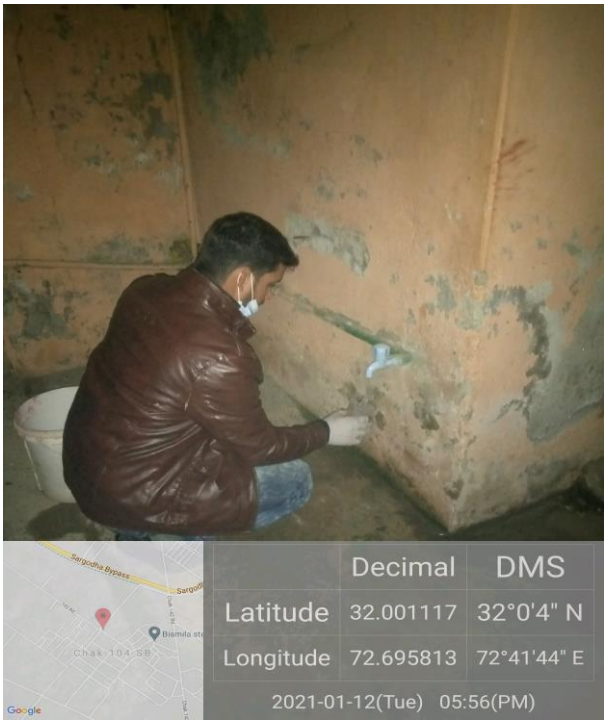


Figure 213: Sample Collection at Chak No 104 Janobi, Sargodha

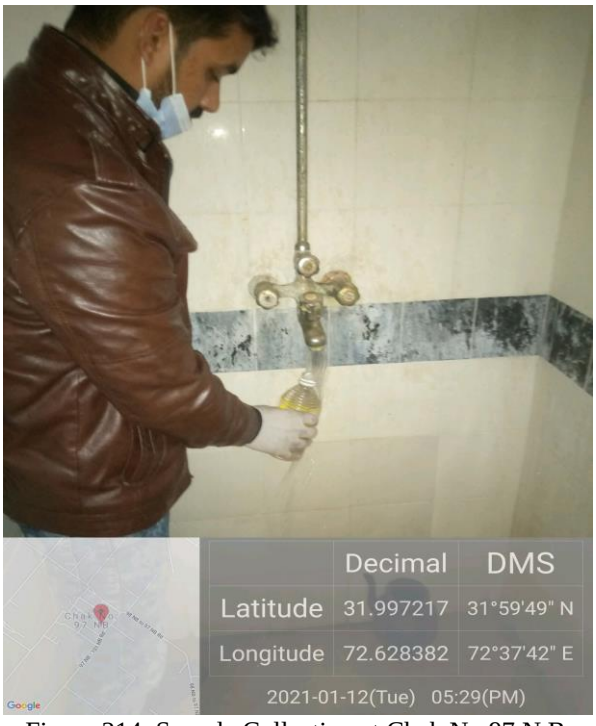


Figure 214: Sample Collection at Chak No 97 N.B, Sargodha

Figure 215: Sample Collection at Chak No 92 N.B, Sargodha

Figure 216: Sample Collection at Chak No 70 Sb, Sargodha

Figure 217: Sample Collection at Chak 40 NB, Sargodha

Figure 218: Sample Collection at Chak No 91 Sb, Sargodha

Figure 219: Sample Collection at Chak 101 Sb, Sargodha

Figure 220: Sample Collection at Chak No 95 Sb, Sargodha

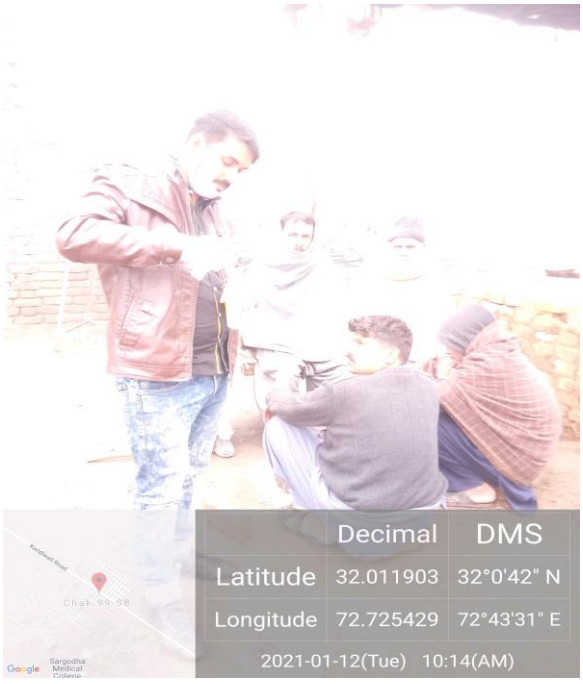


Figure 221: Sample Collection at Chak 99 S.B, Sargodha

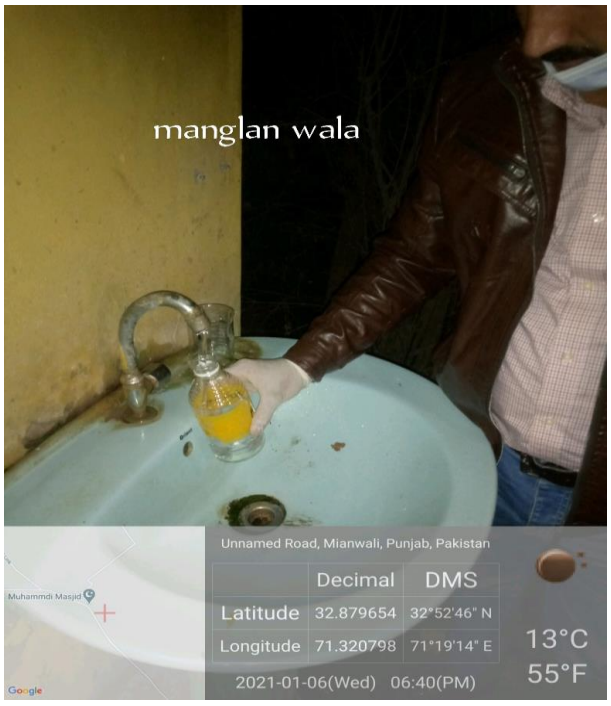


Figure 222: Sample Collection at Mangalan Wala, Essa Khel

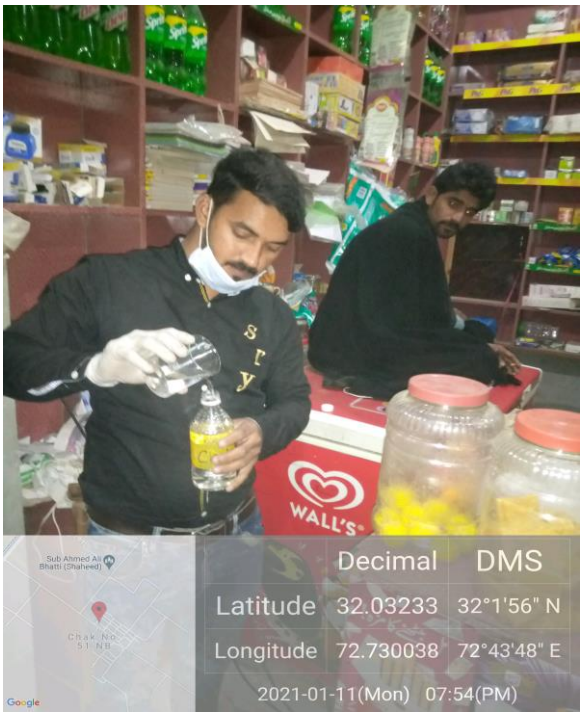


Figure 223: Sample Collection at Chak No 51 Nb, Sargodha

Figure 224: Sample Collection at Chak No#76sb, Sargodha

Figure 225: Sample Collection at Chak No 116 N.B, Sargodha

Figure 226: Sample Collection at Chak No 85sb, Sargodha

Figure 227: Sample Collection at Say Dowana, Sargodha

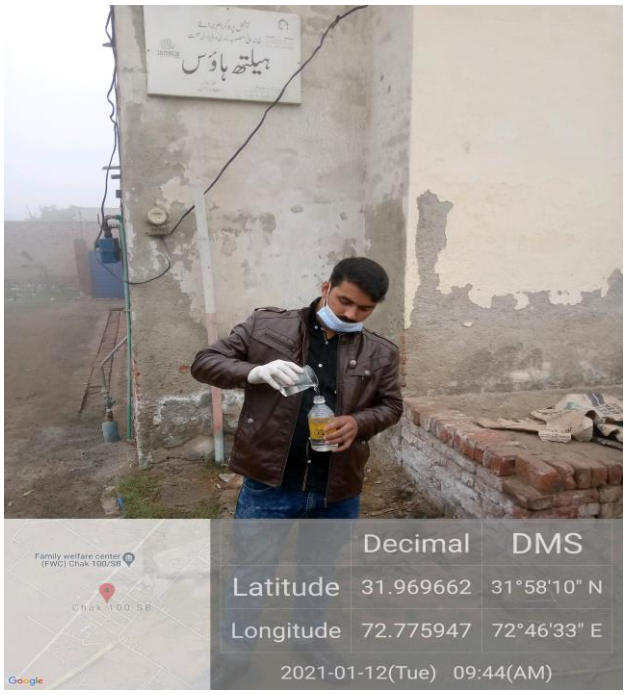


Figure 228: Sample Collection at Chak 100 Sb, Sargodha

Figure 229: Sample Collection at Chak 2 Rakh Dharema, Sargodha

Figure 230: Sample Collection at Chak No #94sb, Sargodha

Figure 231: Sample Collection at Chak No 32 Nb, Sargodha

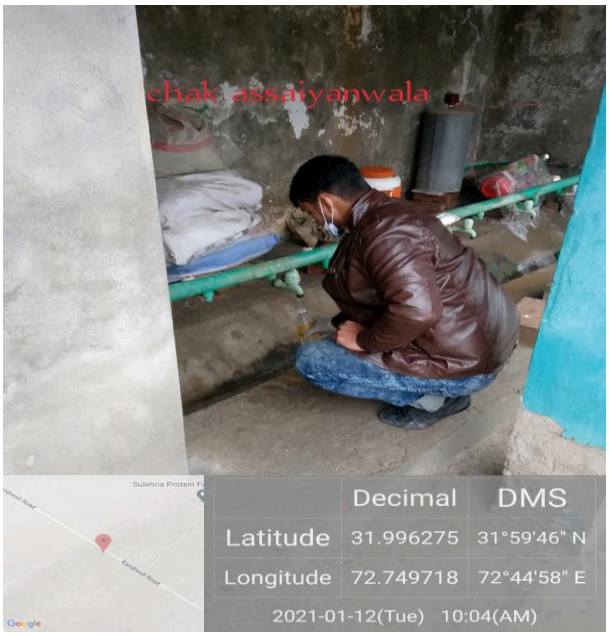


Figure 232: Sample Collection at Chak Asaiyanwala, Sargodha

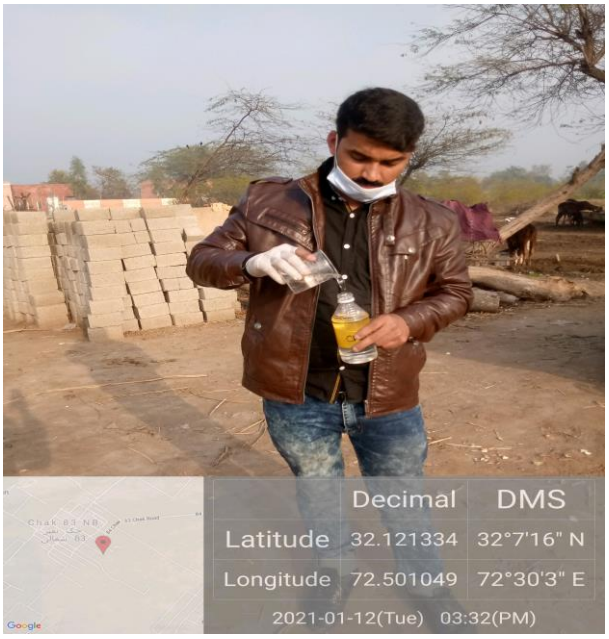


Figure 233: Sample Collection at Chak No 83 Nb, Sargodha

Figure 234: Sample Collection at Chak#1 Rakh Dharema, Sargodha

Figure 235: Sample Collection at Chak#3 Rakh Dharema, Sargodha

Figure 236: Sample Collection at Chak No 84 N.B, Sargodha

Figure 237: Sample Collection at Chak 9 Sb

Figure 238: Sample Collection at Chak#58 Nb, Sargodha

Figure 239: Sample Collection at Godhy Wala, Sargodha

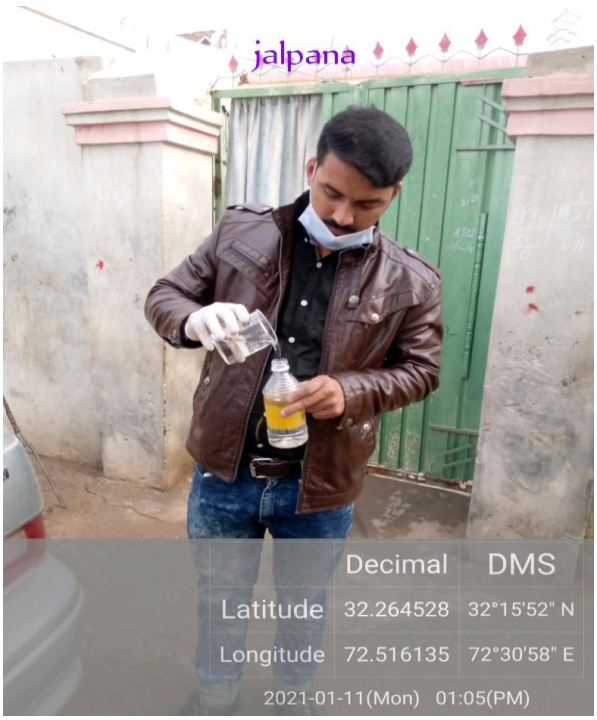


Figure 240: Sample Collection at Jalpanan, Shahpur

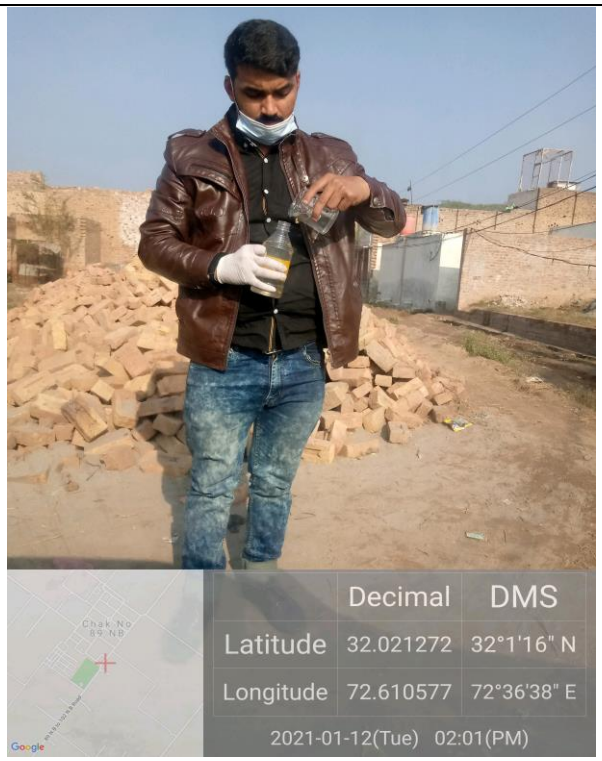


Figure 241: Sample Collection at Chak 89 Nb

Annexure-VI

Socio Economic Surveys

Questionnaire for Socio-EnvironmentalBaseline Survey
Punjab Aab-e-Pak Authority

BASICINFORMATIONOF STUDYAREA					
DateandTime ofInterview	-12-2020				
NameandAgeofRespondent	M. Tariq 21yrs				
Respondent's CNIC(IfAvailable)	0346: 0144498				
Respondent's Mobile No.					
NameofVillage/Mouza	Dagar Yaar Shah Ghasbi (Chakandhanwala)				
Union Council /PatwarCircle	UC - ~~Pag~~ Punj Girain.				
QanoongoHalqa/Tehsil	Teh: Darya Khan				
District	Bhakkar				
CommonLanguages Spoken	Punjabi				
ApproximatePopulation	1500.				
TotalHouses	200-250.				
Location (GPS Coordinates)	Lat. 31 55 02 (N), Long. 71 12 33 (E)				
PHYSICAL ENVIRONMENT					
Type ofThe ProjectArea					
Residential	Agriculture ✓		Commercial	Arid	
Semi-Arid	Saline /Barren		AnyOther:		
DrinkingWater (Availability)					
FromWhere obtain water? (please tick)	Govt. water supply scheme	Privatewater supply	Motorized water pump with in house ✓	Hand pump/ Well	WaterFilter Plant
WaterTanker	Stream	Canal	Other,please specify		
In caseofwatersupplyschemethen describe watersupplyhours X			Morning _____ Afternoon _____		
Ifwaterfilterplantofsourcethen howmuch is distancefromyourhouse? X			_____km		
Whofetcheswater? X	AdultMale	AdultFemale	Children male	Children Female	

Timespendonfetching perday	Fromfiltration plant _____Hrs.	Fromwatertanker _____Hrs.	Fromothersource _____Hrs.
Howmuch costyou pay permonthforwater	~~Irrigati~~ Source ~~Canal~~ Rs._____		
In caseofnowater supply in village then tell aboutnearby scheme/sourceof water	Direction 273° West Distance (fromCenteroftheVillage) 0.5 Km		
QUALITY OF DRINKINGWATER IN GENERAL			
Do you think drinkingwaterisappropriateforcookingpurpose?		Yes.	No.
Howthe drinking water taste like?(pleasetick)	Sweet / Marginal	Brackish	Others
Colorofdrinking water (please tick)	Clean /Clear / Yellow	Dirty	Others
Howthiswatersmells? (please tick)	Good / Bad	Others...	
Ifwaterisdirtythendo you make itsuitablefordrinking? (please tick)		Yes.	No.
Ifyes,then what measureyou taketo clean (pleasetick)	Use alum / Filteritwith cloth	Boilsit	Others...
Willingnesstopayfor improved watersupply? (please tick)	Yes. / No.	Ifyes,How much you can pay?	Rs.____
Are you satisfiedwith thequalityofwater?		Yes.	No.
Isthereanywatermanagementsysteminthe projectarea?		Yes	No
Remark:			
WaterorGreywaterreuse		Yes	No
Availabilityofany	Surface Drain	StormWaterDrains	
Are there anysewermains present?		Yes	No
Are there any liquideffluentsdueto industrial/household?		Yes	No

PowerSource &Transmission		
Are there anygrid station/substation presentin the project area?	Yes	No
Iselectricsupplyavailable toeverycommercial/residential area?	Yes	No
Do people use conventional sources?(Biomass,Coal,Wood, etc.)	Yes	No

Occupation					
Whatarethe majorsourcesof employment?	Agriculture/Farming	Livestock	CottageIndustry	Labor	Others

Education Facilities Availableinthe Study Area							
Educational Facilities Available	Primary School	Middle School	High School	College	Vocational Training Centers	Deeni Madrassa	Others
Yes							
No			✓	✓	✓	✓	
Gov.							
Private	✓	✓					

InstitutionalFacilitiesAvailableinthe StudyArea							
Institutional Facilities Available	Hospital	Dispensary	PostOffice	Mosque	Banks	Shrine	Others (Library, Gird Station, Water Filter Point)
Yes				✓			
No	✓	✓	✓		✓	✓	

Annexure 6.1

Civic Facilities Available	Public Water Supply	Lined Drainage System	SolidWaste Management	Electricity	Gas	Commercial-Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes				✓				
No	✓	✓	✓		✓	✓	✓ No PTCL	✓
Remarks								

Whoarethe influentialin theStudyArea?			
Councilors ✓	ReligiousScholars	Numberdar	Others:
Are you infavoroftheProject?		Yes ✓	No
Remarks:			

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	1-12-2020
Name and Age of Respondent	Haji Sadar
Respondent's CNIC (If Available)	38201-9320279-9
Respondent's Mobile No.	0300-5463983
Name of Village / Mouza	Golaywali city
Union Council / Patwar Circle	UC=28
Qanoongo Halqa / Tehsil	Quaidabad
District	Khushab.
Common Languages Spoken	punjabi
Approximate Population	4000
Total Houses	250
Location (GPS Coordinates)	Lat._____(N), Long._____(E)

PHYSICAL ENVIRONMENT			
Type of The Project Area			
Residential ✓	Agriculture	Commercial	Arid
Semi-Arid	Saline / Barren	Any Other:	

Drinking Water (Availability)					
From Where obtain water? (please tick)	Govt. water supply scheme ✓	Private water supply	Motorized water pump with in house	Hand pump / Well	Water Filter Plant
Water Tanker	Stream ✓	Canal	Other, please specify		
In case of water supply scheme then describe water supply hours			Morning 9:00 – 10:00 AM Afternoon_____ Evening		
If water filter plant of source then how much is distance from your house?			_____km		
Who fetches water?	Adult Male ✓	Adult Female ✓	Children male ✓	Children Female	

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source 2 Hrs Hrs
How much cost you pay per month for water	Source _____	Rs. 900	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ Distance (from Center of the Village)_____Km		
QUALITY OF DRINKING WATER IN GENERAL			
Do you think drinking water is appropriate for cooking purpose?		Yes.	No ✓
How the drinking water taste like? (please tick)	Sweet Marginal	Brackish ✓	Others
Color of drinking water (please tick)	Clean / Clear Yellow ✓	Dirty	Others
How this water smells? (please tick)	Good Bad	Others. No smell.	
If water is dirty then do you make it suitable for drinking? (please tick)		Yes.	No. ✓
If yes, then what measure you take to clean (please tick)	Use alum Filter it with cloth ✓	Boils it	Others…
Willingness to pay for improved water supply? (please tick)	Yes. No.	If yes, How much you can pay?	Rs. 200
Are you satisfied with the quality of water?		Yes.	No ✓
Is there any water management system in the project area?		Yes	No
Remark:			
Water or Grey water reuse		Yes	No
Availability of any	Surface Drain	No	Storm Water Drains
Are there any sewer mains present?		Yes	No ✓
Are there any liquid effluents due to industrial/household?		Yes	No ✓

Power Source & Transmission		
Are there any grid station/ substation present in the project area?	Yes ✓ 15Km	No
Is electric supply available to every commercial/ residential area?	Yes ✓	No
Do people use conventional sources? (Biomass, Coal, Wood, etc.)	Yes ✓	No

Occupation					
What are the major sources of employment?	Agriculture/Farming ✓	Livestock	Cottage Industry	Labor 90%	Others

Education Facilities Available in the Study Area							
Educational Facilities Available	**Primary School**	**Middle School**	**High School**	**College**	**Vocational Training Centers**	**Deeni Madrassa**	**Others**
Yes							
No			✓	✓	✓	✓	
Gov.	✓ Boys	✓ Girls					
Private							

Institutional Facilities Available in the Study Area							
Institutional Facilities Available	**Hospital**	**Dispensary**	**Post Office**	**Mosque**	**Banks**	**Shrine**	**Others (Library, Gird Station, Water Filter Point)**
Yes			✓	✓		✓	
No	✓	✓			✓		✓

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes	✓			✓				
No	✗	✓	✓		✓	✓	✓	✓
Remarks								

Who are the influential in the Study Area?			
Councilors	Religious Scholars	Numberdar ✓	Others:
Are you in favor of the Project?		Yes ✓	No
Remarks:			

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	1-12-2020
Name and Age of Respondent	Muhammad Ahsan - 48yrs.
Respondent's CNIC (If Available)	3820-7601531-9.
Respondent's Mobile No.	0306 1754356.
Name of Village / Mouza	Jabbi Shumali
Union Council / Patwar Circle	UC-15
Qanoongo Halqa / Tehsil	Khushab
District	Khushab
Common Languages Spoken	Punjabi
Approximate Population	35,000.
Total Houses	7000-8000.
Location (GPS Coordinates)	Lat._____(N), Long._____(E)

PHYSICAL ENVIRONMENT

Type of The Project Area

Residential	Agriculture	Commercial	Arid
Semi-Arid	Saline / Barren ✓	Any Other:	

Drinking Water (Availability)

From Where obtain water? (please tick)	Govt. water supply scheme ✓	Private water supply	Motorized water pump with in house	Hand pump / Well	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		
In case of water supply scheme then describe water supply hours			Morning 6am - 2pm. Afternoon_____ Evening		
If water filter plant of source then how much is distance from your house?			_____km No filter plant		

Who fetches water?	Adult Male	Adult Female	Children male	Children Female

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source Hrs
How much cost you pay per month for water	Source water supply	Rs. 70 /m³ water.	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ Distance (from Center of the Village)_____Km		
QUALITY OF DRINKING WATER IN GENERAL			
Do you think drinking water is appropriate for cooking purpose?		Yes.	No ✓
How the drinking water taste like? (please tick)	Sweet Marginal	Brackish ✓	Others
Color of drinking water (please tick)	Clean / Clear ✓ Yellow	Dirty	Others
How this water smells? (please tick)	Good Bad	Others... No Smell	
If water is dirty then do you make it suitable for drinking? (please tick)		Yes.	No ✓
If yes, then what measure you take to clean (please tick)	Use alum Filter it with cloth	Boils it	Others...
Willingness to pay for improved water supply? (please tick)	Yes ✓ Already paying No.	If yes, How much you can pay?	Rs. 70/m³ water
Are you satisfied with the quality of water?		Yes ✓	No.
Is there any water management system in the project area?		Yes	No ✓
Remark:			
Water or Grey water reuse		Yes	No ✓
Availability of any	Surface Drain ✓	Storm Water Drains ✓	
Are there any sewer mains present?		Yes	No ✓
Are there any liquid effluents due to industrial/household?		Yes	No ✓

Power Source & Transmission		
Are there any grid station/ substation present in the project area?	Yes	No ✓
Is electric supply available to every commercial/ residential area?	Yes ✓	No
Do people use conventional sources? (Biomass, Coal, Wood, etc.)	Yes ✓	No

Occupation					
What are the major sources of employment?	Agriculture/Farming 50% ✓	Livestock 30%	Cottage Industry	Labor 20%	Others

Education Facilities Available in the Study Area

Educational Facilities Available	Primary School	Middle School	High School	College	Vocational Training Centers	Deeni Madrassa	Others
Yes							
No				✓	✓	✓	
Gov.	✓	✓	✓				
Private	✓	✓					

Institutional Facilities Available in the Study Area

Institutional Facilities Available	Hospital	Dispensary	Post Office	Mosque	Banks	Shrine	Others (Library, Gird Station, Water Filter Point)
Yes	✓	✓	✓	✓	✓	✓	
No							

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes	✓	✓		✓		✓	✓	
No			✓		✓			✓
Remarks								

Who are the influential in the Study Area?			
Councilors ✓	Religious Scholars	Numberdar ✓	Others:
Are you in favor of the Project?		Yes ✓	No
Remarks:			

Questionnaire for Socio-EnvironmentalBaseline Survey
Punjab Aab-e-Pak Authority

BASICINFORMATIONOF STUDYAREA	
DateandTime ofInterview	
NameandAgeofRespondent	M. Shafi 72yrs.
Respondent's CNIC(IfAvailable)	
Respondent's Mobile No.	0300 4663214
NameofVillage/Mouza	Chak 26 DB.
Union Council /PatwarCircle	
QanoongoHalqa/Tehsil	Mianwali
District	Mianwali
CommonLanguages Spoken	Punjabi
ApproximatePopulation	1200 - 1300
TotalHouses	250 - 300
Location (GPS Coordinates)	Lat. 32 18 52 (N), Long. 71 40 07 (E)

PHYSICAL ENVIRONMENT			
Type ofThe ProjectArea			
Residential	Agriculture ✓	Commercial	Arid
Semi-Arid	Saline /Barren	AnyOther:	

DrinkingWater (Availability)					
FromWhere obtain water? (please tick)	Govt. water supply scheme	Privatewater supply	Motorized water pump with in house ✓	Hand pump/ Well ✓	WaterFilter Plant
WaterTanker	Stream	Canal	Other,please specify		
In caseofwatersupplyschemethen describe watersupplyhours ✗			Morning _____ Afternoon_____		
Ifwaterfilterplantofsourcethen howmuch is distancefromyourhouse? ✗			_____km		

Whofetcheswater?	AdultMale	AdultFemale	Children male ✓	Children Female

Annexure 6.1

Timespendonfetching perday	Fromfiltration plant _____Hrs.	Fromwatertanker _____Hrs.	Fromothersource 15 min Hrs.	
Howmuch costyou pay permonthforwater	Source _____		Rs._____	
In caseofnowater supply in village then tell aboutnearby scheme/sourceof water	Direction N70°S Distance (fromCenteroftheVillage) 0.5 Km			
QUALITY OF DRINKINGWATER IN GENERAL				
Do you think drinkingwaterisappropriateforcookingpurpose?			Yes.	No.
Howthe drinking water taste like?(pleasetick)	Sweet	Marginal	Brackish	Others
Colorofdrinking water (please tick)	Clean /Clear	Yellow	Dirty	Others
Howthiswatersmells? (please tick)	Good	Bad	Others…	
Ifwaterisdirtythendo you make itsuitablefordrinking? (please tick) No use			Yes.	No.
Ifyes,then what measureyou taketo clean (pleasetick)	Use alum	Filteritwith cloth	Boilsit	Others…
Willingnesstopayfor improved watersupply? (please tick)	Yes.	No.	Ifyes,How much you can pay?	Rs._____
Are you satisfiedwith thequalityofwater?			Yes.	No.
Isthereanywatermanagementsysteminthe projectarea?			Yes	No
Remark:				
WaterorGreywaterreuse			Yes	No
Availabilityofany	Surface Drain		StormWaterDrains	
Are there anysewermains present?			Yes	No
Are there any liquideffluentsdueto industrial/household?			Yes	No

PowerSource &Transmission		
Are there anygrid station/substation presentin the project area?	Yes	No
Iselectricsupplyavailable toeverycommercial/residential area?	Yes	No
Do people use conventional sources?(Biomass,Coal,Wood, etc.)	Yes	No

Occupation					
Whatarethe majorsourcesof employment?	Agriculture/Farming	Livestock	CottageIndustry	Labor	Others

Education Facilities Availableinthe Study Area							
Educational Facilities Available	Primary School	Middle School	High School	College	Vocational Training Centers	Deeni Madrassa	Others
Yes							
No		✓	✓	✓	✓		
Gov.	✓						
Private						✓	

InstitutionalFacilitiesAvailableinthe StudyArea							
Institutional Facilities Available	Hospital	Dispensary	PostOffice	Mosque	Banks	Shrine	Others (Library, Gird Station, Water Filter Point)
Yes				✓			
No	✓	✓	✓		✓	✓	✓

Annexure 6.1

Civic Facilities Available	Public Water Supply	Lined Drainage System	SolidWaste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes				✓				
No	✓	✓	✓		✓	✓	✓	✓
Remarks								

Whoarethe influentialin theStudyArea?			
Councilors	ReligiousScholars	Numberdar ✓	Others:
Are you infavoroftheProject?		Yes ✓	No
Remarks:			

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	1-12-2020
Name and Age of Respondent	Kuda Bakhsh.
Respondent's CNIC (If Available)	38201-5179680-1
Respondent's Mobile No.	0300-6070701
Name of Village / Mouza	Nali Shamali
Union Council / Patwar Circle	UC = 12
Qanoongo Halqa / Tehsil	Khushab
District	Khushab
Common Languages Spoken	Punjabi
Approximate Population	25000
Total Houses	4500
Location (GPS Coordinates)	Lat._____(N), Long._____(E)

PHYSICAL ENVIRONMENT			
Type of The Project Area			
Residential ✓	Agriculture	Commercial	Arid
Semi-Arid	Saline / Barren	Any Other:	

Drinking Water (Availability)					
From Where obtain water? (please tick)	Govt. water supply scheme ✓	Private water supply	Motorized water pump with in house	Hand pump / Well	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		
In case of water supply scheme then describe water supply hours			Morning ✓ _____ Afternoon _____ Evening ✓		
If water filter plant of source then how much is distance from your house?			_____km		
Who fetches water?	Adult Male	Adult Female	Children male	Children Female	

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source _____Hrs.
How much cost you pay per month for water	Source _____	Rs. _____	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ Distance (from Center of the Village)_____Km		
QUALITY OF DRINKING WATER IN GENERAL			
Do you think drinking water is appropriate for cooking purpose?		Yes.✓	No.
How the drinking water taste like? (please tick)	Sweet Marginal	Brackish✓	Others
Color of drinking water (please tick)	Clean / Clear✓ Yellow	Dirty	Others
How this water smells? (please tick)	Good Bad	Others... No Smell.	
If water is dirty then do you make it suitable for drinking? (please tick)		Yes.✓	No.
If yes, then what measure you take to clean (please tick)	Use alum Filter it with cloth✓	Boils it	Others...
Willingness to pay for improved water supply? (please tick)	Yes. No.	If yes, How much you can pay?	Rs. 100
Are you satisfied with the quality of water?		Yes.	No✓
Is there any water management system in the project area?		Yes	No ✓
Remark:			
Water or Grey water reuse		Yes	No
Availability of any	Surface Drain✓	Storm Water Drains	
Are there any sewer mains present?		Yes	No✓
Are there any liquid effluents due to industrial/household?		Yes	No✓

Power Source & Transmission		
Are there any grid station/ substation present in the project area?	Yes	No ✓
Is electric supply available to every commercial/ residential area?	Yes ✓	No
Do people use conventional sources? (Biomass, Coal, Wood, etc.)	Yes ✓	No

Occupation					
What are the major sources of employment?	Agriculture/Farming ✓	Livestock	Cottage Industry	Labor 15%	Others

Education Facilities Available in the Study Area							
Educational Facilities Available	**Primary School**	**Middle School**	**High School**	**College**	**Vocational Training Centers**	**Deeni Madrassa**	**Others**
Yes							
No				✓	✓	✓	
Gov.	✓	✓	✓				
Private	✓						

Institutional Facilities Available in the Study Area							
Institutional Facilities Available	**Hospital**	**Dispensary**	**Post Office**	**Mosque**	**Banks**	**Shrine**	**Others (Library, Gird Station, Water Filter Point)**
Yes	✓	✓	✓	✓	✓	✓	
No	✓						✓

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes	✓	✓	✓	✓				
No					✓	✓	✓	✓
Remarks								

Who are the influential in the Study Area?			
Councilors	Religious Scholars	Numberdar ✓	Others:
Are you in favor of the Project?		Yes ✓	No
Remarks:			

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	30-11-2020
Name and Age of Respondent	Taswar Iqbal
Respondent's CNIC (If Available)	38201-2620398-5
Respondent's Mobile No.	0300-2554200
Name of Village / Mouza	~~Panja~~ punja
Union Council / Patwar Circle	UC = 26
Qanoongo Halqa / Tehsil	Khushab
District	Khushab.
Common Languages Spoken	punjabi
Approximate Population	10,000
Total Houses	4000
Location (GPS Coordinates)	Lat. 32° 13' 49" (N), Long. 72° 03' 16" (E)

PHYSICAL ENVIRONMENT					
Type of The Project Area					
Residential	Agriculture ✓		Commercial	Arid	
Semi-Arid	Saline / Barren		Any Other:		
Drinking Water (Availability)					
From Where obtain water? (please tick)	Govt. water supply scheme ✓	Private water supply	Motorized water pump with in house	Hand pump / Well	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		
In case of water supply scheme then describe water supply hours			Morning 9:00, 10:00 Am Afternoon Evening		
If water filter plant of source then how much is distance from your house?			____km		
Who fetches water?	Adult Male	Adult Female	Children male	Children Female	

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source _____Hrs
How much cost you pay per month for water	Source _____	Rs. _____	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ Distance (from Center of the Village)_____Km		
QUALITY OF DRINKING WATER IN GENERAL			
Do you think drinking water is appropriate for cooking purpose?		Yes.	No✓
How the drinking water taste like? (please tick)	Sweet Marginal	Brackish✓	Others
Color of drinking water (please tick)	Clean / Clear Yellow✓	Dirty	Others
How this water smells? (please tick)	Good Bad	Others... Smell	
If water is dirty then do you make it suitable for drinking? (please tick)		Yes.	No✓
If yes, then what measure you take to clean (please tick)	Use alum Filter it with cloth✓	Boils it	Others...
Willingness to pay for improved water supply? (please tick)	Yes. No.	If yes, How much you can pay?	Rs. _____
Are you satisfied with the quality of water?		Yes.	No✓
Is there any water management system in the project area?		Yes	No✓
Remark:			
Water or Grey water reuse		Yes	No✓
Availability of any	Surface Drain✓	Storm Water Drains	
Are there any sewer mains present?		Yes	No✓
Are there any liquid effluents due to industrial/household?		Yes	No✓

Power Source & Transmission						
Are there any grid station/ substation present in the project area?			Yes	No ✓		
Is electric supply available to every commercial/ residential area?			Yes ✓	No		
Do people use conventional sources? (Biomass, Coal, Wood, etc.)			Yes ✓	No		
Occupation						
What are the major sources of employment?	Agriculture/Farming	Livestock ✓ 20%	Cottage Industry	Labor 70%	Others	

Education Facilities Available in the Study Area							
Educational Facilities Available	**Primary School**	**Middle School**	**High School**	**College**	**Vocational Training Centers**	**Deeni Madrassa**	**Others**
Yes							
No			✓	✓	✓		
Gov.	✓	✓ Boys				✓	
Private	✓						

Institutional Facilities Available in the Study Area							
Institutional Facilities Available	**Hospital**	**Dispensary**	**Post Office**	**Mosque**	**Banks**	**Shrine**	**Others (Library, Gird Station, Water Filter Point)**
Yes			✓	✓	✓		
No	✓	✓			✓	✓	✓

Annexure 6.1

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes	✓	✓	✓	✓	✓		✓	
No						✓		✓
Remarks								

Who are the influential in the Study Area?			
Councilors	Religious Scholars ✓	Numberdar	Others:
Are you in favor of the Project?		Yes	No
Remarks:			

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	
Name and Age of Respondent	Dilwar Hussain
Respondent's CNIC (If Available)	38201-2804608-7
Respondent's Mobile No.	0300-9704930
Name of Village / Mouza	Chak No. 50MB
Union Council / Patwar Circle	UC = 19
Qanoongo Halqa / Tehsil	Khushab
District	Khushab.
Common Languages Spoken	punjabi
Approximate Population	10,000
Total Houses	700
Location (GPS Coordinates)	Lat. _____ (N), Long. _____ (E)

PHYSICAL ENVIRONMENT

Type of The Project Area

Residential	Agriculture ✓	Commercial	Arid
Semi-Arid	Saline / Barren	Any Other:	

Drinking Water (Availability)

From Where obtain water? (please tick)	Govt. water supply scheme	Private water supply	Motorized water pump with in house	Hand pump / Well ✓ (out side of village.)	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		
In case of water supply scheme then describe water supply hours			Morning _____ Afternoon _____ Evening		
If water filter plant of source then how much is distance from your house?			_____km		

Who fetches water?	Adult Male ✓	Adult Female	Children male ✓	Children Female

Annexure 6.1

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source _____Hrs.
How much cost you pay per month for water	Source _____	Rs. 300	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ Distance (from Center of the Village)_1_____Km		
QUALITY OF DRINKING WATER IN GENERAL			
Do you think drinking water is appropriate for cooking purpose?		Yes.	No ✓
How the drinking water taste like? (please tick)	Sweet Marginal	Brackish ✓	Others
Color of drinking water (please tick)	Clean ✓ Clear Yellow	Dirty	Others
How this water smells? (please tick)	Good Bad	Others. No Smells.	
If water is dirty then do you make it suitable for drinking? (please tick)		Yes. ✓	No.
If yes, then what measure you take to clean (please tick)	Use alum Filter it with cloth ✓	Boils it	Others...
Willingness to pay for improved water supply? (please tick)	Yes. No.	If yes, How much you can pay?	Rs. 100
Are you satisfied with the quality of water?		Yes.	No ✓
Is there any water management system in the project area?		Yes	No ✓
Remark:			
Water or Grey water reuse		Yes	No ✓
Availability of any	Surface Drain ✓	Storm Water Drains	
Are there any sewer mains present?		Yes	No ✓
Are there any liquid effluents due to industrial/household?		Yes	No ✓

Power Source & Transmission		
Are there any grid station/ substation present in the project area?	Yes	No ✓
Is electric supply available to every commercial/ residential area?	Yes ✓	No
Do people use conventional sources? (Biomass, Coal, Wood, etc.)	Yes ✓	No

Occupation					
What are the major sources of employment?	Agriculture/Farming ✓ 10%	Livestock ✓	Cottage Industry	Labor ✓ 70%	Others

Education Facilities Available in the Study Area

Educational Facilities Available	Primary School	Middle School	High School	College	Vocational Training Centers	Deeni Madrassa	Others
Yes							
No				✓	✓		
Gov.	✓	✓	✓			✓	
Private							

Institutional Facilities Available in the Study Area

Institutional Facilities Available	Hospital	Dispensary	Post Office	Mosque	Banks	Shrine	Others (Library, Gird Station, Water Filter Point)
Yes				✓		✓	✓
No	✓	✓	✓		✓		

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes	✓	✓	✓	✓		✓	✓	
No					✓			✓
Remarks								

Who are the influential in the Study Area?			
Councilors	Religious Scholars	Numberdar ✓	Others:
Are you in favor of the Project?		Yes ✓	No
Remarks:			

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	
Name and Age of Respondent	Muhammad Tariq
Respondent's CNIC (If Available)	38201-8386600-7
Respondent's Mobile No.	0302-86733228
Name of Village / Mouza	Chak No. 41 MB
Union Council / Patwar Circle	UC-20
Qanoongo Halqa / Tehsil	Khushab
District	Khushab
Common Languages Spoken	Punjabi
Approximate Population	4000
Total Houses	400
Location (GPS Coordinates)	Lat._____(N), Long._____(E)

PHYSICAL ENVIRONMENT

Type of The Project Area

Residential	Agriculture ✓	Commercial	Arid
Semi-Arid	Saline / Barren	Any Other:	

Drinking Water (Availability)

From Where obtain water? (please tick)	Govt. water supply scheme	Private water supply	Motorized water pump with in house	Hand pump / Well ✓	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		
In case of water supply scheme then describe water supply hours			Morning_____ Afternoon_____ Evening		
If water filter plant of source then how much is distance from your house?			_____km		

Who fetches water?	Adult Male ✓	Adult Female ✓	Children male ✓	Children Female

Annexure 6.1

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source 30 min Hrs
How much cost you pay per month for water	Source _____	Rs. 900	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ Distance (from Center of the Village)_____Km		
QUALITY OF DRINKING WATER IN GENERAL			
Do you think drinking water is appropriate for cooking purpose?		Yes.	No ✓
How the drinking water taste like? (please tick)	Sweet Marginal	Brackish ✓	Others
Color of drinking water (please tick)	Clean / Clear Yellow ✓	Dirty	Others
How this water smells? (please tick)	Good Bad	Others... Smell	
If water is dirty then do you make it suitable for drinking? (please tick)		Yes.	No. ✓
If yes, then what measure you take to clean (please tick)	Use alum Filter it with cloth ✓	Boils it	Others...
Willingness to pay for improved water supply? (please tick)	Yes. No.	If yes, How much you can pay?	Rs. 100
Are you satisfied with the quality of water?		Yes.	No ✓
Is there any water management system in the project area?		Yes	No ✓
Remark:			
Water or Grey water reuse		Yes	No ✓
Availability of any	Surface Drain	Storm Water Drains	
Are there any sewer mains present?		Yes	No ✓
Are there any liquid effluents due to industrial/household?		Yes	No ✓

Power Source & Transmission		
Are there any grid station/ substation present in the project area?	Yes	No ✓
Is electric supply available to every commercial/ residential area?	Yes ✓	No
Do people use conventional sources? (Biomass, Coal, Wood, etc.)	Yes ✓	No

Occupation					
What are the major sources of employment?	Agriculture/Farming ✓	Livestock	Cottage Industry	Labor ✓ 30%	Others

Education Facilities Available in the Study Area							
Educational Facilities Available	**Primary School**	**Middle School**	**High School**	**College**	**Vocational Training Centers**	**Deeni Madrassa**	**Others**
Yes							
No				✓	✓	✓	
Gov.	✓ Boys	✓	✓ girls				
Private							

Institutional Facilities Available in the Study Area							
Institutional Facilities Available	**Hospital**	**Dispensary**	**Post Office**	**Mosque**	**Banks**	**Shrine**	**Others (Library, Gird Station, Water Filter Point)**
Yes				✓	✓		✓
No	✓	✓	✓			✓	

Annexure 6.1

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes				✓				
No	✓	✓	✓		✓	✓	✓	✓
Remarks								

Who are the influential in the Study Area?			
Councilors	Religious Scholars	Numberdar ✓	Others:
Are you in favor of the Project?		Yes ✓	No
Remarks:			

chak=48MB

Annexure 6.1

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	
Name and Age of Respondent	~~Ahsan Babar~~ Ehsan Babar
Respondent's CNIC (If Available)	38201-5343625-5
Respondent's Mobile No.	0300-7077447
Name of Village / Mouza	Chak No. 48 MB
Union Council / Patwar Circle	UC-18/51
Qanoongo Halqa / Tehsil	Khushab
District	Khushab
Common Languages Spoken	Punjabi
Approximate Population	5000
Total Houses	600
Location (GPS Coordinates)	Lat. _____(N), Long. _____(E)

PHYSICAL ENVIRONMENT

Type of The Project Area

Residential	Agriculture ✓	Commercial	Arid
Semi-Arid	Saline / Barren	Any Other:	

Drinking Water (Availability) out side of village.

From Where obtain water? (please tick)	Govt. water supply scheme	Private water supply	Motorized water pump with in house	Hand pump / Well ✓	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		
In case of water supply scheme then describe water supply hours			Morning_____ Afternoon_____ Evening		
If water filter plant of source then how much is distance from your house?			_____km		

Who fetches water?	Adult Male ✓	Adult Female ✓	Children male ✓	Children Female

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source 30minHrs
How much cost you pay per month for water	Source _____	Rs. _____	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ North Distance (from Center of the Village)___3___Km		
QUALITY OF DRINKING WATER IN GENERAL			
Do you think drinking water is appropriate for cooking purpose?		Yes.	No
How the drinking water taste like? (please tick)	Sweet Marginal	Brackish	Others
Color of drinking water (please tick)	Clean / Clear Yellow	Dirty	Others
How this water smells? (please tick)	Good Bad	Others..Smell	
If water is dirty then do you make it suitable for drinking? (please tick)		Yes.	No
If yes, then what measure you take to clean (please tick)	Use alum Filter it with cloth	Boils it	Others...
Willingness to pay for improved water supply? (please tick)	Yes. No.	If yes, How much you can pay?	Rs 200
Are you satisfied with the quality of water?		Yes.	No
Is there any water management system in the project area?		Yes	No
Remark:			
Water or Grey water reuse		Yes	No
Availability of any	Surface Drain	Storm Water Drains	
Are there any sewer mains present?		Yes	No
Are there any liquid effluents due to industrial/household?		Yes	No

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	2-12-2020
Name and Age of Respondent	SHAH Muhammad
Respondent's CNIC (If Available)	38201-5739354-1
Respondent's Mobile No.	0301-3733467
Name of Village / Mouza	Katha Sagral
Union Council / Patwar Circle	UC = 9
Qanoongo Halqa / Tehsil	Khushab
District	Khushab
Common Languages Spoken	Punjabi
Approximate Population	17000, 18000
Total Houses	5000
Location (GPS Coordinates)	Lat._____(N), Long._____(E)

PHYSICAL ENVIRONMENT					
Type of The Project Area					
Residential	Agriculture		Commercial	Arid	
Semi-Arid	Saline / Barren ✓		Any Other:		
Drinking Water (Availability)					
From Where obtain water? (please tick)	Govt. water supply scheme	Private water supply	Motorized water pump with in house	Hand pump / Well ✓	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		
In case of water supply scheme then describe water supply hours			Morning ✓ Afternoon ✓ Evening ✓		
If water filter plant of source then how much is distance from your house?			_____km		
Who fetches water?	Adult Male	Adult Female	Children male	Children Female	

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source Hrs	
How much cost you pay per month for water	Source _____		Rs. _____	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ Distance (from Center of the Village)_____Km			
QUALITY OF DRINKING WATER IN GENERAL				
Do you think drinking water is appropriate for cooking purpose?			Yes. ✓	No.
How the drinking water taste like? (please tick)	Sweet ✓	Marginal	Brackish	Others
Color of drinking water (please tick)	Clean / Clear ✓	Yellow	Dirty	Others
How this water smells? (please tick)	Good	Bad	Others.. No Smell.	
If water is dirty then do you make it suitable for drinking? (please tick)			Yes. ✓	No.
If yes, then what measure you take to clean (please tick)	Use alum	Filter it with cloth ✓	Boils it	Others…
Willingness to pay for improved water supply? (please tick)	Yes.	No.	If yes, How much you can pay?	Rs. _____
Are you satisfied with the quality of water?			Yes ✓	No.
Is there any water management system in the project area?			Yes	No
Remark:				
Water or Grey water reuse			Yes	No
Availability of any	Surface Drain ✓		Storm Water Drains ✓	
Are there any sewer mains present?			Yes	No ✓
Are there any liquid effluents due to industrial/household?			Yes	No ✓

Power Source & Transmission		
Are there any grid station/ substation present in the project area?	Yes	No ✓
Is electric supply available to every commercial/ residential area?	Yes ✓	No
Do people use conventional sources? (Biomass, Coal, Wood, etc.)	Yes ✓	No

Occupation					
What are the major sources of employment?	Agriculture/Farming ✓	Livestock	Cottage Industry	Labor ✓	Others

Education Facilities Available in the Study Area							
Educational Facilities Available	**Primary School**	**Middle School**	**High School**	**College**	**Vocational Training Centers**	**Deeni Madrassa**	**Others**
Yes							
No					✓	✓	
Gov.	✓	✓	✓	✓			
Private	✓						

Institutional Facilities Available in the Study Area							
Institutional Facilities Available	**Hospital**	**Dispensary**	**Post Office**	**Mosque**	**Banks**	**Shrine**	**Others (Library, Gird Station, Water Filter Point)**
Yes	✓	✓	✓	✓	✓	✓	✓
No							

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes	✓	✓		✓	✗	✓	✓	✓
No			✓		✓	✗		
Remarks								

Who are the influential in the Study Area?			
Councilors	Religious Scholars	Numberdar ✓	Others:
Are you in favor of the Project?		Yes ✓	No
Remarks:			

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	
Name and Age of Respondent	Aamir Shahzad
Respondent's CNIC (If Available)	~~Aamir Shahzad~~
Respondent's Mobile No.	0304-4182312
Name of Village / Mouza	Roda
Union Council / Patwar Circle	UC - 24
Qanoongo Halqa / Tehsil	Khushab
District	Khushab
Common Languages Spoken	Punjabi
Approximate Population	38,000
Total Houses	5000
Location (GPS Coordinates)	Lat. 32° 04' 05" (N), Long. 72° 05' 57" (E)

PHYSICAL ENVIRONMENT					
Type of The Project Area					
Residential	Agriculture ✓		Commercial	Arid	
Semi-Arid	Saline / Barren		Any Other:		
Drinking Water (Availability)					
From Where obtain water? (please tick)	Govt. water supply scheme ✓	Private water supply	Motorized water pump with in house	Hand pump / Well	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		
In case of water supply scheme then describe water supply hours			Morning 8:00, 9:00 Am Afternoon Evening		
If water filter plant of source then how much is distance from your house?			_____km		
Who fetches water?	Adult Male	Adult Female	Children male	Children Female	

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker 12,10 Km Hrs.	From other source Hrs
How much cost you pay per month for water	Source Water Supply	Rs. 150	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ Distance (from Center of the Village)_____Km		
QUALITY OF DRINKING WATER IN GENERAL			
Do you think drinking water is appropriate for cooking purpose?		Yes.	No ✓
How the drinking water taste like? (please tick)	Sweet Marginal ✓	Brackish	Others
Color of drinking water (please tick)	Clean / Clear ✓ Yellow	Dirty	Others
How this water smells? (please tick)	Good Bad	Others... No Smells.	
If water is dirty then do you make it suitable for drinking? (please tick)		Yes ✓	No.
If yes, then what measure you take to clean (please tick)	Use alum Filter it with cloth ✓	Boils it	Others...
Willingness to pay for improved water supply? (please tick)	Yes. No.	If yes, How much you can pay?	Rs. 150
Are you satisfied with the quality of water?		Yes.	No ✓
Is there any water management system in the project area?		Yes	No ✓
Remark:			
Water or Grey water reuse		Yes ✓	No
Availability of any	Surface Drain ✓	Storm Water Drains	
Are there any sewer mains present?		Yes ✓	No
Are there any liquid effluents due to industrial/household?		Yes	No ✓

Power Source & Transmission			2.5 km
Are there any grid station/ substation present in the project area?	Yes ✓	No	
Is electric supply available to every commercial/ residential area?	Yes ✓	No	
Do people use conventional sources? (Biomass, Coal, Wood, etc.)	Yes	No ✓	

Occupation					
What are the major sources of employment?	Agriculture/Farming ✓	Livestock ✓	Cottage Industry	Labor ✓ 50%	Others

Education Facilities Available in the Study Area							
Educational Facilities Available	**Primary School**	**Middle School**	**High School**	**College**	**Vocational Training Centers**	**Deeni Madrassa**	**Others**
Yes							
No					✓		
Gov.	✓	✓	✓ Girls Boys	✓		✓	
Private							

Institutional Facilities Available in the Study Area							
Institutional Facilities Available	**Hospital**	**Dispensary**	**Post Office**	**Mosque**	**Banks**	**Shrine**	**Others (Library, Gird Station, Water Filter Point)**
Yes	✓		✓	✓	✓		✓
No						✓	

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes	✓	✓	✓	✓		✓	✓	
No					✓			✓
Remarks								

Who are the influential in the Study Area?			
Councilors	Religious Scholars	Numberdar ✓	Others:
Are you in favor of the Project?		Yes ✓	No
Remarks:			

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	
Name and Age of Respondent	Muhammad Tahir
Respondent's CNIC (If Available)	38201-3961447-3
Respondent's Mobile No.	0301-3301544.
Name of Village / Mouza	Chak No. 42MB.
Union Council / Patwar Circle	UC = 32.
Qanoongo Halqa / Tehsil	Khushab.
District	Khushab.
Common Languages Spoken	Punjabi
Approximate Population	3000
Total Houses	700
Location (GPS Coordinates)	Lat. _____(N), Long. _____(E)

PHYSICAL ENVIRONMENT

Type of The Project Area

Residential	Agriculture ✓	Commercial	Arid
Semi-Arid	Saline / Barren	Any Other:	

Drinking Water (Availability)

From Where obtain water? (please tick)	Govt. water supply scheme	Private water supply	Motorized water pump with in house	Hand pump / Well ✓ (out side of the village.)	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		

In case of water supply scheme then describe water supply hours	Morning _____ Afternoon _____ Evening
If water filter plant of source then how much is distance from your house?	_____km

Who fetches water?	Adult Male ✓	Adult Female	Children male ✓	Children Female

Annexure 6.1

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source 15 min Hrs
How much cost you pay per month for water	Source _____	Rs. 600	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ 300 NW, 60 NE Distance (from Center of the Village)_____Km		

QUALITY OF DRINKING WATER IN GENERAL			
Do you think drinking water is appropriate for cooking purpose?		Yes.	No
How the drinking water taste like? (please tick)	Sweet Marginal	Brackish	Others
Color of drinking water (please tick)	Clean / Clear Yellow	Dirty	Others
How this water smells? (please tick)	Good Bad	Others..Smell.	
If water is dirty then do you make it suitable for drinking? (please tick)		Yes.	No
If yes, then what measure you take to clean (please tick)	Use alum Filter it with cloth	Boils it	Others...
Willingness to pay for improved water supply? (please tick)	Yes. No.	If yes, How much you can pay?	Rs. 150
Are you satisfied with the quality of water?		Yes.	No
Is there any water management system in the project area?		Yes	No
Remark:			
Water or Grey water reuse		Yes	No
Availability of any	Surface Drain	Storm Water Drains	
Are there any sewer mains present?		Yes	No
Are there any liquid effluents due to industrial/household?		Yes	No

Power Source & Transmission		
Are there any grid station/ substation present in the project area?	Yes	No ✓
Is electric supply available to every commercial/ residential area?	Yes ✓	No
Do people use conventional sources? (Biomass, Coal, Wood, etc.)	Yes ✓	No

Occupation					
What are the major sources of employment?	Agriculture/Farming ✓	Livestock	Cottage Industry	Labor 10/	Others

Education Facilities Available in the Study Area							
Educational Facilities Available	**Primary School**	**Middle School**	**High School**	**College**	**Vocational Training Centers**	**Deeni Madrassa**	**Others**
Yes							
No		✓	✓	✓	✓	✓	
Gov.	Boys, Girls ✓						
Private							

Institutional Facilities Available in the Study Area							
Institutional Facilities Available	**Hospital**	**Dispensary**	**Post Office**	**Mosque**	**Banks**	**Shrine**	**Others (Library, Gird Station, Water Filter Point)**
Yes			✓	✓			
No	✓	✓	✗		✓	✓	✓

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes		✓		✓				
No	✓		✓		✓	✓	✓	✓
Remarks								

Who are the influential in the Study Area?			
Councilors ✓	Religious Scholars	Numberdar	Others:
Are you in favor of the Project?		Yes ✓	No
Remarks:			

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	
Name and Age of Respondent	Haji Muhammad Iqbal
Respondent's CNIC (If Available)	38201-2380136-3
Respondent's Mobile No.	0305-7672703
Name of Village / Mouza	Waheer Shumali
Union Council / Patwar Circle	Waheer Shumali UC-
Qanoongo Halqa / Tehsil	Khushab
District	Khushab
Common Languages Spoken	Punjabi
Approximate Population	15000
Total Houses	2000
Location (GPS Coordinates)	Lat._____(N), Long._____(E)

PHYSICAL ENVIRONMENT

Type of The Project Area

Residential	Agriculture ✓	Commercial	Arid
Semi-Arid	Saline / Barren	Any Other:	

Drinking Water (Availability) out side of village.

From Where obtain water? (please tick)	Govt. ✓ water supply scheme	Private water supply	Motorized water pump with in house	Hand pump / Well	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		

In case of water supply scheme then describe water supply hours	Morning 8:00 To 9:00 Afternoon Evening
If water filter plant of source then how much is distance from your house?	_____km

Who fetches water?	Adult Male ✓	Adult Female ✓	Children male ✓	Children Female

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source 10-20 min Hrs
How much cost you pay per month for water	Source _____	Rs. _____	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ Distance (from Center of the Village)_____Km		
QUALITY OF DRINKING WATER IN GENERAL			
Do you think drinking water is appropriate for cooking purpose?		Yes.	No ✓
How the drinking water taste like? (please tick)	Sweet Marginal	Brackish ✓	Others
Color of drinking water (please tick)	Clean / Clear ✓ Yellow	Dirty	Others
How this water smells? (please tick)	Good Bad	Others... No Smell.	
If water is dirty then do you make it suitable for drinking? (please tick)		Yes.	No ✓
If yes, then what measure you take to clean (please tick)	Use alum Filter it with cloth ✓	Boils it	Others...
Willingness to pay for improved water supply? (please tick)	Yes. ✓ No.	If yes, How much you can pay?	Rs. 100
Are you satisfied with the quality of water?		Yes.	No ✓
Is there any water management system in the project area?		Yes	No
Remark:			
Water or Grey water reuse		Yes	No ✓
Availability of any	Surface Drain ✓	Storm Water Drains ✓	
Are there any sewer mains present?		Yes	No ✓
Are there any liquid effluents due to industrial/household?		Yes	No ✓

Power Source & Transmission		
Are there any grid station/ substation present in the project area?	Yes	No ✓
Is electric supply available to every commercial/ residential area?	Yes ✓	No
Do people use conventional sources? (Biomass, Coal, Wood, etc.)	Yes ✓	No

Occupation					
What are the major sources of employment?	Agriculture/Farming ✓	Livestock ✓	Cottage Industry	Labor 25%	Others

Education Facilities Available in the Study Area

Educational Facilities Available	Primary School	Middle School	High School	College	Vocational Training Centers	Deeni Madrassa	Others
Yes							
No				✓	✓		
Gov.	✓	✓	✓			✓	
Private	✓						

Institutional Facilities Available in the Study Area

Institutional Facilities Available	Hospital	Dispensary	Post Office	Mosque	Banks	Shrine	Others (Library, Gird Station, Water Filter Point)
Yes	✓		✓	✓			
No		✓			✓	✓	✓

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes	✓	✓		✓	✓			
No			✓		✓	✓	✓	✓
Remarks								

Who are the influential in the Study Area?			
Councilors ✓	Religious Scholars	Numberdar	Others:
Are you in favor of the Project?		Yes ✓	No
Remarks:			

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	9-12-2020
Name and Age of Respondent	Muhammad Hussain
Respondent's CNIC (If Available)	3890l-1151721-3
Respondent's Mobile No.	0301-4541787
Name of Village / Mouza	Nari
Union Council / Patwar Circle	Nari = UC = 11
Qanoongo Halqa / Tehsil	Khushab
District	Khushab
Common Languages Spoken	Punjabi
Approximate Population	30,000
Total Houses	5000
Location (GPS Coordinates)	Lat._____(N), Long._____(E)

PHYSICAL ENVIRONMENT

Type of The Project Area

Residential ✓	Agriculture	Commercial	Arid
Semi-Arid	Saline / Barren	Any Other:	

Drinking Water (Availability)

From Where obtain water? (please tick)	Govt. water supply scheme ✓	Private water supply	Motorized water pump with in house	Hand pump / Well ✓	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		
In case of water supply scheme then describe water supply hours			Morning_____ Afternoon ✓_____ Evening		
If water filter plant of source then how much is distance from your house?			_____km		

Who fetches water?	Adult Male	Adult Female	Children male	Children Female

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source _____Hrs.	
How much cost you pay per month for water	Source _____		Rs. _____	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ Distance (from Center of the Village)_____Km			
QUALITY OF DRINKING WATER IN GENERAL				
Do you think drinking water is appropriate for cooking purpose?			Yes.✓	No.
How the drinking water taste like? (please tick)	Sweet	Marginal	Brackish✓	Others
Color of drinking water (please tick)	Clean ✓Clear	Yellow	Dirty	Others
How this water smells? (please tick)	Good	Bad	Others..No Smell.	
If water is dirty then do you make it suitable for drinking? (please tick)			Yes.✓	No.
If yes, then what measure you take to clean (please tick)	Use alum	Filter it with cloth✓	Boils it	Others…
Willingness to pay for improved water supply? (please tick)	Yes.	No.	If yes, How much you can pay?	Rs. _____
Are you satisfied with the quality of water?			Yes.	No✓
Is there any water management system in the project area?			Yes	No✓
Remark:				
Water or Grey water reuse			Yes	No✓
Availability of any	Surface Drain✓		Storm Water Drains	
Are there any sewer mains present?			Yes	No✓
Are there any liquid effluents due to industrial/household?			Yes	No✓

Power Source & Transmission		
Are there any grid station/ substation present in the project area?	Yes	No ✓
Is electric supply available to every commercial/ residential area?	Yes ✓	No
Do people use conventional sources? (Biomass, Coal, Wood, etc.)	Yes ✓	No

Occupation					
What are the major sources of employment?	Agriculture/Farming	Livestock	Cottage Industry	Labor	Others

Education Facilities Available in the Study Area

Educational Facilities Available	Primary School	Middle School	High School	College	Vocational Training Centers	Deeni Madrassa	Others
Yes							
No					✓		
Gov.	✓	✓	✓	✓		✓	
Private	✓	✓	✓				

Institutional Facilities Available in the Study Area

Institutional Facilities Available	Hospital	Dispensary	Post Office	Mosque	Banks	Shrine	Others (Library, Gird Station, Water Filter Point)
Yes			✓	✓		✓	✓
No	✓	✓			✓		

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes	✓	✓	✓	✓				
No					✓	✓	✓	✓
Remarks								

Who are the influential in the Study Area?			
Councilors ✓	Religious Scholars	Numberdar	Others:
Are you in favor of the Project?		Yes	No
Remarks:			

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	
Name and Age of Respondent	Karam Ali age = 50 year
Respondent's CNIC (If Available)	38202-1920145O
Respondent's Mobile No.	0341-1803251
Name of Village / Mouza	Dadu wala.
Union Council / Patwar Circle	UC = 44
Qanoongo Halqa / Tehsil	Noor pur Thal
District	Khushab
Common Languages Spoken	Punjabi
Approximate Population	3500-4000
Total Houses	800-900-,
Location (GPS Coordinates)	Lat. 31° 37' 36" (N), Long. 71° 54' 42" (E)

PHYSICAL ENVIRONMENT			
Type of The Project Area			
Residential	Agriculture	Commercial	Arid
Semi-Arid	Saline / Barren	Any Other:	

Drinking Water (Availability)					
From Where obtain water? (please tick)	Govt. water supply scheme	Private water supply	Motorized water pump with in house	Hand pump / Well ✓	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		
In case of water supply scheme then describe water supply hours			Morning_____ Afternoon_____ Evening		
If water filter plant of source then how much is distance from your house?			_____km		
Who fetches water?	Adult Male	Adult Female	Children male	Children Female	

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source _____Hrs.
How much cost you pay per month for water	Source _____	Rs. _____	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ Distance (from Center of the Village)_____Km		
QUALITY OF DRINKING WATER IN GENERAL			
Do you think drinking water is appropriate for cooking purpose?		Yes.✓	No.
How the drinking water taste like? (please tick)	Sweet Marginal✓	Brackish	Others
Color of drinking water (please tick)	Clean / Clear✓ Yellow	Dirty	Others
How this water smells? (please tick)	Good Bad	Others..No Smell.	
If water is dirty then do you make it suitable for drinking? (please tick)		Yes.✓	No.
If yes, then what measure you take to clean (please tick)	Use alum Filter it with cloth✓	Boils it	Others…
Willingness to pay for improved water supply? (please tick)	Yes. No.✓	If yes, How much you can pay?	Rs. _____
Are you satisfied with the quality of water?		Yes.	No✓
Is there any water management system in the project area?		Yes	No
Remark:			
Water or Grey water reuse		Yes	No✓
Availability of any	Surface Drain	Storm Water Drains	
Are there any sewer mains present?		Yes	No ✓
Are there any liquid effluents due to industrial/household?		Yes	No✓

Power Source & Transmission		
Are there any grid station/ substation present in the project area?	Yes	No ✓
Is electric supply available to every commercial/ residential area?	Yes ✓	No
Do people use conventional sources? (Biomass, Coal, Wood, etc.)	Yes ✓	No

Occupation					
What are the major sources of employment?	Agriculture/Farming ✓	Livestock	Cottage Industry	Labor 50%	Others

Education Facilities Available in the Study Area							
Educational Facilities Available	**Primary School**	**Middle School**	**High School**	**College**	**Vocational Training Centers**	**Deeni Madrassa**	**Others**
Yes							
No			✓	✓	✓	✓	
Gov.	✓	✓					
Private							

Institutional Facilities Available in the Study Area							
Institutional Facilities Available	**Hospital**	**Dispensary**	**Post Office**	**Mosque**	**Banks**	**Shrine**	**Others (Library, Gird Station, Water Filter Point)**
Yes		✓		✓			
No	✓		✓		✓	✓	✓

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes				✓				
No	✓	✓	✓		✓	✓	✓	✓
Remarks								

Who are the influential in the Study Area?			
Councilors	Religious Scholars	Numberdar ✓	Others:
Are you in favor of the Project?		Yes ✓	No
Remarks:			

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	3-12-2020
Name and Age of Respondent	Qaiser Abbas.
Respondent's CNIC (If Available)	38202-1263003-5
Respondent's Mobile No.	0333-6075709.
Name of Village / Mouza	Shah Hussain
Union Council / Patwar Circle	~~Noorpur Thal~~ = UC = 47.
Qanoongo Halqa / Tehsil	Noorpur Thal
District	Khushab
Common Languages Spoken	Punjabi
Approximate Population	6000 - 7000
Total Houses	2020,
Location (GPS Coordinates)	Lat._____(N), Long._____(E)

PHYSICAL ENVIRONMENT			
Type of The Project Area			
Residential	Agriculture	Commercial	Arid
Semi-Arid	Saline / Barren	Any Other:	

Drinking Water (Availability)					
From Where obtain water? (please tick)	Govt. water supply scheme	Private water supply	Motorized water pump with in house	Hand pump / Well ✓	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		
In case of water supply scheme then describe water supply hours			Morning_____ Afternoon_____ Evening		
If water filter plant of source then how much is distance from your house?			_____km		

Who fetches water?	Adult Male	Adult Female	Children male	Children Female

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source _____Hrs.
How much cost you pay per month for water	Source _____	Rs. _____	
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ Distance (from Center of the Village)_____Km		
QUALITY OF DRINKING WATER IN GENERAL			
Do you think drinking water is appropriate for cooking purpose?		Yes ✓	No.
How the drinking water taste like? (please tick)	Sweet Marginal	Brackish ✓	Others
Color of drinking water (please tick)	Clean / Clear ✓ Yellow ✓	Dirty	Others
How this water smells? (please tick)	Good Bad	Others. No Smell	
If water is dirty then do you make it suitable for drinking? (please tick)		Yes ✓	No.
If yes, then what measure you take to clean (please tick)	Use alum Filter it with cloth ✓	Boils it	Others…
Willingness to pay for improved water supply? (please tick)	Yes. No.	If yes, How much you can pay?	Rs. _____
Are you satisfied with the quality of water?		Yes.	No.
Is there any water management system in the project area?		Yes	No ✓
Remark:			
Water or Grey water reuse		Yes	No ✓
Availability of any	Surface Drain	Storm Water Drains	
Are there any sewer mains present?		Yes	No ✓
Are there any liquid effluents due to industrial/household?		Yes	No ✓

Power Source & Transmission		
Are there any grid station/ substation present in the project area?	Yes	No ✓
Is electric supply available to every commercial/ residential area?	Yes ✓	No
Do people use conventional sources? (Biomass, Coal, Wood, etc.)	Yes ✓	No

Occupation					
What are the major sources of employment?	Agriculture/Farming	Livestock	Cottage Industry	Labor	Others

Education Facilities Available in the Study Area

Educational Facilities Available	Primary School	Middle School	High School	College	Vocational Training Centers	Deeni Madrassa	Others
Yes							
No				✓	✓	✓	
Gov.	✓	✓	✓				
Private							

Institutional Facilities Available in the Study Area

Institutional Facilities Available	Hospital	Dispensary	Post Office	Mosque	Banks	Shrine	Others (Library, Gird Station, Water Filter Point)
Yes		✓	✓	✓	✓		
No	✓						✓

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes	✓	✓		✓				
No			✓		✓	✓	✓	✓
Remarks								

Who are the influential in the Study Area?			
Councilors	Religious Scholars	Numberdar ✓	Others:
Are you in favor of the Project?		Yes ✓	No
Remarks:			

Questionnaire for Socio-Environmental Baseline Survey
Punjab Aab-e-Pak Authority

BASIC INFORMATION OF STUDY AREA	
Date and Time of Interview	
Name and Age of Respondent	Jamsheed Khan
Respondent's CNIC (If Available)	-
Respondent's Mobile No.	0344 - 8185581
Name of Village / Mouza	Borana wala
Union Council / Patwar Circle	UC 47
Qanoongo Halqa / Tehsil	Noorpur Thal
District	Khushab
Common Languages Spoken	Punjabi
Approximate Population	7500
Total Houses	1500 - 1800
Location (GPS Coordinates)	Lat._____(N), Long._____(E)

PHYSICAL ENVIRONMENT			
Type of The Project Area			
Residential	Agriculture	Commercial	Arid
Semi-Arid	Saline / Barren	Any Other:	

Drinking Water (Availability)					
From Where obtain water? (please tick)	Govt. water supply scheme	Private water supply	Motorized water pump with in house	Hand pump / Well ✓	Water Filter Plant
Water Tanker	Stream	Canal	Other, please specify		
In case of water supply scheme then describe water supply hours			Morning_____ Afternoon_____ Evening		
If water filter plant of source then how much is distance from your house?			_____km		

Who fetches water?	Adult Male	Adult Female	Children male	Children Female

Time spend on fetching per day	From filtration plant _____Hrs.	From water tanker _____Hrs.	From other source Hrs.	
How much cost you pay per month for water	Source _____	Rs. _____		
In case of no water supply in village then tell about nearby scheme / source of water	Direction_ Distance (from Center of the Village)_____Km			
QUALITY OF DRINKING WATER IN GENERAL				
Do you think drinking water is appropriate for cooking purpose?		Yes✓	No.	
How the drinking water taste like? (please tick)	Sweet Marginal	Brackish✓	Others	
Color of drinking water (please tick)	Clean / Clear Yellow✓	Dirty	Others	
How this water smells? (please tick)	Good Bad	Others.. Smell		
If water is dirty then do you make it suitable for drinking? (please tick)		Yes✓	No.	
If yes, then what measure you take to clean (please tick)	Use alum Filter it with cloth✓	Boils it	Others...	
Willingness to pay for improved water supply? (please tick)	Yes. No.	If yes, How much you can pay?	Rs. _____	
Are you satisfied with the quality of water?		Yes.	No✓	
Is there any water management system in the project area?		Yes	No	
Remark:				
Water or Grey water reuse		Yes	No✓	
Availability of any	Surface Drain	Storm Water Drains		
Are there any sewer mains present?		Yes	No✓	
Are there any liquid effluents due to industrial/household?		Yes	No✓	

Power Source & Transmission		
Are there any grid station/ substation present in the project area?	Yes	No ✓
Is electric supply available to every commercial/ residential area?	Yes ✓	No
Do people use conventional sources? (Biomass, Coal, Wood, etc.)	Yes ✓	No

Occupation					
What are the major sources of employment?	Agriculture/Farming	Livestock	Cottage Industry	Labor	Others

Education Facilities Available in the Study Area

Educational Facilities Available	Primary School	Middle School	High School	College	Vocational Training Centers	Deeni Madrassa	Others
Yes							
No				✓	✓	✓	
Gov.	✓	✓	✓				
Private							

Institutional Facilities Available in the Study Area

Institutional Facilities Available	Hospital	Dispensary	Post Office	Mosque	Banks	Shrine	Others (Library, Gird Station, Water Filter Point)
Yes			✓	✓			
No	✓	✓			✓	✓	✓

Civic Facilities Available	Public Water Supply	Lined Drainage System	Solid Waste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes				✓				
No	✓	✓	✓		✓	✓	✓	✓
Remarks								

Who are the influential in the Study Area?			
Councilors	Religious Scholars	Numberdar ✓	Others:
Are you in favor of the Project?		Yes ✓	No
Remarks:			

Questionnaire for Socio-EnvironmentalBaseline Survey
Punjab Aab-e-Pak Authority

BASICINFORMATIONOF STUDYAREA	
DateandTime ofInterview	12-12-2020.
NameandAgeofRespondent	M. Naseem
Respondent's CNIC(IfAvailable)	
Respondent's Mobile No.	0307-7172160.
NameofVillage/Mouza	Tibbi
Union Council /PatwarCircle	
QanoongoHalqa/Tehsil	Piplan
District	Mianwali
CommonLanguages Spoken	Punjabi
ApproximatePopulation	11,000
TotalHouses	3000.
Location (GPS Coordinates)	Lat. 32 28 19 (N), Long. 71 33 53 (E)

PHYSICAL ENVIRONMENT					
Type ofThe ProjectArea					
Residential	Agriculture ✓		Commercial	Arid	
Semi-Arid	Saline /Barren		AnyOther:		
DrinkingWater (Availability)					
FromWhere obtain water? (please tick)	Govt. water supply scheme	Privatewater supply	Motorized water pump with in house ✓	Hand pump/ Well	WaterFilter Plant
WaterTanker	Stream	Canal	Other,please specify		
In caseofwatersupplyschemethen describe watersupplyhours ✗			Morning _____ Afternoon_____		
Ifwaterfilterplantofsourcethen howmuch is distancefromyourhouse? ✗			_____km		

Whofetcheswater? ✗	AdultMale	AdultFemale	Children male	Children Female

Annexure 6.1

Timespendonfetching perday X	Fromfiltration plant _____Hrs.	Fromwatertanker _____Hrs.	Fromothersource _____Hrs.	
Howmuch costyou pay permonthforwater	Source ~~Canal~~		Rs._____	
In caseofnowater supply in village then tell aboutnearby scheme/sourceof water	Direction 235° SW Distance (fromCenteroftheVillage) Canal - 300m Km			
QUALITY OF DRINKINGWATER IN GENERAL				
Do you think drinkingwaterisappropriateforcookingpurpose?			Yes.	No.
Howthe drinking water taste like?(pleasetick)	Sweet	Marginal	Brackish	Others
Colorofdrinking water (please tick)	Clean /Clear	Yellow	Dirty	Others
Howthiswatersmells? (please tick)	Good	Bad	Others...	
Ifwaterisdirtythendo you make itsuitablefordrinking? (please tick) Clean water.			Yes.	No.
Ifyes,then what measureyou taketo clean (pleasetick)	Use alum	Filteritwith cloth	Boilsit	Others...
Willingnesstopayfor improved watersupply? (please tick)	Yes.	No.	Ifyes,How much you can pay?	Rs._____
Are you satisfiedwith thequalityofwater?			Yes.	No.
Isthereanywatermanagementsysteminthe projectarea?			Yes	No
Remark:				
WaterorGreywaterreuse			Yes	No
Availabilityofany No		Surface Drain	StormWaterDrains	
Are there anysewermains present?			Yes	No
Are there any liquideffluentsdueto industrial/household?			Yes	No

Annexure 6.1

PowerSource &Transmission						
Are there anygrid station/substation presentin the project area?				Yes	No ✓	
Iselectricsupplyavailable toeverycommercial/residential area?				Yes ✓	No	
Do people use-conventional sources?(Biomass,Coal,Wood, etc.)				Yes	No ✓	
Occupation						
Whatarethe majorsourcesof employment?	Agriculture/Farming	Livestock	CottageIndustry	Labor ✓	Others	

Education Facilities Availableinthe Study Area							
Educational Facilities Available	**Primary School**	**Middle School**	**High School**	**College**	**Vocational Training Centers**	**Deeni Madrassa**	**Others**
Yes							
No				✓	✓	✓	
Gov.	✓		✓				
Private		✓					

InstitutionalFacilitiesAvailableinthe StudyArea							
Institutional Facilities Available	**Hospital**	**Dispensary**	**PostOffice**	**Mosque**	**Banks**	**Shrine**	**Others (Library, Gird Station, Water Filter Point)**
Yes				✓		✓	
No	✓	✓	✓		✓		✓

Annexure 6.1

Civic Facilities Available	Public Water Supply	Lined Drainage System	SolidWaste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes				✓				✓
No	✓	✓	✓		✓	✓	✓	
Remarks								

Whoarethe influentialin theStudyArea?

Councilors ✓	ReligiousScholars	Numberdar ✓	Others:
Are you infavoroftheProject?		Yes ✓	No

Remarks:

Questionnaire for Socio-EnvironmentalBaseline Survey
Punjab Aab-e-Pak Authority

BASICINFORMATIONOF STUDYAREA					
DateandTime ofInterview					
NameandAgeofRespondent	بذا رسول پراچہ 50 Year				
Respondent's CNIC(IfAvailable)	38302-1070721-3				
Respondent's Mobile No.	0308-6822197				
NameofVillage/Mouza	نیو ماڑی انڈس				
Union Council /PatwarCircle	ماڑی ~~میانوالی~~				
QanoongoHalqa/Tehsil	میانوالی				
District	میانوالی				
CommonLanguages Spoken	سرائیکی				
ApproximatePopulation	4000				
TotalHouses	1200				
Location (GPS Coordinates)	Lat._____(N), Long._____(E)				
PHYSICAL ENVIRONMENT					
Type ofThe ProjectArea					
Residential ✓	Agriculture		Commercial	Arid	
Semi-Arid	Saline /Barren		AnyOther:		
DrinkingWater (Availability)					
FromWhere obtain water? (please tick)	Govt. water supply scheme ✓	Privatewater supply	Motorized water pump with in house	Hand pump/ Well	WaterFilter Plant
WaterTanker	Stream	Canal	Other,please specify		
In caseofwatersupplyschemethen describe watersupplyhours			Morning گھنٹے 4 Afternoon گھنٹے 4		
Ifwaterfilterplantofsourcethen howmuch is distancefromyourhouse?			X km		

Whofetcheswater?	AdultMale	AdultFemale ✓	Children male	Children Female

Annexure 6.1

Civic Facilities Available	Public Water Supply	Lined Drainage System	SolidWaste Management	Electricity	Gas	Commercial Shops	Telephone	Others (Fire Brigade, 1122 Rescue, Edhi Center, Fuel Station)
Yes	✓			✓		✓	✓	✓
No		✓	✓		✓			
Remarks								

Whoarethe influentialin theStudyArea?			
Councilors ✓	ReligiousScholars	Numberdar	Others:
Are you infavoroftheProject?		Yes ✓	No
Remarks:			

PowerSource &Transmission						
Are there anygrid station/substation presentin the project area?				Yes	No	
Iselectricsupplyavailable toeverycommercial/residential area?				Yes	No	
Do people use conventional sources?(Biomass,Coal,Wood, etc.)				Yes	No	
Occupation						
Whatarethe majorsourcesof employment?	Agriculture/Farming	Livestock	CottageIndustry	Labor	Others	
Education Facilities Availableinthe Study Area						

Educational Facilities Available	Primary School	Middle School	High School	College	Vocational Training Centers	Deeni Madrassa	Others
Yes	✓	✓	✓	✓		✓	
No							
Gov.	✓	✓	✓	✓			
Private				✓		✓	

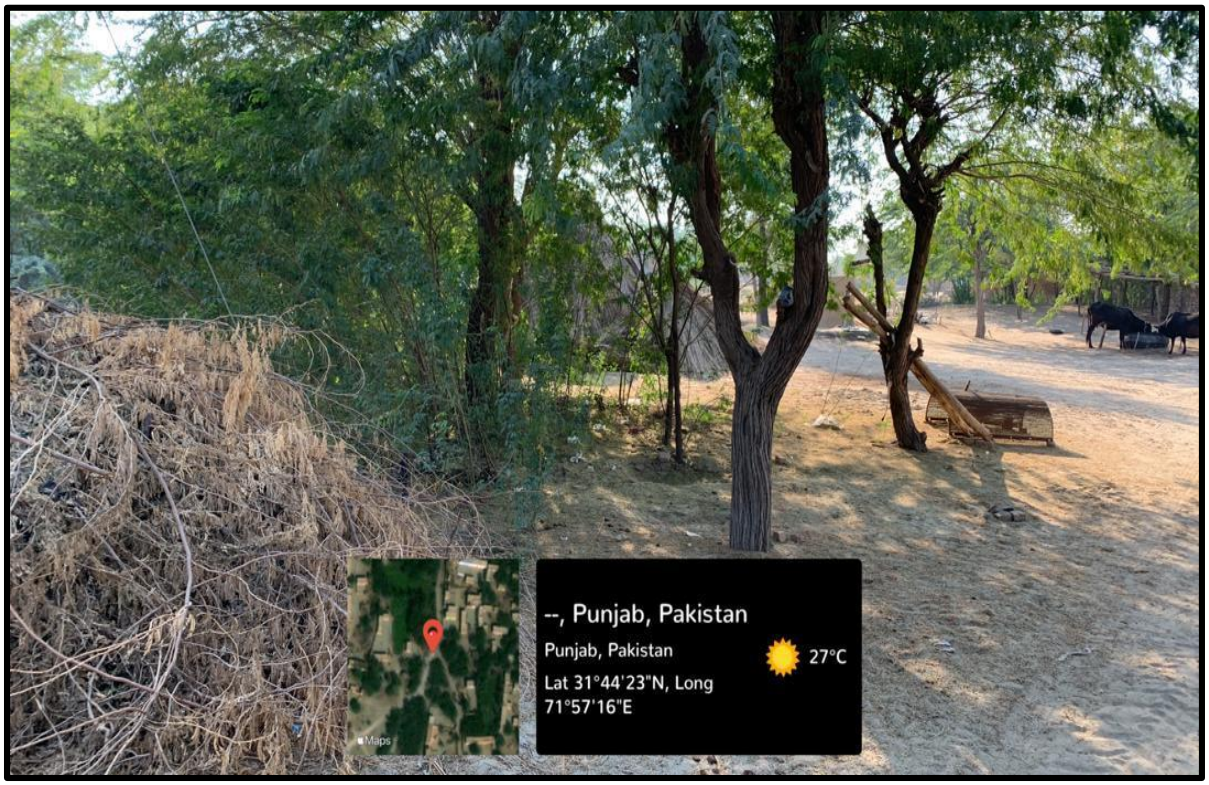
InstitutionalFacilitiesAvailableinthe StudyArea							
Institutional Facilities Available	Hospital	Dispensary	PostOffice	Mosque	Banks	Shrine	Others (Library, Gird Station, Water Filter Point)
Yes		✓	✓	✓			Grid station
No							

Timespendonfetching perday	Fromfiltration plant _____Hrs.	Fromwatertanker _____Hrs.	Fromothersource _____Hrs.	
Howmuch costyou pay permonthforwater	Source _____		Rs._____	
In caseofnowater supply in village then tell aboutnearby scheme/sourceof water	Direction_ Distance (fromCenteroftheVillage)_____Km			
QUALITY OF DRINKINGWATER IN GENERAL				
Do you think drinkingwaterisappropriateforcookingpurpose?			Yes.	No.
Howthe drinking water taste like?(pleasetick)	Sweet ✓	Marginal	Brackish	Others
Colorofdrinking water (please tick)	Clean /Clear ✓	Yellow	Dirty	Others
Howthiswatersmells? (please tick)	Good ✓	Bad	Others...	
Ifwaterisdirtythendo you make itsuitablefordrinking? (please tick)			Yes.	No.
Ifyes,then what measureyou taketo clean (pleasetick)	Use alum	Filteritwith cloth	Boilsit	Others...
Willingnesstopayfor improved watersuppiy? (please tick)	Yes.	No. ✓	Ifyes,How much you can pay?	Rs._____
Are you satisfiedwith thequalityofwater?			Yes.	No.
Isthereanywatermanagementsysteminthe projectarea?			Yes	No
Remark:				
WaterorGreywaterreuse			Yes	No
Availabilityofany		Surface Drain	StormWaterDrains	
Are there anysewermains present?			Yes	No
Are there any liquideffluentsdueto industrial/household?			Yes	No

Annexure-VII

PHOTO LOG

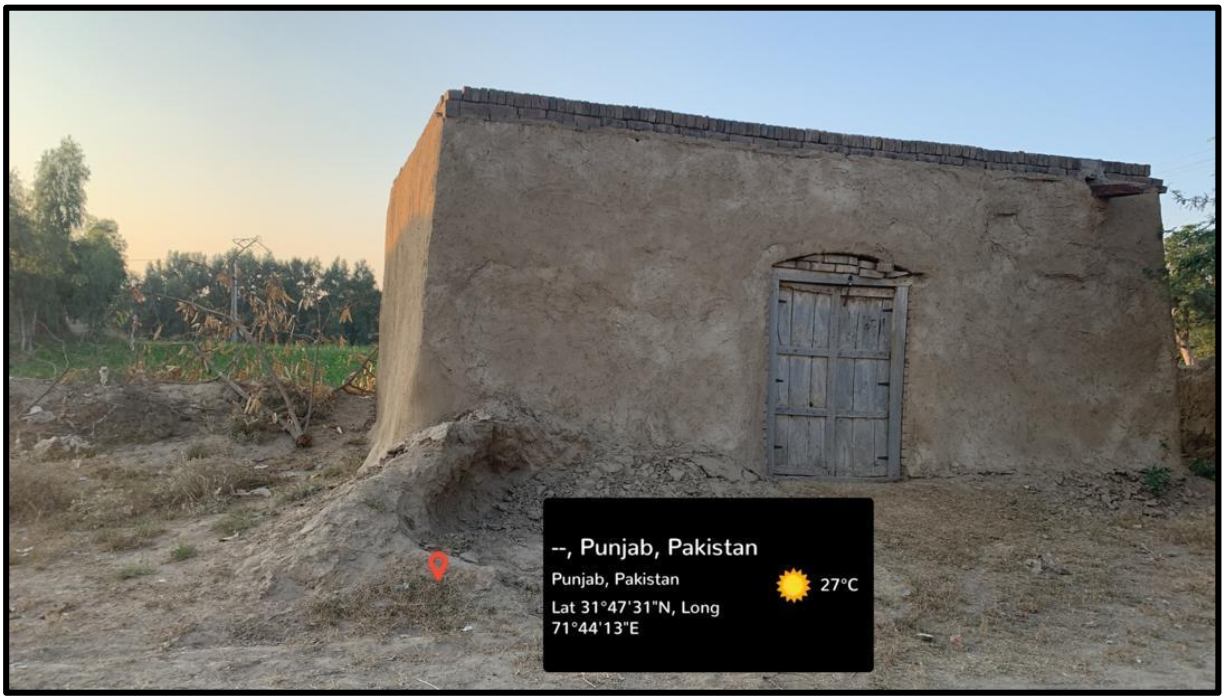
Proposed site for installation of RO Plant in Village Chak 46, Khushab District, Pakistan



Proposed site for installation of RO plant in village Bambool, Khushab District, Pakistan

Visual Representation of Flora within the project Vicinity

Proposed site for RO filtration plant in Chassu Wala, District Khushab, Pakistan

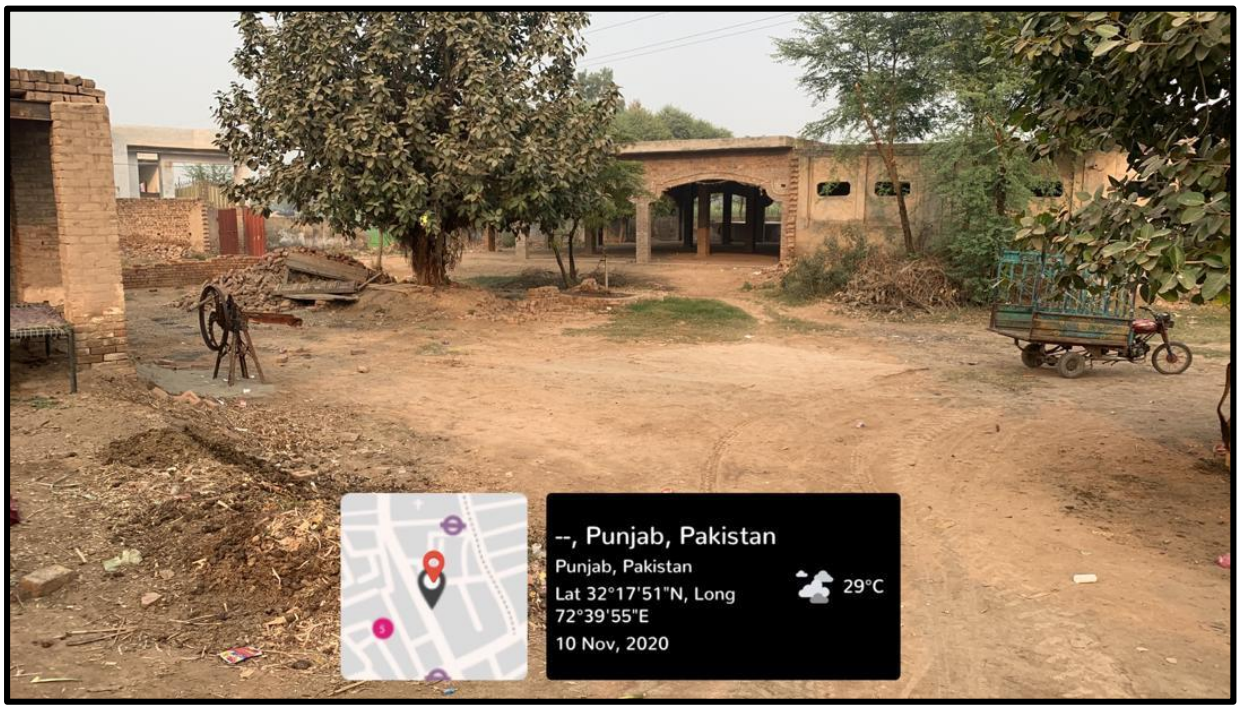


Proposed site for installation of S/AC plant in Maikan, KHsushab district, Pakistan

Government school in the vicinity of the aforesaid project

Proposed land for installation of S/AC filter in village Dala Mer Wala Pur, Mianwali district, Pakistan

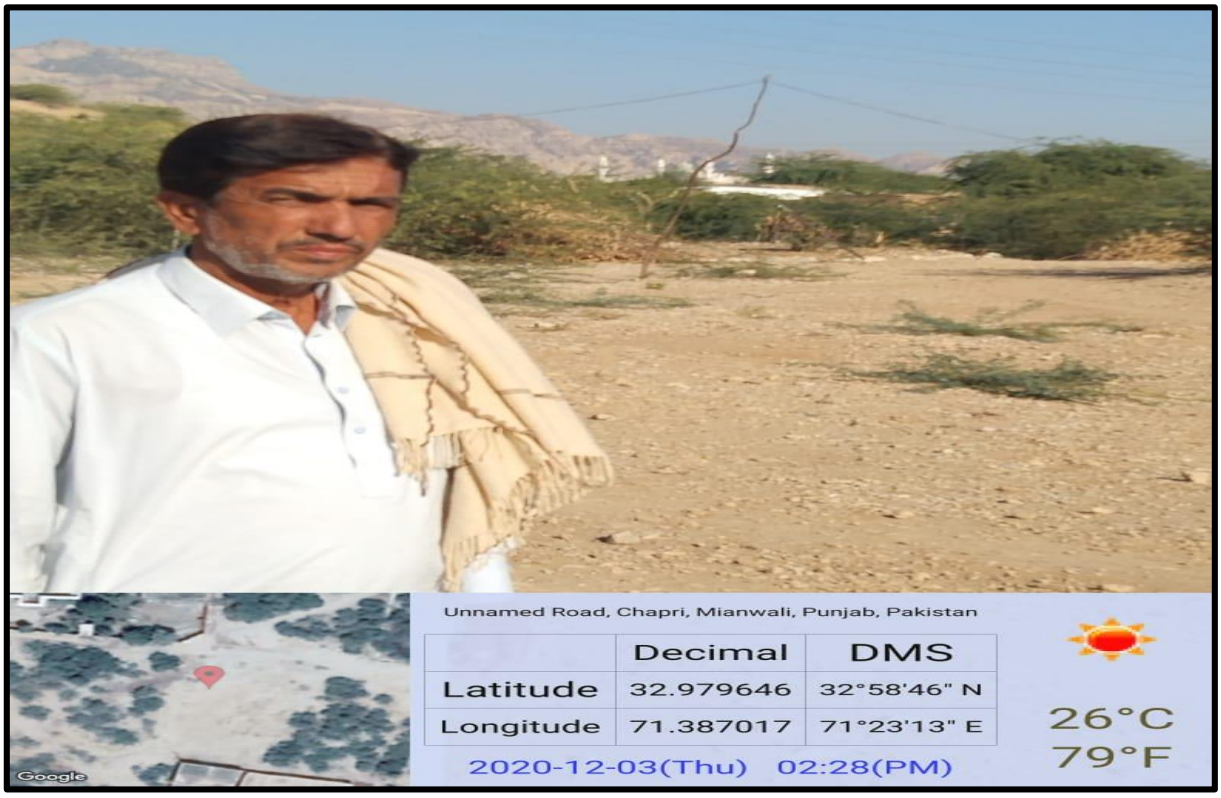
Proposed site for installation of RO plant in Village Nawabpur, District Sargodha, Pakistan



Imambargah in the vicinity of village Manke Wala in District Sargodha, Pakistan

Proposed site for installation of S/AC filter with Chlorination in village Chitta Watta, District Mianwali, Pakistan

Public Consultation with PHED (XEN)



Proposed site for S/AC filtration plant with Chlorination in village Chapri, District Mianwali, Pakistan

Consultation with Local Residents Regarding Aforesaid Project

Consultation with Local Residents Regarding Aforesaid Project

Consultation with local residents regarding aforesaid project

Consultation with local residents regarding aforesaid project

Visual representation of TDS analysis of water via TDS meter at the project site

Consultation with local residents regarding aforesaid project

Visual of Village Musa Khel, Ddistrict Mianwali, Pakistan

Visual of Elementary School of Village Gole Wali, District Khushab