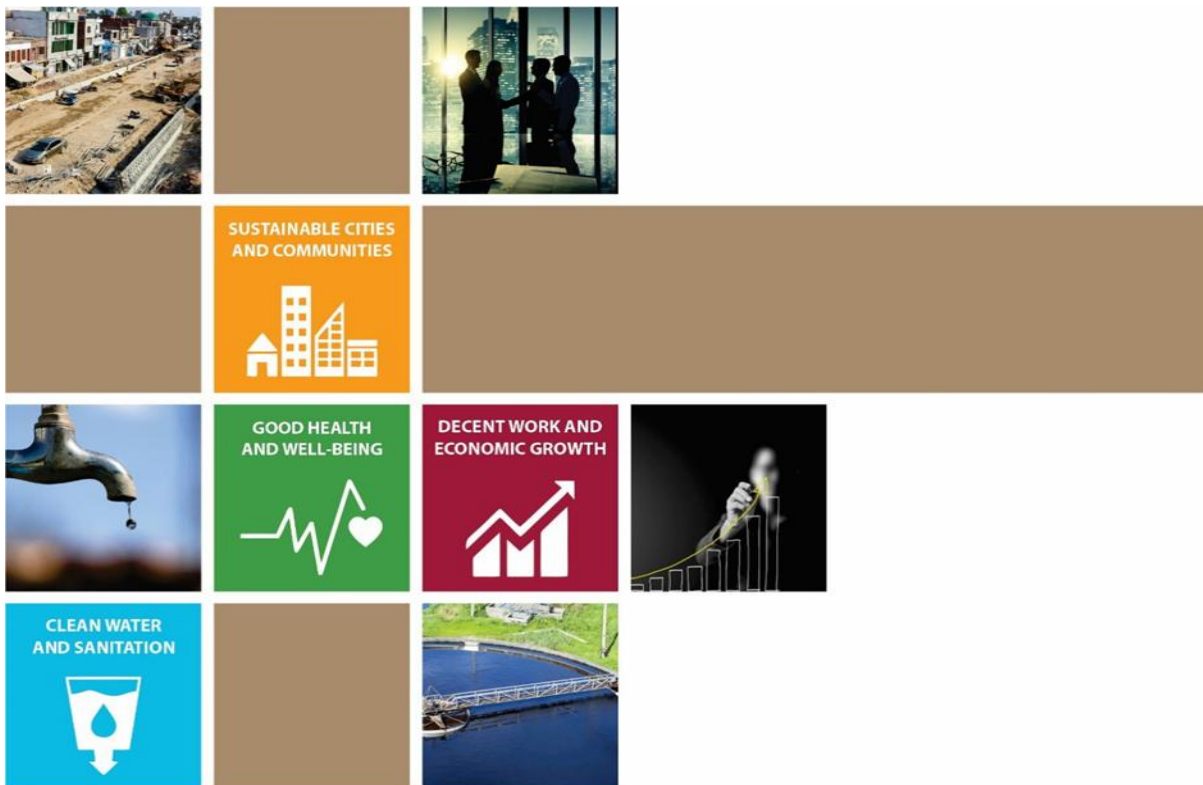


Detailed Design of Infrastructure Sub-Projects, Sectoral Planning and Resident Supervision in 16 Cities of Punjab (Package V)

COMPREHENSIVE SEWAGE SYSTEM IN OKARA CITY



Environmental and Social Impact Assessment

October 2023

Punjab Municipal Development Finance Company



COMPREHENSIVE SEWAGE SYSTEM IN OKARA CITY

October 2023



MM Pakistan (Pvt.) Limited, Registered in Pakistan No. K-527/9363
Headquarters at Lahore,
Regional Offices at Islamabad, Karachi and Peshawar

Issue and Revision Record

MMP-U&I- PCP-Reports-1076-261-2023

Rev	Date	Originator	Checked	Approved	Description
00	October 2023	Moazzam Ali Muhammad Saqib Siddiq Ms. Shazia Ihsan	Dr. Muhammad Ashraf Bodla	Iftekhar Ahmed (Team Leader P-5)	Draft

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List of Abbreviations

Acronym	Definition
AFB	Aerobic Fluidized Bed
BOD	Bio-chemical Oxygen Demand
CC	Construction Contractor
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CSTR	Continuous Stirred Tank Reactor
DB (A)	Decibel
DC	Design Consultant
DO	Dissolved Oxygen
EGSB	Expanded Granular Sludge Bed
EIA	Environmental Impact Assessment
ESMP	Environmental Management Plan
EPA	Environment Protection Agency
EPD	Environment Protection Department
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FFB	Fixed Film Bioreactor
GOP	Government of Pakistan
IEE	Initial Environmental Examination
Km	kilometer
MBR	Membrane Bioreactor
MC	Municipal Committee
NEQS	National Environmental Quality Standards
NOC	No Objection Certificate
NO _x	Nitrogen Oxides
NSL	Natural Surface Level
°C	Degree Centigrade
OLR	Organic Loading Rate
PbEPA	Punjab Environmental Protection Act
PMDFC	Punjab Municipal Development Fund Company
PM	Particulate Matter
RBC	Rotating Biological Contactors
SBR	Sequencing Batch Reactor
SRT	Solid Retention Time
SC	Supervision Consultant
SO _x	Sulfur Oxides
TA	Technical Assistance
TPH	Ton per hour
TSS	Total Suspended Solids
UASB	Upflow Anaerobic Sludge Bed
UBF	Upflow Bed Filter
UC	Union Council
WHO	World Health Organization

Executive Summary

Purpose and Need of the Proposed Action

This Environmental and Social Impact Assessment (ESIA) has been prepared for improvement of sewerage system in Okara City. This involves the rehabilitation & replacement of existing sewerage facilities in Okara, and construction of existing sewerage treatment plant. The World Bank through the Punjab Municipal Development Fund Company (PMDFC) has funded the subproject, and it will be implemented by the Municipal Committee Okara. The construction and rehabilitation works will be supervised by consultants appointed by PMDFC. The Proponent of the project i.e., PMDFC entrusted MM Pakistan with the assignment of carrying out an ESIA of the proposed subproject.

The ESIA study aims at the identification of the possible environmental and social impacts of the proposed subproject on its immediate surroundings on both short and long-term basis, suggesting mitigation measures and identifying the responsible agencies to implement those measures. The overall objective of the proposed subproject is to provide basic utility to the residents and to improve the existing environmental conditions of the subproject area.

The scope of the ESIA Study includes environmental assessment of the subproject including collection and scrutiny of data related to physical, biological and socio-economic environment, assessment of impacts which may be caused by the project activities and mitigation measures for the abatement of potential environmental impacts along with the estimate of mitigation cost.

Background and History

The specific objectives of the ESIA are to: Okara is about 127km to the south-west of Lahore on the National Highway and on the main Lahore-Karachi railway track. Okara spreads between latitudes of 30°18' to 30°8' North, and the longitudes of 73°14' to 74°09' East. The current population of the city is 466,852 and the projected population by the year 2032 is 764,459.

Okara sewerage system covers about 70% population. The existing system consists of lateral sewers, mains, trunk sewers and disposal stations. No waste water treatment plant (WWTP) exists in Okara city.

Punjab Municipal Development Finance Company (PMDFC) has proposed the establishment of a waste water treatment plant (WWTP) at Okara city with the financial support of the World Bank (WB). The treatment facility will receive the municipal waste water generated from southern part of Okara City through a main sewer line and after treatment will dispose it of in the Sukhera Drain. The project will be supervised by Municipal Committee Okara.

In order to ensure that all project activities to be implemented under the project are environmentally sound and socially acceptable, an environmental and social assessment has been carried out as per World Bank OP 4.01. Environmental & Social Screening Checklist and Involuntary Resettlement Checklist were used to categorize the project and as per the Environmental and Social Management Framework (ESMF) under Punjab Cities Program (PCP), the proposed project is categorized as E-1 and S-1 that require preparation of ESIA. Moreover, according to the PEPA, Review of IEE/EIA Regulations 2022, the proposed project is included under Clause F (3) "Water Supply, Sewerage System and Treatment" of Schedule-II; that requires to develop an EIA (ESIA) and its subsequent approval/NOC from the competent forum.

- Provide information to existing environmental and social issues with regards to the activities to be implemented at the pre-construction, construction and operation phases of the proposed project.

- Identify the project impacts on the physical, biological and socio-economic environments.
- Propose suitable mitigation measures for potentially adverse environmental and social impacts through documenting a comprehensive Environmental and Social Management Plan (ESMP) for the project and a viable Monitoring Plan for evaluating ESMP implementation.
- Define the specific actions required, roles and responsibilities for these actions, and associated costs.

Legislative Requirement of ESIA Study for the Proposed Action

The Government of Pakistan and Government of Punjab have enacted a range of laws, regulations, policies and procedures for management and mitigation of social and environmental impacts for infrastructure development projects.

Each proposed subproject is scrutinized as to its type; location; the sensitivity, scale, nature, and magnitude of its potential environmental impacts; and availability of cost-effective mitigation measures. According to the **PEPA, Review of IEE/EIA Regulations 2022, Clause F “Water Supply, Sewerage System and Treatment” of Schedule-II**; proposed subproject requires to develop an EIA (ESIA) and its subsequent approval/NOC from the competent forum.

This is mandatory according to the Pakistan Environmental Protection Act (PEPA-1997). Section 12(1) of the PEPA, 1997 which states that:

“No proponent of a Project shall commence construction or operation unless he has filed with the Federal Agency an initial environmental examination or, where the Project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained approval from the Federal Agency in respect thereof.”

The Policy Core Principles of World Bank states that environmental assessment requirements for projects depend on the significance of environmental impacts.

Environment & Social Assessment Categories

Environmental Categories:

Depending on size, cost, location and the nature, scheme will have varying impacts on city's environment. The rigorousness of environmental assessment requires identifying and mitigating the impacts, largely dependent upon the complexities of scheme. To facilitate effective screening, Environmental and Social Framework (ESMF) for the project categorized schemes into three categories viz. E-1, E-2 and E-3.

- **E-1** schemes are those wherein major environmental impacts are foreseen;
- **E-2** schemes are expected to have only moderate environmental impacts; and
- **E-3** schemes are the schemes with negligible environmental impacts and hence, these can be termed as “environmentally benign”.

Social Categories

Based on the number of households that may be affected by the scheme, i.e., Affected Households (AHs) and magnitude of impacts, schemes are categorized as S-1, S-2 and S-3.

- **S-1** schemes are those schemes that will impact more than 40 households, and are expected to have significant negative social consequences;
- **S-2** schemes are those which will impact less than 40 households and are expected to have significant social consequences affecting local inhabitants; and
- **S-3** schemes are not expected to have any significant adverse social impacts.

Type and Category of Sub-Project

- This ESIA is developed for proposed subproject “Improvement of Sewerage System in Okara City and Construction of WWTP. The current subproject requires an ESIA report for its environmental approval under section 12 of the PEPA Act 1997 (amended 2012 & 2017). ESIA is a systematic identification and evaluation of potential impacts of proposed projects, plans, programs or legislative actions relative to the physical, chemical, biological, cultural and socio-economic components of the environment followed by mitigation measures in the form of Environmental and Social Management and Monitoring Plan (ESMMP) to ascertain the EPA Punjab requirements:
- As per the ESMF under PCP, the sub-projects are environmentally categorized in E1, E2 and E3 categories and socially characterized in S1, S2 and S3 categories based on the magnitude and severity of the environmental and social impacts of the sub-project.
- Based on the environmental and social impacts, proposed subproject “Improvement of Sewerage System in Okara City and Construction of WWTP is categorized as E-1 and S-1. Environmental & Social Screening Checklist and Involuntary Resettlement Checklists is attached as **Annexure-F**, for new construction of wastewater treatment plant, ESIA has to be prepared, according to Punjab EPA Review of IEE/EIA, Schedule (II) F (3), 2022.

Methodology

The study has been conducted using standard environmental assessment methodology in accordance with national and international environmental guidelines. The study evaluates the proposed subproject according to the Environmental Impact Assessment requirements established by Punjab Environmental Protection Agency. The contents of this report conform to Pb EPA IEE, EIA Regulations, 2022. To produce a quality report, a proper methodology was established as follows:

- Planning was carried out to assess data requirements and their sources; time schedules and responsibilities for their collection; logistics and facilitation needs for the execution of the data acquisition plan;
- Primary and secondary data were collected through observations during the field survey, environmental monitoring in the field and published materials to establish baseline profile for physical, biological and socio-economic environmental conditions;
- The impacts of the subproject on the physical, biological and socio-economic environment prevalent in the subproject area were visualized at the design, construction and operational phases; and
- The adequate mitigation measures and implementation mechanisms were proposed so that the proponent could incorporate them beforehand in the design phase.

Alternatives to the Proposed Action

Different options have been studied to conclude a reasonable and safe solution to the problems associated with project interventions. These options are mentioned hereunder:

- No Action alternative
- Site alternatives
- Municipal Wastewater Treatment Technologies alternatives
- Alternatives of replacement and rehabilitation works.

In case of implementation of no action alternative of the subproject, the sewerage issues will remain un-resolved, accordingly, the no-action alternative of the subproject has not been considered. The existing area for wastewater treatment has no alternative as the existing land is government owned and shifting treatment facility to another area will involve land acquisition that is not cost effective. Moreover, shifting the sewer lines to new area will require new corridor that would need further environmental and social assessment in addition to land acquisition.

Typical conventional anaerobic–aerobic treatment systems that are commercially used are; aerated stabilization ponds, aerated and non-aerated lagoons, as well as natural and artificial wetland systems. All these systems have some merits and demerits. It is clear from the different wastewater treatment technology combinations that there is still a lot of research in terms of the most optimal process configuration/s, i.e., anaerobic/aerobic bioreactor types and the coupling of the bioreactors with the membrane modules, need/s to be investigated. This includes process conditions, material of construction, prevention/reduction of fouling in membranes and others. These technologies need high costs and skilled operators so the existing option to expand the existing WWTP is most suitable option.

Environment and Social Assessment

The environment was assessed based on physical, biological and socio-economic attributes of the subproject's area of influence. The physical attributes include: geology and 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 and family structure and other socio-economic features. Air, water and noise monitoring was carried out to determine the base line condition of the area.

Environmental Consequences

The impacts on the physical, biological and socio-economic environment of the subproject area were identified for the pre-construction, construction and operational phases of the subproject. Characterization was done on the basis of significance, probability and prevalence of the potential impacts in the surrounding environment. The potential impacts in the construction phase will be r soil, surface water, ground water, air quality, noise, solid/construction waste, wastewater/sludge, cultural heritage, occupational health & safety, community health and safety, traffic management, ecological disturbances, employment opportunities. At the operation phase, the potential impacts are anticipated to be positive.

Environment & Social Management & Monitoring Plan (ESMMP)

An ESMMP has been prepared to address all the major environmental issues during the preconstruction, construction operational and decommissioning phases of the subproject. Targets to be achieved and mitigation measures to meet those targets have also been detailed in the ESMMP. The ESMMP should be carefully implemented keeping in view of mitigation measures and coordinated with the design and construction program of the subproject to ensure that Best Management Practices are implemented for the subproject execution.

Main Concerns of the Community

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

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

It is also suggested in the ESMMP to maintain a complaint register to file the grievances and resolve public complaints and to take necessary actions to avoid issues in the future. Grievance Redress Mechanism (GRM) is to provide a robust system of procedures and processes that provides for transparent and rapid resolution of concerns and complaints identified at the local level. At MC level the GRC comprising of the following will be constituted:

Deputy Program Officer (Environmental & Social Management)	Chairperson & Convener
Deputy Program Officer (Infrastructure Development)	Member
Deputy Program Officer (Institutional Strengthening)	Member

For integration of GRM into Complaint Tracking System (CTS), a Grievance Redress Committee (GRC) at project level will under umbrella of Punjab Cities Program (PCP) will also be constituted that will be headed by the Secretary LG & CDD. This committee will be responsible to oversee the overall functions of the GRM at a strategic level including monthly review of grievances.

Conclusion and Recommendations

In conclusion, the rehabilitation of existing sewerage system, laying of new sewerage lines and construction of Waste water Treatment Plant will be beneficial for the residents of Okara city in addition to improving the environmental quality of the area. 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). ESMMP should be the part of the contract document and should be implemented in totality. A critical element will be the sustained involvement of all stakeholders during the construction and of the subproject for its timely completion and successful functioning. The subproject is environmentally safe and socially viable for implementation.

1 Introduction

1.1 General

This Report deals with Environmental and Social Impact Assessment (ESIA) for Comprehensive Sewage System in Okara City. The ESIA study is carried out to comply with National Environmental Regulations as well as World Bank's safeguard requirements. The main objective of the ESIA Report is to identify the potential environmental impacts of the proposed subproject and to suggest suitable mitigation measures for sustainable development of the subproject.

1.2 Sub-Project Background

Okara is about 127km to the south-west of Lahore on the National Highway and on the main Lahore-Karachi railway track. Okara spreads between latitudes of 30°48'29.02" N and 73°26'44.99" E. The current population of the city is 425,223 and the projected population¹ by the year 2035 is 574,130.

Okara sewerage system covers about 70% population. The existing system consists of lateral sewers, mains, trunk sewers and disposal stations. No waste water treatment plant (WWTP) exists in Okara city.

Punjab Municipal Development Finance Company (PMDFC) has proposed the establishment of a comprehensive sewage system in Okara City with the financial support of the World Bank (WB). The system will be comprised of laying of RCC sewer lines and establishment of a wastewater treatment plant. The project will be supervised by Municipal Committee Okara.

In order to ensure that all project activities to be implemented under the project are environmentally sound and socially acceptable, an environmental and social assessment has been carried out as per World Bank OP 4.01. Environmental & Social Screening Checklist and Involuntary Resettlement Checklist were used to categorize the project and as per the Environmental and Social Management Framework (ESMF) under Punjab Cities Program (PCP), the proposed project is categorized as E-1 and S-1 that require preparation of ESIA report. Moreover, according to the Punjab Environmental Protection Agency (Pb. EPA), Review of IEE/EIA Regulations 2022, the proposed project is included under Clause F (3) "Water Supply, Sewerage System and Treatment" of Schedule-II; that requires to develop an EIA (ESIA) and its subsequent approval/NOC from the competent forum.

1.3 Okara Sewerage Delivery Level

The coverage of the sewerage facility is approximately 50%. Of the remaining 50%, 25% is served with an open drain, while the other 25% is totally un-served. There is currently no sewerage treatment. Municipal Wastewater is being disposed through sewerage system. The storm drainage system also exists in the city. Untreated waste water is being utilized by the nearest farmers and remaining is disposed of into seepage drains and in to LBDC. Tehsil Municipal Administration (TMA), Okara also sale out waste water at two places.

1.4 Requirement of ESIA Study for the Proposed Action

EIA is mandatory according to the Pakistan Environmental Protection Act (PEPA), 1997. Section 12(1) of the PEPA, 1997 which states that:

¹ <https://worldpopulationreview.com/world-cities/okara-population>

“No proponent of a Project shall commence construction or operation unless he has filed with the Federal Agency an initial environmental examination or, where the Subproject is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained approval from the Federal Agency in respect thereof.”

According to Pakistan Environmental protection Agency (Review of IEE and EIA) Regulations, 2000, the proposed subproject falls under category G (2) (Waste Disposal) of Schedule-II, which requires EIA before commencement of construction.

1.5 Scope of Study

The scope of the ESIA study includes collection and scrutiny of data related to physical, biological and socio-economic environment of the subproject area of influence and to prepare the baseline environmental profile. Moreover, it also aims at the identification, prediction and evaluation of the potential environmental impacts of the proposed subproject on its immediate surroundings on both short and long-term basis. Based on the nature and levels of those impacts, appropriate mitigation measures along with the cost have been incorporated in this ESIA Report.

1.6 Study Objectives

The overall objective of this ESIA is to carry out a detailed environmental assessment of the subproject area; to assess impacts caused by the different activities of the proposed subproject and to address measures to mitigate adverse environmental impacts arising from the execution of the proposed subproject. The specific objectives of the ESIA Study are as follows:

- To determine pre-project state of affairs to assess post-project conditions if they have changed for better or worse;
- Documentation of all the resources likely to be affected due to the implementation of the proposed subproject;
- To provide maximum information to the proponent about the existing environmental conditions and the implications of the proposed subproject;
- To minimize potential impacts of the proposed subproject on different environmental attributes such as physical environment, biological environment and socio-economic environment; and
- To prepare Environmental and Social Management and Monitoring Plan (ESMMP).

1.7 The Proponent and Consultant

The proponent of the Subproject is Municipal Committee Okara while the Consultant is M/s MM Pakistan; the addresses are given as under:

(a) Proponent Contact Address

Managing Director (MD)
Punjab Municipal Development Fund Company (PMDFC)
Government of the Punjab
184 Scotch Corner, Shahrah-e-Quaid-e-Azam behind NIPA,
Lahore, Punjab

Tel: +92 42 99204386

(b) Consultant Contact Address

M/s. MM Pakistan (Pvt.) Limited (MMP)

Regional Office

2nd Floor CTI Building, 27 Empress Road,

Lahore.

Tel: +92 42-36292525-28

+92 423 636 3234

+92 423 666-5049 (Fax)

lhr@mmpakistan.com

1.8 Study Team

A multidisciplinary team was formulated to conduct the study. The team comprises the following persons:

Mr. Iftikhar Ahmad	:	Project Manager / Team Leader
Dr. Muhammad Ashraf Bodla	:	Chief Environmentalist
Mr. Moazzam Ali	:	Environmentalist
Mr. Muhammad Saqib Siddiq	:	Sociologist
Ms. Shazia Ihsan	:	Gender Specialist

1.9 Study Approach and Methodology

1.9.1 Study Approach

The study has been conducted in accordance with Environmental Protection Agency (EPA), Government of Pakistan (GoP) Environmental Assessment Guidelines, 2000. The study is based on both primary and secondary data and information. The primary data include data collected from field observations and secondary data include review of available published reports, papers and articles etc. Discussions were held with stakeholders including government officials, community representatives and affected persons. The main purpose of this approach was to obtain a fair impression on the people's perceptions of the subproject and its environmental impacts.

1.9.2 Methodology

The following methodology was adopted for carrying out the ESIA study of the proposed Subproject:

(a) Orientation

Meetings and discussions were held among the members of the Consultant's ESIA Team. This activity was aimed at achieving a common ground of understanding of various aspects of the study.

(b) Data Collection Planning

Subsequent to the concept clarification and understanding obtained in the preceding step, a detailed data acquisition plan was developed for the internal use of the ESIA 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.

(c) Data Collection

In this step, primary and secondary data was collected through field observations, environmental monitoring in the field, contacting with the concerned departments and collecting the 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 Consultations.
- Field Observations & Studies.
- Laboratory Analysis.

(d) Environmental Baseline Survey

Environmental Baseline Survey outlines the existing physical, biological and socio-cultural environment of the subproject area. The environmental baseline serves to be benchmark for the environmental conditions.

- ***Physical Environment:***

Information was collected on the existing physical environment, particularly as related to geology, topography, soils, hydrology and drainage, water quality, air quality and noise.

- ***Geology, Topography, Soils:***

Data related to geology, topography and soil was collected to review the baseline of the subproject area and further to find out the impacts of the subproject during the construction and operational phases.

- ***Hydrology and Drainage:***

A literature review was conducted to identify the components of the hydrological cycle that are likely to impact on the subproject and the possible impacts that the subproject could have on the hydrologic regime. Field assessments included a determination and verification of all the existing inflows into the drain, assessment of drainage issues, interviews with local community members, and round-table discussions with stakeholders.

- ***Air Quality:***

Ambient air quality measurements are essential to provide a description of the existing conditions, to provide a baseline against which changes can be measured and to assist in the determination of potential impacts of the proposed construction on air quality conditions. Air quality data was collected for air quality monitored for criteria pollutants at subproject area including: Carbon Monoxide (CO), Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Particulate Matter (PM₁₀). Air quality was monitored for

24 hours by a laboratory approved by the Punjab Environmental Protection Agency. The results were compared with the Punjab Environmental Quality Standards for ambient air 2016.

- **Noise:**

Noise levels were also monitored at proposed WWTP site by a Pb-EPA certified laboratory for 24 hours. The noise levels were compared with Punjab Environmental Quality Standards for ambient air 2016.

- **Water Quality:**

The surface and groundwater quality at the subproject was also determined by the Pb. EPA certified laboratory in accordance with Punjab Environmental Quality Standards 2016 for water quality.

- **Biological Environment:**

The status of the flora and fauna of the study area was determined by field observations and review of literature relevant to the subproject area.

- **Flora:** The subproject area was traversed and the vegetation growing in the subproject area was observed with reference to trees, shrubs/herbs and grasses. The species were identified by using "Plant.Net" software.
- **Fauna:** Information on fauna was gathered from existing literature on reported species as well as observations in the field. The local people were also consulted for getting information about the fauna existing in the subproject area.

(e) **Socio-Cultural Environment**

The Consultants utilized a combination of desk research, field investigations, census data, structured interviews, maps, reports to generate the data required for description of the existing social environment and assessment of the potential impacts due to the construction of the proposed subproject. Data was gathered on the following aspects:

- Land use and Municipal Status;
- Demographics;
- Livelihoods;
- Education;
- Health;
- Social Setup;
- Community Facilities;
- Recreational Activities; and
- Archaeological and Cultural Heritage.

(f) **Stakeholder Consultations**

Public consultation sessions were held with different stakeholder groups that may be socially and environmentally affected by the proposed sub-project. The consultation process was carried out to comply with the requirements of World Bank Operational Policy 4.01 (Section-16).

(g) **Identification and Evaluation of Environmental Impacts**

The impacts of the proposed subproject on the physical, biological and socioeconomic environment prevalent in the subproject area were visualized at the design, construction and operational phases.

(h) Mitigation Measures and Implementation Arrangements

The adequate mitigation measures were suggested to avoid, prevent, offset and compensate the potential impacts.

(i) Environmental and Social Management and Monitoring Plan (ESMMP)

Environmental and Social Management and Monitoring Plan (ESMMP) has been developed for allocation of resources for mitigation of any potential environmental impact that may be caused due to the implementation of the subproject. The objective of ESMMP is to provide framework for the implementation of the proposed mitigation measures during execution of the proposed subproject.

(j) Conclusion and Recommendations

Conclusion is drawn based on the baseline information, identified impacts, suggested mitigation measures and proposed environmental cost. Based on the conclusion, recommendations regarding the future plan of action are provided.

1.10 Outline of the Report

The format of the Report consists of the following Sections:

1. Introduction

This section represents an introduction of the ESIA Report. It contains the scope of study and overview of the subproject.

2. Policy, Legal and Administrative Framework

This section covers policy, guidelines, statutory obligations and roles of institutions concerning ESIA study of the proposed subproject.

3. Description of the Sub-Project

In this section, salient features of the subproject are presented. It provides information about the subproject location and its benefits to the public. The focus information is as under:

- Information of the subproject;
- Objectives of the subproject;
- Location of the subproject area;
- Project Implementation Schedule;
- Components of the subproject etc.

4. Description of the Environment

It provides an overview of the present environmental baseline of the subproject area. It discusses the following:

- Physical Environment;

- Biological Environment; and
- Socio-Economic Environment.

5. Public consultation and Disclosure

This section consists of the information based on public consultation and information disclosure about the Project. It comprises of the following:

- Identification of the Main Stakeholders;
- Detail of Scoping Sessions;
- Stakeholders' Concerns;
- Information Disclosure Plan.

6. Environmental Impacts and Mitigation Measures

This section provides the information on the anticipated environmental impacts and proposed mitigation measures. It discusses the following:

- Pre-Construction/Design Phase Impacts and Mitigation Measures;
- Construction Phase Impacts and Mitigation Measures; and
- Operation Phase Impacts and Mitigation Measures.

7. Environmental & Social Management & Monitoring Plan (ESMMP)

This section describes the measures suggested for implementing the Environmental Management and Monitoring Plan (ESMMP) at the subproject site. It elaborates the following in details:

- Objectives of ESMMP;
- Key Environmental and Social Components;
- Role of Functionaries;
- Specific Implementation Responsibilities;
- Environmental Monitoring Plan;
- Environmental Technical Assistance and Training Plan.

8. Conclusions

This section presents the outcomes of the whole study.

2 Legislative, Regulatory and Institutional Frameworks

This section provides an overview of the national and provincial policy framework and legislation that applies to the proposed subproject. The subproject is expected to comply with all National/Provincial legislation regulations, EPA Guidelines, World Bank Operational Policies and Guidelines which are relevant and applicable to the Sub-project.

2.1 National Policy and Legal Framework

The Ministry of Climate Change is the responsible authority for environmental protection policy making in Pakistan.

The Pakistan National Conservation Strategy (NCS) that was approved by the federal cabinet in March 1992 is the principal policy document on environmental issues in the country (EUAD/IUCN, 1992). The NCS outlines the country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment. The core areas that are relevant in the context of the proposed subproject are pollution prevention and abatement and supporting forestry and plantations.

Prior to the adoption of the 18th Constitutional Amendment (2011), the Pakistan Environmental Protection Act (PEPA) 1997 was the governing law for environmental conservation in the country. Under PEPA 1997, the Pakistan Environmental Protection Council (PEPC) and Pak EPA were primarily responsible for administering PEPA 1997. Post the adoption of the 18th Constitutional Amendment, the subject of environment was devolved and the provinces have been empowered for environmental protection and conservation.

2.2 Regulations for Environmental Assessment, Punjab EPA

Under Section 12 (and subsequent Amendment) of the PEPA (1997), a project falling under any category specified in Schedule I of the Punjab EPA-IEE/EIA Regulations, 2022 requires the proponent of the project to file an IEE with the provincial EPA. Projects falling under any category specified in Schedule II require the proponent to file an EIA with the provincial agency, which is responsible for its review and accord approval or request any additional information deemed necessary.

2.3 Regulatory Clearances, Punjab EPA

In accordance with regulatory requirements, an EIA satisfying the requirements of the Punjab Environmental Protection (Amendment) Act 2012 will be cleared by Punjab-EPA and No Objection Certificate (NOC) will be issued accordingly.

2.4 Guidelines for Environmental Assessment, Pakistan EPA

The Pak-EPA has published a set of environmental guidelines for conducting environmental assessments and the environmental management of different types of development projects. The guidelines that are relevant to the proposed subproject are listed below:

- Guidelines for the Preparation and Review of Environmental Reports, Pakistan, EPA 1997; and

- Guidelines for Public Consultations; Pakistan EPA May 1997.

2.5 Punjab Environmental Quality Standards (PEQS), 2016

The Punjab Environmental Quality Standards (PEQS), 2016 specify the following standards:

- Water Quality: Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment facilities, and the sea (three separate sets of numbers);
- Air Quality: Maximum allowable concentration of pollutants in gaseous emissions from industrial sources; and
- Noise Levels.

These standards apply to the water supply to the workers, sewage quality, machinery and equipment being used during project execution and operation. The standards for vehicles also apply during the construction as well as operation phase of the subproject.

2.6 Other Social and Environment Related Legislations

Table 2-1: National and Provincial Legislative Framework

Sr. No.	Act	Description	Applicability to sub-project
1.	Punjab Environment Protection Act, 2012	Additionally, under this Act, no proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an initial environmental examination or, where the project is likely to cause an adverse environmental effect, an Environmental Impact Assessment (EIA), and has obtained the approval in respect thereof.	Section 11, 12 and 14 of PEPA, 2012 will be applicable during construction and operation phases of this subproject.
2.	Punjab Environment Protection Review of IEE/EIA Regulations, 2022	Provided that the proponent shall file an environmental impact assessment, if the project is likely to cause an adverse environmental impact	Schedule II F include the waste water channels and sewerage system schemes therefore Section-4 of Regulations applies that require filing of an EIA report to Punjab-EPA
3.	Delegations of power for (Environmental Approvals) Rules, 2017	These rules set out: - Application of Approval for the projects under Schedule-I of the Rules - Preliminary Scrutiny. - Review. - Environmental Approval Committee. - Conditions of approval. - Monitoring. - Cancellation of approval.	The subject subproject does not fall under Schedule-I of the rules hence these Rules do not apply.

Sr. No.	Act	Description	Applicability to sub-project
4.	Notification No. SOG/EPD/5-86/2019 dated 28 th January 2020 Delegation Powers and Functions to the Deputy Commissioners	The powers for approval of the projects related to the following were delegated to Dy. Commissioners of the districts. - Rice mills, flour Mills, and some crushing units - Cottage industry units with product cost less than rupees 10 million unless otherwise specified by the environmental protection agency. - Commercial extraction of sand gravel, lime stone, clay, sulphur and any other mineral not included in Schedule-II of the Pakistan Environmental Protection Agency review of initial environmental examination and environmental impact assessment regulations, 2000 with total cost less than rupees 100 million. - Restaurant and hotels below 3-star category. - Marriage halls and event centers - Bakeries, sweet manufacturing units and other similar concerns - Bus and wagons stand of category 'C' with area up to 08-Kanals - Cement block manufacturing factories - Land sub-division.	Not applicable for this subproject
5.	Pakistan Penal Code, 1860	The Code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The Code also addresses control of noise, noxious emissions and disposal of effluents.	The provisions of the Penal Code, 1860 are applicable to the subproject in terms of penalties for effecting human lives and public property. It also addresses the control of noise, air emissions and effluent disposal.
6.	The Bonded Labor System (Abolition) Act, 1992	- According to this act, forced labor is any type of work or kind of service in which someone engages involuntarily and under implied coercion a manifest threat of a party or oppression measures. The bonded labor can exist in following forms under different situations: - Bonded labor in exchange of advance/an amount of money given before services are rendered, received by a person or his family. - Bonded labor as a consequence of some social or customary obligations. - Bonded labor in exchange of an economic benefit/consideration received by a person or his family,	This act is applicable to protect the rights of labor involved in the sub project implementation. In this regard, PMDFC has also developed SOPs which will be applicable to this sub-project by making them the part of bid documents and contract agreement with the contractor

Sr. No.	Act	Description	Applicability to sub-project
		- Bonded labor of a guarantor in exchange for debtor who was unable to pay off his debt. - Bonded labor is prevalent in agriculture sector, brick kilns, domestic work and begging.	
7.	The Land Acquisition Act, 1894	The Land Acquisition Act, 1894, is a "law for the acquisition of land needed for public purposes and for companies and for determining the amount of compensation to be paid on account of such acquisition". The exercise of the power of acquisition has been limited to public purposes. The principles laid down for the determination of compensation, as clarified by judicial pronouncements made from time to time, reflect the anxiety of the law-giver to compensate those who have been deprived of property, adequately. The land needed for the construction of development projects will be acquired under normal conditions based on prevailing market prices or negotiated prices between client and the owners of land. Section 17(4) of the LAA will not be used in the absence of an emergency. Instead, the land will be purchased under willing-seller willing-buyer deal at agreed upon market rates and the seller will have the option not to sell the land, in case an acceptable deal for both the parties is not reached.	This act will not trigger as no land acquisition is required in this subproject.
8.	The Punjab Land Acquisition Rules, 1983,	It describes the land acquisition procedure for public purposes or for a company.	This act will not trigger as no land acquisition is required.
9.	Pakistan Antiquities Act 1975 and Punjab Antiquities Amendment Act 2012	- The Punjab Antiquities Amendment Act, 2012 is adopted from the Pakistan Antiquities Act of 1975 with a few minor changes. The Antiquities Act, 1975 (amended in 1990) states the following: "Ancient" is any object that is at least 75 years old; - All accidental discoveries of artefacts must be reported to the Federal Department of Archaeology; - The Government is the owner of all buried antiquities discovered on any site, whether protected or otherwise; - All new construction within a distance of 200 feet from protected antiquities is forbidden; - No changes or repairs can be made to a protected monument, even if it is owned	The provisions of this act would be applicable, if any accidental archaeological discoveries may occur during the excavation works for the construction of proposed subproject.

Sr. No.	Act	Description	Applicability to sub-project
		privately, without approval of the responsible authorities; and The cultural heritage laws of Pakistan are uniformly applicable to all categories of sites regardless of their state of preservation and classification as monuments of national or world heritage.	
10.	Punjab Restriction of Employment of Children Act, 2016	According to the sub-section 11(a) of this Act, an occupier who employs or permits a child (person under the age of 15 years) to work in an establishment shall be liable to punishment with imprisonment for a term which may extend to six months, but which shall not be less than seven days, and a mandatory fine between 10,000 and 50,000 rupees.	The relevance of this act to the subproject will be to prohibit child employment as labor. PMDFC has formulated the SOPs to enact this Act and the same will be applicable on this subproject
11.	The Punjab Occupational Safety and Health Act, 2019	The Punjab Occupational Safety and Health Act, 2019 (IV of 2019) is an Act to provide for occupational safety and health at workplace. It is necessary to make and consolidate the law for the occupational safety and health of the persons at workplace and to protect them against risks arising out of the occupational hazards; to promote safe and healthy working environment catering to the physiological and psychological needs of the employees at workplace and to provide for matters connected therewith or ancillary thereto.	PMDFC EHS SOPs for Labor /Workers and Women Workers rules will be implemented

2.7 International Laws/Treaties

2.7.1 The World Bank Operational Policies

The World Bank (WB) has approved a series of Operational Policies, which define the conduct of WB operations. A summary of the status of those Operational Policies, which relate to environmental and social aspects of the subproject are provided in the following **Table 2-2**.

Table 2-2: Assessment of Applicable World Bank Operational Policies

Safeguard Policies	Triggered?	Explanation
Environmental Assessment OP/4.01	Yes	This sub-project has been categorized as 'Category A'. The sub-project activities may potentially cause mild to moderate potential negative environmental and social, but reversible impacts.
Involuntary Resettlement OP/4.12	Yes	OP 4.12 is triggered as the sub-project involves involuntary resettlement of 36 households (190 persons). The livelihood of these persons will also be affected. Consequently, an Abbreviated Resettlement Action Plan has to be prepared and implemented.

2.7.2 World Bank Environmental, Health and Social Guidelines

The World Bank's EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines has been tailored to the hazards and risks established for the sub project on the basis of the results of the environmental assessment in which site-specific variables, such as assimilative capacity of the environment, and other subproject factors, are taken into account.

The General EHS Guidelines are organized as follows:

1. Environmental

- 1.1 Air Emissions and Ambient Air Quality
- 1.2 Energy Conservation
- 1.3 Wastewater and Ambient Water Quality
- 1.4 Water Conservation
- 1.5 Hazardous Materials Management
- 1.6 Waste Management
- 1.7 Noise
- 1.8 Contaminated Land

2. Occupational Health and Safety

- 2.1 General Facility Design and Operation
- 2.2 Communication and Training
- 2.3 Physical Hazards
- 2.4 Chemical Hazards
- 2.5 Biological Hazards
- 2.6 Radiological Hazards
- 2.7 Personal Protective Equipment (PPE)
- 2.8 Special Hazard Environments
- 2.9 Monitoring

3. Community Health and Safety

- 3.1 Water Quality and Availability
- 3.2 Structural Safety of Project Infrastructure

3.3 Life and Fire Safety (L&FS)

3.4 Traffic Safety

3.5 Transport of Hazardous Materials

3.6 Disease Prevention

3.7 Emergency Preparedness and Response

4. Construction and Decommissioning

4.1 Environment

4.2 Occupational Health & Safety

4.3 Community Health & Safety

Table 2-3: World Bank Policy, Core Principles and Applicability on Sub-project

Core Principles	Applicability
Core Principle 1: Environmental and social management procedures and processes are designed to (a) avoid, minimize, or mitigate against adverse impacts; (b) promote environmental and social sustainability in program design; and (c) Promote informed decision-making relating to a program's environmental and social effects.	ESIA prepared under the light of this Principle in order to mitigate negative impacts envisaged in this Sub-project. ESMMP implementation and monitoring arrangements of ESIA will help in achieving environmental and social sustainability.
Core Principle 2: Environmental and social management procedures and processes are designed to avoid, minimize, and mitigate against adverse effects on natural habitats and physical cultural resources resulting from the program	ESMMP prepared to mitigate all adverse impacts anticipated during the course of the Sub-project.
Core Principle 3: Program procedures ensure adequate measures to protect public and worker safety against the potential risks associated with: (a) construction and/or operations of facilities or other operational practices developed or promoted under the Program; and (b) exposure to toxic chemicals, hazardous wastes, and otherwise dangerous materials.	All the mitigation measures have been incorporated in the ESMMP addressing risks associated with workers and community health and safety. Contractor will ensure compliance with these attributes.
Core Principle 4: Land acquisition and loss of access to natural resources are managed in a way that avoids or minimizes displacement, and affected people are assisted in improving, or at least restoring, their livelihoods and living standards	Involuntary resettlement and livelihood loss of 36 households (190 persons) is involved in the subproject. An Abbreviated Resettlement Plan has been prepared accordingly.
Core Principle 6: Avoid exacerbating social conflict, especially in fragile states, post-conflict areas, or areas subject to territorial disputes.	Vulnerable community exists within the subproject area that has to be looked after during project execution

3 Description of the Sub-Project

3.1 General

This section describes the need, rationale and objectives of the subproject. It also furnishes information about the location of the proposed subproject, its major components, cost and alternative analysis etc.

3.2 Sub-Project Background

Municipal Committee Okara City is unable to render satisfactory services to the entire area of the city because of degraded infrastructure wherein major replacements are direly needed but MC could not be able to accomplish them because of low revenue recovery and funding constraints. As a result, major areas are deprived of the required level of the service. This is resulting in low credibility of the municipal services and citizen dissatisfaction. Further, the municipal infrastructure has not been extended keeping in pace with the growth of population which has impacted the service delivery level of MC.

The major areas like General Bus Stand, Rehman Abad, Grain Market and other areas are un-served. Sanitation conditions are very poor, wastewater stagnating in the streets, open plates converted into ponds. Road network is deteriorated due to non-existence of proper sewerage system. Overflow on the road is occurring resultantly, road network is damaging. MC, Okara spending huge funds for maintenance as well as reconstruction of road network. Municipal Committee has constructed open drain for dewatering of wastewater and this wastewater is going to the agriculture farms without any treatment.

3.3 Objectives of the Sub-Project

The subproject aims for the improvement of Infrastructure for municipal services including improved sewerage system service delivery. The subproject comprises of the replacement of old, outlived, damaged or worn-out components in existing infrastructure:

- To improve service delivery level of the municipal services in the served areas of the city for provision of better basic urban services for improved livability of the citizen.
- To reduce in annual O&M cost of the infrastructure through reduced repairs in the forthcoming years.
- To prompt address the public complaints regarding municipal service delivery.
- To provide the wastewater treatment facility for reduction of BOD to bring the effluent within permissible limits of the NEQS.
- To improve growth potential and the local economy of the city.

3.4 Location of the Proposed Sub-Project

Okara is located at 30° 48' 30.6000" North and 73° 27' 33.8256" East at a distance of 110Km in North West of famous city of Lahore. Okara City is situated 38 km from Sahiwal towards Lahore at N-5 Lahore Multan Road. **Figure 3-1** represent the location of the proposed subproject.

3.5 Administrative Jurisdiction

According to Punjab Government setup, the proposed subproject site, located in the Okara city, falls under the administrative jurisdiction of District Okara.

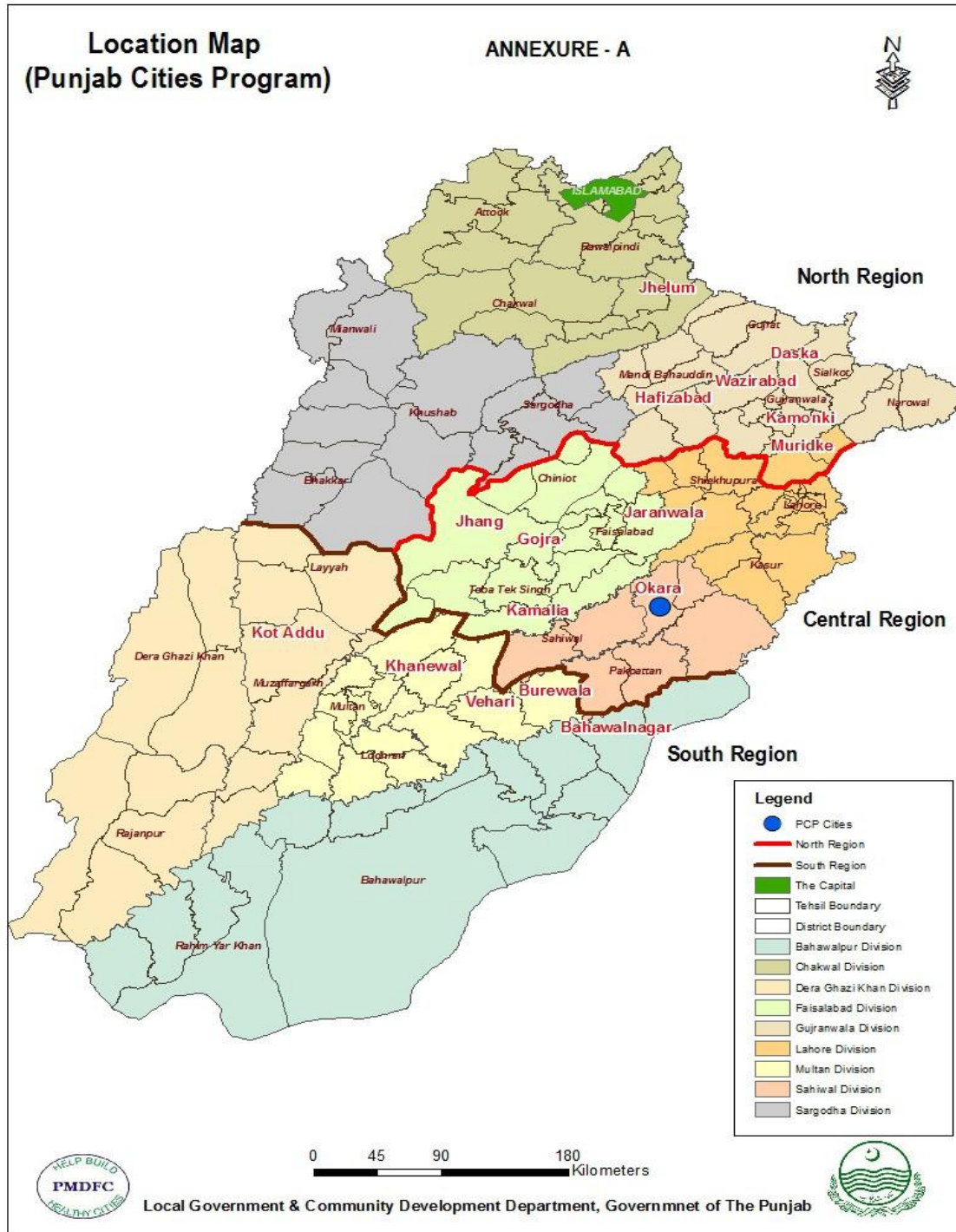


Figure 3-1: Location of Map of Okara

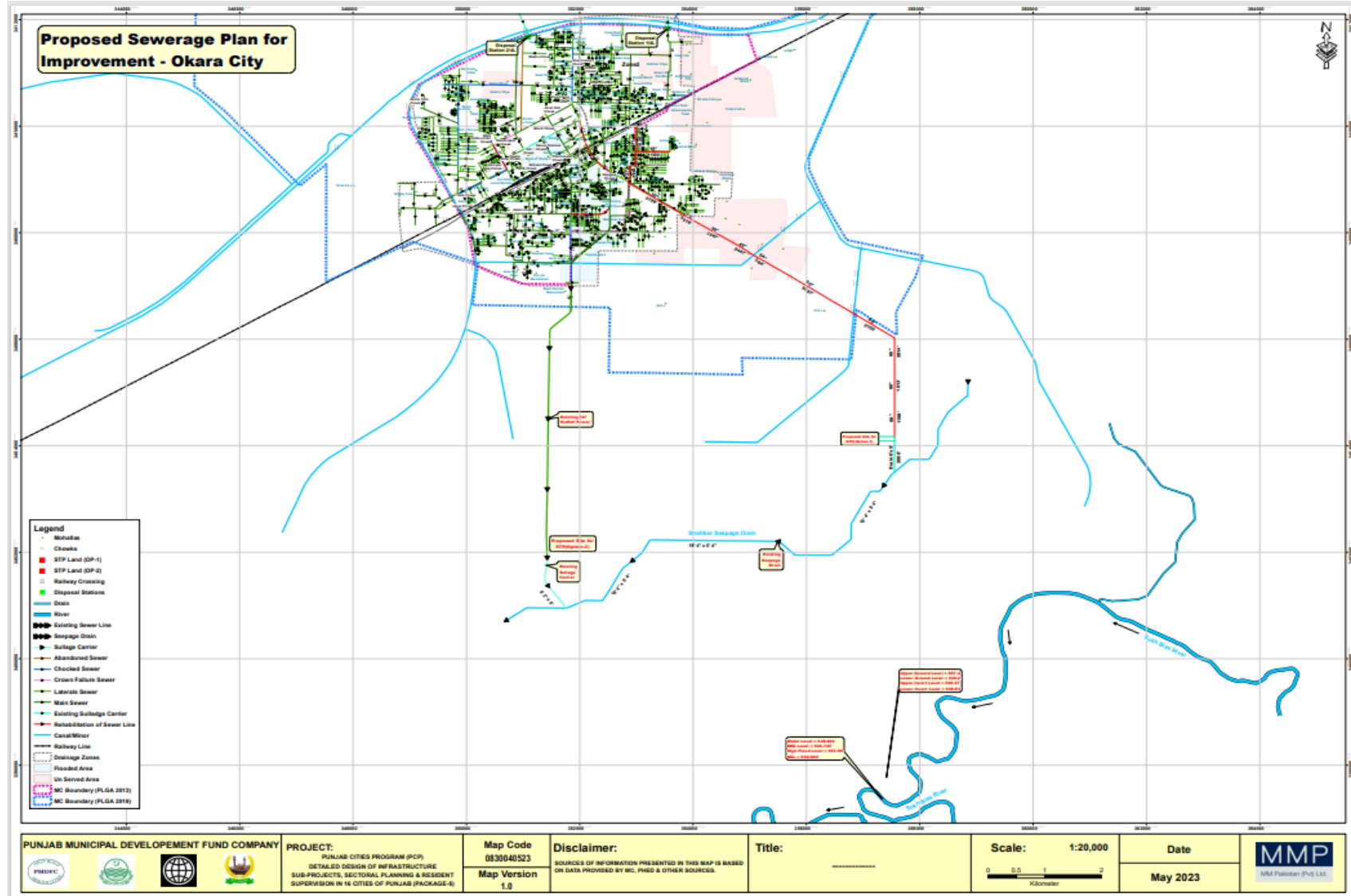


Figure 3-2: Location of Map of Okara

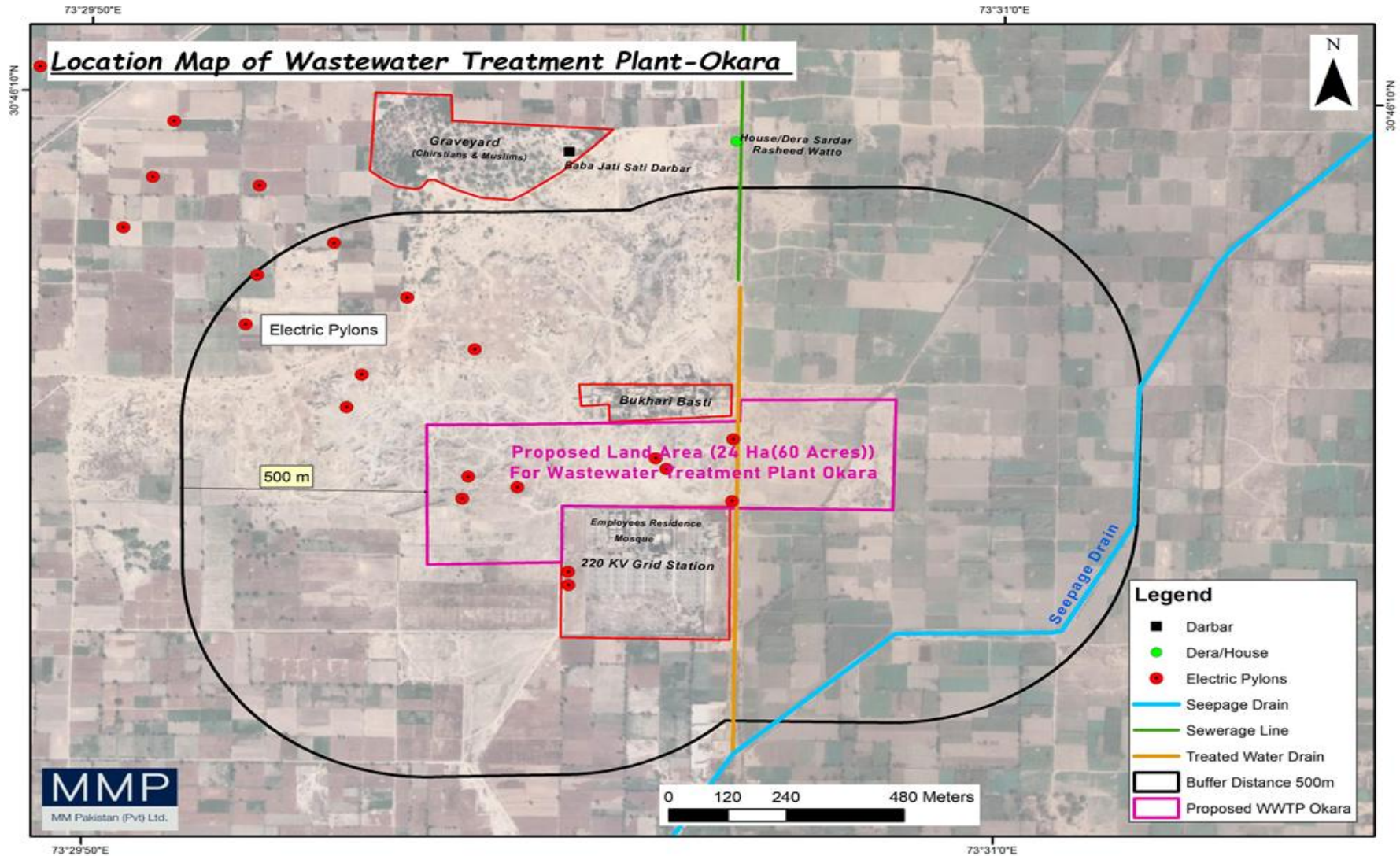


Figure 3-3: Location Map of Proposed Treatment Plant

3.6 Cost and Size of the Proposed Sub-Project

Total cost of the proposed sub project is Rs.1952.60 million.

3.7 Project Implementation Schedule

The duration of construction will be fourteen (14) months approximately.

3.8 Major Components of the Proposed Sub-Project

The major components of the proposed subproject include:

1. Replacement of Existing Sewerage system

Replacement of Existing Sewers	
12" I/d	2297 Rft
24" I/d	1969 Rft
27" I/d	1000 Rft
42" I/d	2142 Rft

2. Comprehensive sewerage system in Okara City

RCC sewers	
a) 9" I/d	2500 Rft
b) 12" I/d	4159 Rft
c) 15" I/d	2750 Rft
d) 18" I/d	2597 Rft
e) 24" I/d	3164 Rft
f) 30" I/d	3994 Rft
g) 42" I/d	3131 Rft
h) 60" I/d	4332 Rft
i) 66 I/d	7775 Rft

3. Waste water Treatment Plant comprising of:

- Sewage Collecting pit / Chamber = 1 No
- Course & fine Screening Chamber = 1 No
- Grit Chamber
- Sullage Drains
- Anaerobic ponds = 4 Nos
- Facultative ponds = 4 Nos
- Sludge drying beds = 2 No
- Administration block = 1 No
- Floating plants = 10% of Facultative ponds area
- Effluent water course = 1

4. Liquid Waste Machinery comprising of:

- Jetting Machine = 1
- Suction Machine = 1

- c) Desilting Machine = 1
- d) Pressure Pipe for Jetting Machine = 500 Rft

5. RPC Manhole Covers = 968 Nos

3.9 Alternative Analysis

Different options have been studied to conclude a reasonable and safe solution to the construction and operation related issues. These options are mentioned hereunder:

3.11.1 No Action Alternative

No action alternative is that the subproject will not be implemented and all problems related to sewage wastewater management issues will be left unresolved.

The sewerage problems of Okara city with a population of 416,289 persons² remained unresolved for last many years.

In case of implementation of no action alternative of the subproject, the sewerage issues will remain un-resolved, accordingly, the no-action alternative of the subproject will not be considered.

3.11.1 Site Alternatives

Table 3-1: Comparison of Different Sites Identified for Construction of Waste Water Treatment Plant (WWTP) Okara City

Consideration	Parameter	Site-I	Site-II	Site-III	Remarks
General Information	Coordinates	30.740031 73.449604	30.764487 73.509482°	30.762627 74.1322	Site 1: This site is to away project area and under the control of army, that's why we have rejected this site. Site 2: This site is located near Chick No.49/2-L, Graveyard is situated under the proposed site, this site is also not feasible. Site 3: In the light of above-mentioned site problem we have selected the 3rd site. This site comparatively better than other.
	Tentative Altitude	171 m	176 m	170 m	
Sites Location.	Topography	Flat	Excavated land with borrow pit excavation	Excavated land with borrow pit excavation	
	Existing Landaus of identified land	Under cultivation	Under cultivation	Under cultivation	All sites are under intensive cropping presently main crops grown are Rice, Sugarcane and Fodder
	Distance from Sukhera main drain	900m	700m	600m	
	Accessibility	Difficult	Difficult	Easy	
	Distance from nearest settlement (Expected Buffer Zone)	30-40 m (from Chick 6A 4L)	±20 to 30 m from 3 to 5 Marla Scheme	±0 from 3 to 5 Marla Scheme	

² Municipal Committee Okara 2023: Punjab Cities Program, PC-I Form, Comprehensive Sewage System in Okara City.

Consideration	Parameter	Site-I	Site-II	Site-III	Remarks
	Sensitive receptor within Buffer Zone	No	No	No	
	Distance from proposed Raw water Pumping station	0	0	0	Gravity based Sukhera no pumping involved.
	Land Productivity Level	Very fertile and productive	Very fertile and productive	Very fertile and uncultivated land	
	Cost of Land (Million Rs. per acre)	45	50	MC Land	
Flood Threat	Risk level to WWTP	No Risk	No Risk	No Risk	Palku Nullah receives medium to high flood almost every year during Monsoon and causes damages to crops and allied structures
Groundwater	Depth				
	Quality	Good	Good	Good	
Trees under threat	Approximate number of trees to be cut	Nil	Nil	Nil	
	Tentative Cost of WWTP	Same	Same	Same	
	WWTP intake & hydraulic design	Difficult	Difficult	Easy	Gravity based system
	Odor issues for residents during operation	No	No	No	The adjacent housing colony is to be shifted as per MC undertaken
	Odor issues for residents during Desludging	No	No	No	

3.11.1 Types of Wastewater Treatment Plant Technology

Conventional Treatment Technology

Sewage treatment plants frequently involve the use of energy intensive mechanical treatment systems such as those most commonly installed in industrialized nations. While these systems offer a solution to liquid waste treatment problems, they are only one of many options open to sanitation planners in less developed countries (LDCs). The unfortunate fact is, that the historical reasons and climatic conditions, which led to the development of these sewage treatment processes, are not generally relevant in developing countries. These plants are not only energy-intensive, but also costly to operate, require skilled operators and generally lead to sludge disposal problems. Sludge treatment and disposal can account for up to 50 percent of the total cost of conventional sewage treatment.

The obsession with conventional sewage treatment has led to other problems related to treated effluent standards in LDCs. In Europe the standards are usually concerned with Biochemical Oxygen Demand (BOD) and suspended solids (SS); they arose from the need to reduce the organic loading of the sewage effluent to a level at which it places a suitably low demand for dissolved oxygen in the receiving water course (i.e., limits oxygen depletion to a level which will not endanger fish stocks). In addition, conventional plants do not provide for any significant degree of pathogen removal (which is very important in LDCs) unless a tertiary treatment process such as maturation ponds or chlorination is incorporated. However, effluent chlorination can lead to its other problems and is not generally recommended.

Waste Stabilization Pond Systems

It has long been accepted that tropical and subtropical climates provide an ideal environment for the natural treatment of sewage in ponds. They also function well in temperate and very cold climates and are extensively used in North America and EU Countries. By detaining raw sewage in a series of shallow ponds for say, two to three weeks, a significant level of both BOD and pathogen removal can be achieved. The natural action of warmth and sunlight promotes the rapid growth of microorganisms which remove BOD both aerobically (in the presence of oxygen), and anaerobically (in the absence of oxygen).

Alternative arrangements of pond sizes and depths can be used to promote either aerobic or anaerobic activity. The resultant effluent will be nutrient rich through its high algal content but will be low in excreted pathogens and other faecal organisms. This is particularly relevant in hot climates where the spread of gastro-enteric and other diseases by excreted pathogens presents very serious problems particularly in densely populated urban areas.

Factors Affecting Choice

Provided sufficient land is available at reasonable cost and proximity, the case for choosing stabilization ponds for sewage treatment in LDCs is overwhelming. BOD and pathogens can be removed from sewage at less capital and operating cost than in conventional plants, and ponds are particularly effective where maintenance skills are limited, since maintenance can be carried out by unskilled labor under minimal supervision. Moreover, conventional sewage treatment plants require regular sludge removal resulting in a demand for large areas of drying beds or sophisticated and expensive sludge disposal facilities. On the other hand, anaerobic ponds will only require de-sludging every three to five years, and facultative and maturation ponds are generally capable of functioning satisfactorily for over 20 years before sludge buildup reaches a level that necessitates its removal.

The effluent from waste stabilization ponds is rich in nutrients through its high algal content, which can be recovered by direct irrigation or even by harvesting the algae to produce food for animals or for fertilizer, though simple methods of algal removal are yet to be developed. Alternatively, with careful design and good monitoring the tertiary and subsequent ponds can be used for aquaculture. Various fish, particularly carp and tilapia, thrive in the algal rich environment of these ponds and yields of up to 10 metric tons of fish per hectare per year have been recorded. On the other hand, effluent from conventional plants is seldom suitable for agricultural reuse due to its high pathogen content and low nutrient value, unless costly tertiary treatment processes are incorporated. If chlorination is used it may be relatively ineffective and the after-effects may even be detrimental to crops.

Some authorities and consultants have rejected ponds in the past on the grounds of odor nuisance and the risk of fly and mosquito breeding; these are not valid reasons for the rejection of ponds because: (a) odor problems can occur in any type of system where maintenance is neglected; and (b) fly breeding can be less of a nuisance in pond systems than in badly maintained conventional plants. Well designed, operated and maintained pond systems will cause little odor problems. The simple maintenance function of removing surface scum and preventing vegetation from growing down into the ponds will preclude the creation of an environment conducive to fly and mosquito breeding. Flies breeding in the crust which forms on anaerobic ponds can be controlled by spraying with chemicals or preferably with biodegradable insecticides.

Sewage Treatment Options

COMPARISON OF VARIOUS SEWAGE TREATMENT SYSTEMS								
Criteria	Package Plant	Activated Sludge Plant	Trickling Filter	Extended Aeration Plant	Oxidation Ditch	Aerated Lagoon System	Waste Stabilization Pond System (including anaerobic units)	Waste Stabilization Pond System (excluding anaerobic units)
BOD5 Removal	**	**	**	**	***	***	***	***
FC Removal	*	*	*	**	**	***	***	***
SS Removal	**	***	***	***	***	**	**	**
Helminth Removal	*	**	*	*	**	**	***	***
Virus Removal	*	**	*	**	**	***	***	***
Ancillary Use Possibilities	*	*	*	*	*	***	***	***
Effluent Reuse Possibilities	*/a	*/a	*/a	**	**	***	***	***
Simple and Cheap Construction	*	*	*	*	**	**	***	***
Simple Operation	*	*	**	*	**	*	***	***
Land Requirement	***	***	***	***	***	**	**	*
Maintenance Costs	*	*	**	*	*	*	***	***
Energy Demand	*	*	**	*	*	*	***	***
Minimization of sludge for removal	*	**/b	**/b	**/b	*	**	***	***

Key: *** = good; ** = fair; * = poor.

*/a The effluents from activated sludge, trickling filter and package plants frequently have high ammonia levels (>5mg/liter) and fecal bacterial concentrations, and are usually not suitable for irrigation or fish farming without tertiary treatment.

*/b Assumes provision of sludge digesters.

Design of Stabilization Ponds

Initially the designer must recognize that this is basically a simple technique for wastewater treatment but as yet it is not possible to quantify all the criteria affecting the process. It must be appreciated that all existing design approaches are approximations. Designers should resist the temptation to adopt a highly complicated approach and should remember that often the best assistance that can be obtained is from the results of operation of existing ponds in the same locality. Frequently an empirical design based on the operation of existing ponds will be not only the simplest but also the most effective and realistic. The factors affecting the design of facultative stabilization ponds can be listed as:

- Organic loading (BOD or COD)
- Residence time
- Climate (Temperature)

- Pond depth
- Number of ponds in series
- Type of waste
- Complete-mix or plug-flow
- The quality of effluent required
- Plus, presently unquantifiable factors such as wind and rain effects. Of these, the effect of temperature most concerns the designer working in hot countries.

3.11.1 Rehabilitation of the Settled/Damaged Sewer (Option-1)

Option of rehabilitating the existing trunk sewer was considered. It was based on assumption that only 30% length of sewer is damaged and need to be replaced.

This option was ruled out because without proper investigations and realistic assessment of damage, the cost was likely to increase after start of the work due to actual damage to the sewer. It was also not sure that no damage will occur in future due to no investigations.

3.11.1 Replacement of the Existing Sewer (Option-2)

Replacement of the whole length of existing trunk sewer was also considered. This option was also not found feasible because:

- Extensive dewatering arrangements will be required.
- This option will require full scale geotechnical investigations.
- Additional cost will have to bear by PHED for dismantling of the existing sewer.

3.10 Feasible Design Option

Based on the above-mentioned technical narration, option 1 looks more feasible and worthwhile both technically and environmentally and is therefore recommended with the following works:

Part-A. Sewer Lines and Manholes

Part-A-1 Replacement of Sewer Lines

- Replacement of Sewer lines 27" i/d from Harniaya wala chowk to sabzi Mandi Akbar Road
- Replacement of Sewer from Islam building to Depalpur Chowk 12" and 24" i/d
- Replacement of sewer line 42" i/d and from Chungi No. 6 to Chungi No. 7 along Okara Multan road
- Replacement of Sewer from Depalpur Road to Rehman Colony (Main Line)
- Restoration of Road (for Replacement of Sewer)

Part-A-1 New Sewer Lines and Manholes

- Main Sewer Line 66" i/d and Manholes
- Main Sewer Line 60" i/d and Manholes

- iii. Main Sewer Line 42" i/d and Manholes
- iv. Main Sewer Line 30" i/d and Manholes
- v. Main Sewer Line 24" i/d and Manholes
- vi. Main Sewer Line 18" i/d and Manholes
- vii. Main Sewer Line 15" i/d and Manholes
- viii. Lateral Sewer Line 12" i/d and manholes
- ix. lateral Sewer Line 9" i/d and manholes
- x. Restoration of Road (for Laying of Sewer)

Part-B. CONSTRUCTION OF WASTE WATER TREATMENT PLANT

Part-B-1 Anaerobic, Facultative and Sludge Drying Ponds (MRS and Non-MRS)

Part-B-2 Inlet/Outlet Channels & Collection/ Distribution Chambers

Part-B-3 Office Building

Part-B-4 Staff building

Part-B-5 Area Lighting works of WWTP

Part-B-6 Floating wetland in Facultative ponds

Part-B-7 Plantation

Part-B-8 Protection Work for STP

Part-B-9 Storm water Chanel

Part-B-10 Provision for Deposit Works to Irrigation Department for

Upgradation of Drain

3.11 Site Description

3.11.1 Land Ownership

MC owns Land for construction of waste water treatment plant and no land acquisition will be required for any of the subproject component. New sewerage lines will be laid in the center or on right or left side in case of a major road or highway to avoid any impact on existing infrastructure.

3.11.1 Government Approvals

PMDFC has applied for environmental approval. They will apply for local government approvals after getting Environmental Approval.

3.11.1 Land Use on Site

The Okara city comprises buildings, transportation channels, utilities, social services, and open land (parks etc.). The land use of study area is residential cum commercial along with agriculture land at some places. The schools and college, mosques, and hospitals/clinics are present at different locations. The proposed subproject confirms to the land-use plan for the Okara District. The land use at the proposed treatment plant is comprised barren land with sparse vegetation cover, residential area and a 220kV electricity grid station and approach roads.

3.11.1 Road Access

All subproject components have road access. There will not be any problem for access to the roads during construction as the parallel roads are available for movement of vehicles and public.

3.11.1 Waste Water Treatment Facility

There is no waste water treatment facility available for the Okara city.

At the prevailing practice, this wastewater is being directly used by the farmers for irrigation of crops without any treatment. The plant needs to be rehabilitated so that after treatment, wastewater could be used for irrigation of land without posing any potential environmental hazards.

The BOD limits are exceeding the NEQS level of 80 mg/L. Similarly, the COD of the sewage from these disposal stations is 242 mg/L and 234 mg/L respectively that is also exceeding NEQS of 120 mg/L. The Laboratory Analysis Report showing BOD and COD values at **Annexure G**.

3.11.1 Benefits of the Treated Water

Wastewater is not waste; several resources can be recovered from it, namely water, energy, biosolids and nutrients. All these resources, once recovered, can either generate an extra revenue stream or can help reduce operating costs, thereby contributing to the sustainability of the plant and the operator.

Agriculture is the largest user of water, and the utilization of treated urban wastewater for agricultural irrigation is a growing practice worldwide. The use of partially treated wastewater in agriculture helps conserve and expand available water supplies and can contribute toward a more integrated management of water resources. Moreover, the nutrients (phosphorous and nitrogen) found in treated wastewater can be very valuable for farmers. These elements in the effluents can increase crop yield and size. However, if not planned, managed, and implemented properly, water reuse can be associated with a number of risks, including public health, agronomic, and environmental risks.

In addition to its reuse for irrigation, various ways to use treated wastewater include: groundwater recharge; flow augmentation; dryness amelioration; washing/cleaning; cooling of power generation towers; boiler feed water, washing streets, firefighting, etc.³. However, it should be taken into account that the use of recycled water in agriculture is not always possible, especially when chemical composition of wastewater is incompatible with agriculture (high concentrations of sodium and calcium compared to potassium and magnesium)⁴.

3.11.1 Relocation and Rehabilitation Plans

A settlement comprising of about 195 persons is located near the proposed near the waste water treatment plant that has to be resettled. Their houses and other infrastructure have to be dismantled.

3.11.1 Topographical Survey and Geotechnical Investigation of Sub-Project Area

Geotechnical Investigation reveals that the soils of the subproject are characterized as alluvium deposits of Sandy-Loam and Sandy-Silt. These soils are generally well drained but due to vast irrigation networks some signs of water logging and salinity have been observed in the area. Groundwater level ranges from 13.5m to 50m depth.

³ Rodriguez, Diego J.; Serrano, Hector A.; Delgado, Anna; Nolasco, Daniel; Saltiel, Gustavo. 2020. From Waste to Resource: Shifting paradigms for smarter wastewater interventions in Latin America and the Caribbean." World Bank, Washington, DC

⁴Galkina E. and Olesya Vasyutina 2018. Reuse of treated wastewater. IOP Conf. Ser.: Mater. Sci. Eng. 365 022047.

However, seasonal variation can result into increase of any temporary saturation condition in the upper layer of soil.

3.11.1 Design of the Proposed Sub-Project

For meeting the needs of population up to year 2050, the proposed sewerage system including Rehabilitation of the existing system, laying of 14.32 km sewer lines, replacement of existing sewers, construction of wastewater treatment plant (WWTP) will address the required municipal infrastructure coping with demand of population up to planning horizon.

3.11.1 Per Capita Sewage Flow

Provision/suggestion of Sewer layout on road

- When there is a wide road like 40 -60 feet, it is a good recommendation to propose sewer in center. On sides, there is surely water connection and electric poles and it is good practice to avoid its damage/demolition.
- When there is small right of way, then also we recommend the sewer layout in the center of road.
- In very ideal case when there is no obstruction on sides of road, then we suggest sewer on left/right side.

Per capita sewage flow

- Water demand per capita for viz. 39.6 gpcd
- Sewage flow per capita is recommended: $85\% \times \text{water demand} = 33.6 \text{ gpcd}$

Rehabilitation of existing sewers:

- We normally calculate the carrying capacity of existing sewer in current year as well for design period.
- When the sewer is laid recently and its ok from design period of view then no replacement is required, only desilting or repair cost is added in to tentative cost.

3.11.1 Sub-Project Horizon

The proposed sewerage system is to be designed for 50 years subproject horizon. This design period is justified keeping in view the projected growth rate of population in the area.

3.2 Development for Required Utilities

3.11.1 Water Requirement and Classification of Water

Water will be required for construction and operations as well as for drinking and domestic purposes. Ground water will be used to meet the requirements of domestic and construction usage.

3.11.1 Drainage Facilities

Drainage facilities are necessary to collect the water used in washing of vehicles and domestic usage. The wastewater will safely dispose off to nearby sewer line after treatment through septic tank.

3.11.1 Power Requirement and Generation

LESCO's electric supply will be the main source of power for proposed subproject. However, MC will install standby generators. Generator will be maintained and their emissions will be duly monitored as per the legal requirement.

3.3 Machinery to be Used during Construction Phase

The list of the machinery and the equipment required for the proposed subproject is provided in **Table 3-1**.

Table 3-2: Type and Name of Machinery which will be used for Construction

Sr. No.	Type of Machinery and Equipment
1.	Dump Trucks
2.	Loaders
3.	Sub soil water lowering equipment
4.	Vibratory Rollers
5.	Water Tankers
6.	Generators
7.	Concrete Transit Mixer
8.	Excavators
9.	Mechanical Pumps
10.	Cranes
11.	Vibrators
12.	Venching Machines
13.	Geo-membrane Installation Machine
14.	Tractor with Plough
15.	Scum-Removal Equipment
16.	First Aid Equipment
17.	Grass Cutter
18.	Screen Rack
19.	Lifebuoys ⁵

⁵ <https://www.netsolwater.com/how-are-stabilization-ponds-constructed.php?blog=2770>

4 Description of the Environment

This section describes the baseline conditions, which cover the existing physical, biological, and socio-economic environment of the project area. Information on these aspects has been derived from the desk study of available data, field visits to the subproject area as well as information obtained through visits to the Government departments and other relevant agencies. The aim of describing the environmental conditions of the study area is:

- To understand the environmental characteristics of the area.
- To assess the existing environmental quality, as well as the environmental impacts of the future developments being studied.
- To identify environmentally significant factors or geographical areas that could influence any decision about future development.

The purpose of socio-economic survey was to compile information about:

- The generic characteristics of nearby communities.
- Socio-economic status.
- Cultural traditions.
- Social issues and religious affiliations.

An environmental baseline study is essential to have a thorough understanding of the nature of those existing environmental conditions prior to commencement of any proposed subproject activities. A site visit was done to obtain environmental data on physical, biological and socioeconomic parameters. In addition to that, interviews with stakeholders, consultation with general public in the surroundings as per need and meeting with concerned government departments regarding subproject were held to obtain NOC of proposed subproject.

Baseline data includes an inventory of physical, biological and socio-economic parameters in order to identify any potential impact on and changes to the natural and socioeconomic aspects. Covering these aspects, data has been grouped into three categories:

4.1 Baseline Physical Environment

4.1.1 Topography

The subproject is located in a flat plain area and the average elevation of the subproject district is barely 184 m above sea level⁶.

4.1.2 Soil

The soils of the subproject are characterized as alluvium deposits of Sandy-Loam and Sandy-Silt. These soils are generally well drained but due to vast irrigation networks some signs of water logging and salinity have been observed in the area⁷.

⁶ https://elevation.maplogs.com/poi/okara_punjab_pakistan.575216.html

⁷ https://elevation.maplogs.com/poi/okara_punjab_pakistan.575216.html

4.1.3 Climate, Temperature and Air Quality

The climate of Okara is hot in summer and comparatively cold in winter. May and June are the hottest months when temperature rises up to 44°C. The Mon-soon starts at the end of June and remains by the middle of September but the average temperature is 36°C. January is coldest month with average temperature of 6 degree centigrade. The minimum, maximum and average temperatures of Okara for 12 years (2010 to 2022) are given below (**Figure 4-1**). The hot season lasts for 5.0 months, from April 22 to September 23, with an average daily high temperature above 36°C. The hottest month of the year in Okara is June, with an average high of 40°C and low of 29°C. The cool season lasts for 2.4 months, from December 6 to February 19, with an average daily high temperature below 23°C. The coldest month of the year in Okara is January, with an average low of 8°C and high of 20°C.

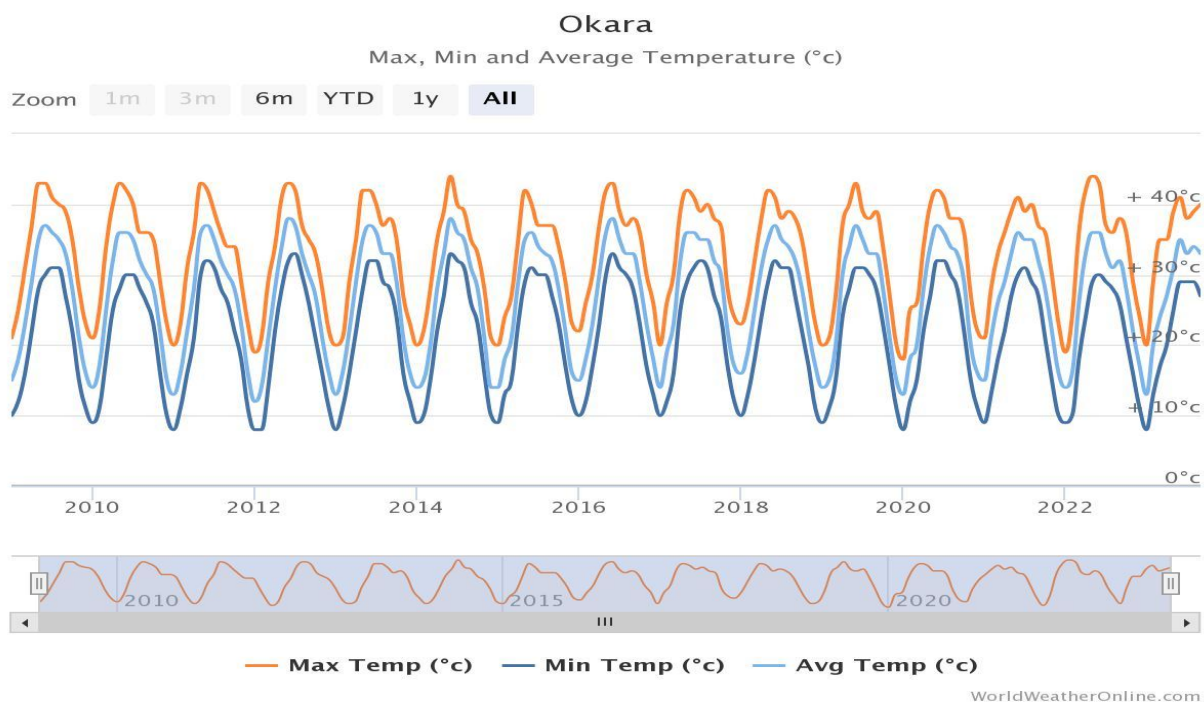


Figure 4-1: Maximum, Minimum and Average Temperatures at Okara

The components of sewerage subproject are located in residential/commercial areas where air polluting industry exists. There are transport vehicles that run on few roads that generate significant exhaust gases. There are rows of trees growing along the roads that instantly absorb the gaseous emissions from the light vehicles. Moreover, no chronic bronchial diseases have been reported from the subproject area. However, the ambient air quality will be regularly monitored during construction phase⁸.

4.1.4 Precipitation

Okara experiences significant seasonal variation in monthly rainfall. The rainy period of the year lasts for 8.1 months, from February 1 to October 4, with a sliding 31-day rainfall of at least 13 millimeters. The month with the most rain in Okara is July, with an average rainfall of 66 millimeters.

⁸ <https://www.worldweatheronline.com/okara-weather-averages/punjab/pk.aspx>

The rainless period of the year lasts for 3.9 months, from October 4 to February 1. The month with the least rain in Okara is November, with an average rainfall of 3 millimeters. (Figure 4-2).

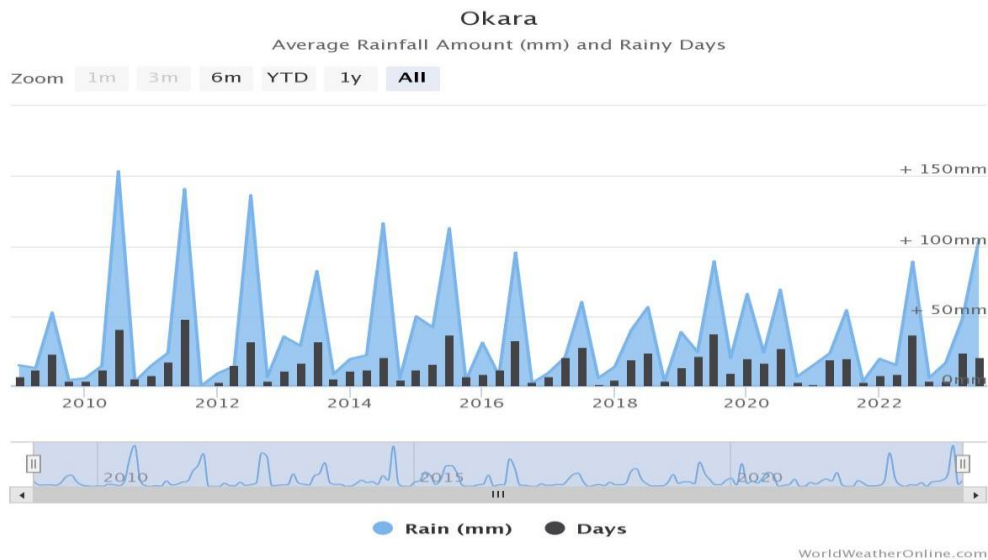


Figure 4-2: Precipitation in Okara

4.1.5 Wind Speed

The average hourly wind speed in Okāra experiences mild seasonal variation over the course of the year. The windier part of the year lasts for 5.1 months, from March 23 to August 25, with average wind speeds of more than 9.3 kilometers per hour. The windiest month of the year in Okāra is June, with an average hourly wind speed of 11.1 kilometers per hour. The calmer time of year lasts for 6.9 months, from August 25 to March 23. The calmest month of the year in Okāra is November, with an average hourly wind speed of 7.4 kilometers per hour⁹ (Figure 4-3).

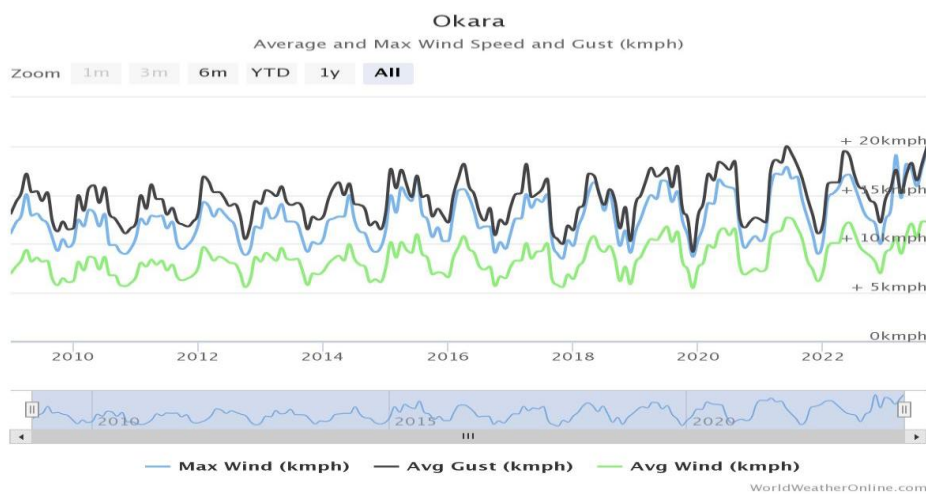


Figure 4-3: Wind Speed in Okara

⁹ <https://www.worldweatheronline.com/okara-weather-averages/punjab/pk.aspx>

4.1.6 Geography

The district lies between 31°- 55' and 32°- 30' north latitudes and 74°- 35' and 75°- 21' east longitude. The Multan Road connects the district capital, Okara with Lahore 110 km away and Faisalabad 100 km bypassing the Ravi River ¹⁰. Okara District shares a boundary on the south with Bahawalnagar, on the south-west with Pakpattan, on the west with Sahiwal, on the north with the district of Faisalabad, and Nankana Sahib, on the far-north with Kasur.

4.1.7 Seismic Zones

The Seismic Zoning Map of Pakistan is shown in **Figure 4-4**. According to it, Pakistan is divided into five seismic zones (Zones 1, 2A, 2B, 3, and 4) considering the severity of seismic hazard; zone 1 is the lowest, and zone 4 is the highest seismic zone. It is evident from the seismic zoning map that the northern parts of Pakistan, as well as the north western parts of Balochistan, are situated in high seismic zones, whereas most of Punjab and Sindh provinces are situated in low seismic zones¹¹ (**Table 4-1**).

Table 4-1: Seismic Zones of Tehsils of Pakistan ¹²

Tehsil	Seismic Zone	Tehsil	Seismic Zone	Tehsil	Seismic Zone
Punjab					
Bhakkar	2A	Kasur	2A	Kot Addu	2A
Kalur Kot	2B	Chunian	2A	Bahawalpur	2A
Mankera	2A	Pattoki	2A	Hasilpur	2A
Darya Khan	2A	Okara	2A	Yazman	2A
Khushab	2B	Depalpur	2A	Ahmadpur East	2A
Nurpur	2A	Renala Khurd	2A	Khairpur Tamawali	2A

According to the Seismic Data of Pakistan; Okara lies in 2A zone with minimum risks to any earthquakes its Peak Ground acceleration is (PGA range is 0.8 – 1.6 m/sq. sec) with minimum risks to any earthquakes.

4.1.8 Natural Disasters

Geographically Okara lies at a distance of 32 Km and 111 Km from River Ravi and Satluj respectively and is therefore historically not affected by floods. (**Table 4-2**).

Table 4-2: Risk Analysis of Potential Hazards of District Okara.

Hazards Risk	Likelihood Score (1-5)	Impact Score (1-5)	
Floods	5	5	25
Urban Flooding	1	1	1
Flash Floods	1	1	1
Hill Torrent	1	1	
Glacial Lake Outburst Flood (GLOF)	1	1	1
Landslide	1	1	1
Tornado	1	1	1

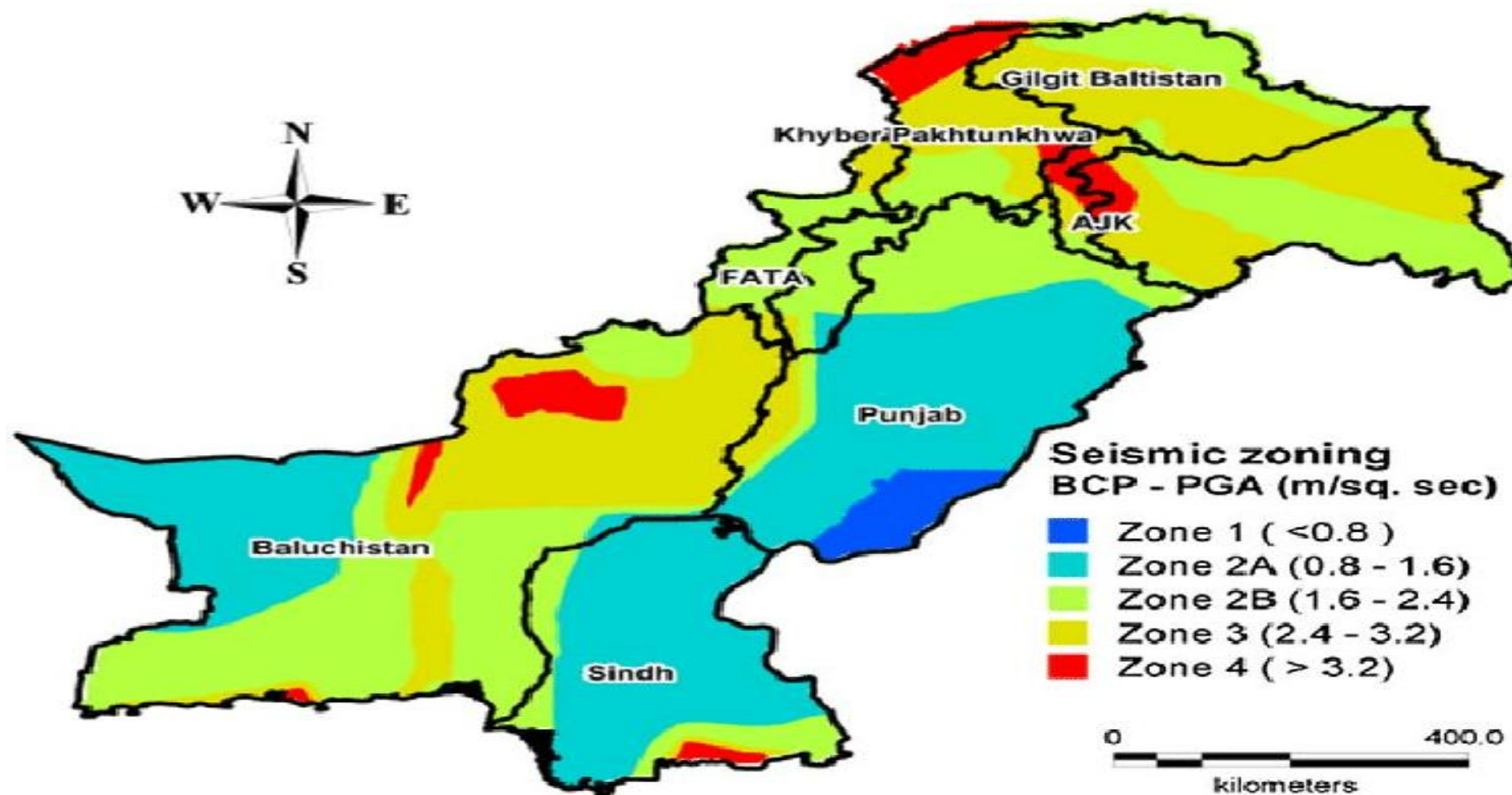
¹⁰ <https://okara.punjab.gov.pk/geography>.

¹¹ Muhammad Shahid Siddique M.S and Jochen Schwarz, M.EERI 2014. Elaboration of Multi-Hazard Zoning and Qualitative Risk Maps of Pakistan. Earthquake Spectra · December 2014.

¹² https://iisee.kenken.go.jp/net/seismic_design_code/pakistan/pakistan_table111.html

Hazards Risk	Likelihood Score (1-5)	Impact Score (1-5)	
Earthquake	5	5	25
Drought	1	1	1
Epidemic	2	4	8
Fire Incidents	1	1	1
Other Major Accidents (Building Collapse, road traffic accidents, train accident, Stampede, plane crash)	1	1	1
Environmental Hazards (industrial accidents, severe pollution etc.)	1	1	1
Risk = Impact x Likelihood Low: 1-7 Medium: 8-14 High: 15-25			

Source: District Disaster Management Plan 2020 (District Okara)

Figure 4-4: Seismologic Zone ¹³¹³ Source: Geological Survey of Pakistan.

4.1.9 Water Resources

Most of the area of the city is equipped with piped water supply system. However, some of the areas are facing water shortage whereas some others have no water supply system and the inhabitants have developed their own water sources because the shallow as well as deep aquifers over here have chemically fresh water but the shallow aquifers are mostly contaminated and cannot be relied on for drinking purposes.

16 No's ultrafiltration plants and 2 Nos. RO plants have been installed in the city at various places for supply of potable water to the citizen and most of the residents are fetching drinking water from these filtration plants.

In total 13 tube wells were originally installed in the city out of which only 7 tube wells are operational¹⁴. There is no area in city with abandoned water supply system because all the areas previously served by the abandoned tube wells are being served by the remaining operational tube wells. However, it has created water shortage in these areas.

4.1.10 Water Quality

Water supply from shallow as well as deep aquifers over here have chemically fresh water but the shallow aquifers are mostly contaminated. No specific primary and secondary data available in context of Kh City. MC Okara has not sampled/analyzed any drinking water since PHED handed over whole water supply infrastructure to MC.

Ground water quality was analyzed and it was observed that the quality of ground water from tube wells is generally fit for drinking all the parameters were found within permissible limit of PEQS¹⁵. Biological analysis showed no contamination of Coliform bacteria in ground water from tube well. Results are depicted in **Table 4-3**.

Table 4-3: Results of Water Quality Analysis Report for Samples Collected from TWs and Tap Water on 12.10.2022

Sr. No.	Parameters	Limit As per PEQS for Drinking water	Results							
			Old Water Works GST	Old GST Household	GST Akbar Road	Tube Well T # 15	Tube Well # 12	Tube Well # 2	M. Pura Akbar Road	GST Chamra Mandi
1.	Turbidity	<5 NTU	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2.	pH @ 25°C	6.5 - 8.5	7.24	7.25	7.48	7.22	7.35	7.38	7.50	7.39
3.	Color	<15 TCU	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4.	Solids, Total Dissolved (TDS)	<1000	928	262	254	208	282	210	208	235
5.	Total Hardness	<500	348	166	132	108	156	120	116	138
6.	Alkalinity, Total as CaCO ₃	--	256	180	180	132	168	132	132	160
7.	Nitrate, Nitrogen (NO ₃)	<50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
8.	Carbonates	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
9.	Hardness, Bicarbonates	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0
10.	Sulfate (SO ₄)	--	32.92	34.57	32.10	25.51	39.51	27.16	26.34	29.63
11.	Chloride	<250	19.56	19.56	17.60	15.64	23.47	15.64	15.64	15.64

¹⁴ GAP Analysis Report, PMDFC

¹⁵ Water Quality Analysis conducted by MMP through SGS Labs

Sr. No.	Parameters	Limit As per PEQS for Drinking water	Results							
			Old Water Works GST	Old GST Household	GST Akbar Road	Tube Well T # 15	Tube Well # 12	Tube Well # 2	M. Pura Akbar Road	GST Chamra Mandi
12.	Electrical Conductivity,	--	456.4	457.8	421	334.3	468.5	341.9	335	393.8
13.	Fluoride	<1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
14.	Arsenic	<0.05	0.037	0.005	0.005	0.039	0.018	<0.005	0.056	0.018
15.	Iron	--	0.008	0.013	0.014	0.022	0.015	0.011	0.013	0.013
16.	Sodium	--	16.40	16.30	21.40	12.10	23.20	13.10	13.10	14.50
17.	Potassium	--	5.15	5.21	6.32	4.39	5.36	4.67	4.45	5.01
18.	Calcium	--	36.40	36.30	26.30	23.90	31.10	27.40	21.90	29.40
19.	Magnesium	--	12.06	12.10	12.30	8.00	11.60	9.30	7.90	10.60
20.	Total Coliform	0 CFU / 100ml	35	33	41	22	Absent	Absent	Absent	46
21.	Fecal Coliform	0 CFU / 100ml	19	21	25	Absent	Absent	Absent	Absent	Absent

4.2 Baseline Ecological Environment

4.2.1 Ecological Resources

Because of extensive cultivations, high population and human activities, there is little wildlife in the project area. However, the local population as well as Wildlife Department have reported some fauna. The following is the wildlife profile of Okara District, in general:

- **Mammals:** Common mammals reported from the project area wild-bore, hyaena (*Hyaena striata*), red Indian foxes (*Vulpes bengalensis*), porcupines and jackals (*Canis aureus*). Until a few years ago the wolf (*Canis palfies*) was also found in riverain forests, but the species has almost become extinct due to loss of forests.
- **Birds:** The commonly found birds of the area are hawk, kite, partridge and common crow. A large variety of waterfowls and migratory birds also visit the region because of the barrages and wetlands in the area.
- **Reptiles:** Because of hot and humid climate of the region, some populations of reptiles have also been reported from the project area. Reptilian and amphibian fauna is not well documented. However, local people have reported that snakes and lizards are common in the region.

Wild-bore are reported to be inflicting serious crop damages, mainly to sugarcane and potatoes crops. Some degree of illegal hunting, poaching and trapping has been reported from the project area.

4.2.2 Forest Resources

The entire Okara District has no natural forests, mainly due to vast agricultural activities. Until a few decades ago Ravi River was well known for riverain forests, known as Bela forests, which have almost become extinct due to lack of water. Except Pipli Pahar irrigated plantations of 7,275 acres, the district has no other reserved forests. However, according to an old provincial notification, the trees along canals, provincial highways and rural roads are the responsibility of forest department, and fall in the category of reserved forests.

The dominant tree species in this zone are Sheesham (*Dilbergia sisoo*), Keekar (*Acacia arabica*), Peeloo (*Salvadora persica*), Bohar (*Ficus religiosa*), Gaz (*Tamarix indica*), Nim (*Azadirachta indica*), Eucalyptus and Mesquite (*Prosopis juliflora*), the last two being the exotic species and mesquite has suppressed endemic species to a great extent. The endemic species of Peeloo and Bohar are reported to be endangered, as the forest department is not propagating the same, and similarly the wild berry (*Zizyphus numularia*) has almost become extinct.

Local farmers are practicing a small degree of farm-forestry in the project area to meet their fuel-wood and other day-to-day needs. The common species in such plantations are Poplar (*Populus alba*), Eucalyptus, Keekar (*Acacia arabica*), mulberry (*Morus alba*) and Jamun (*Syzygium cumini*).

4.2.3 Fish Resources

It is reported by the Fisheries Department that the main fish species found in Canal are Gulfam (*Cyprinus carpio*), Rahoo (*Lebeorohita sp.*) and Mohri (*Crhinus miragata*). The Department has conducted no methodical fish surveys of fresh water streams and canals, in the recent past. Because of the construction of several barrages on the river network, migratory species like Khagga, Bam and Pamphlait have almost become extinct in Punjab waters and Soal and Shangri are considered to be highly endangered.

4.3 Socio-Economic Baseline of Okara City

The Okara city is situated 130 km in the South-East of Lahore, Punjab, Pakistan. The location of the city is in between 30° 18' to 31° 08' north latitudes, and 73° 14' to 74° 09' east longitudes. The district is bounded on the East by Kasur District, and on the West by Sahiwal and Pakpattan Districts. These two Districts are separated from Okara by the River Ravi, which forms a natural boundary for the whole length (about 40 km) of Okara district. On the south of Okara is Bahawalnagar district, and the Indian border lies on the South Eastern side of the district. The city consists of 10 union councils. It is the capital of the Okara District, and it is also known as Mini Lahore. The Sutlej River is located to the east, while the River Ravi is 100 km to the West. It is famously known as the Land of Warriors for the bravery of its people. The region shares borders with Bahawalnagar in the South, Kasur in the East, Nankana Sahib and Faisalabad in the North, Pakpattan in the South-West, and Sahiwal in the West. With its proximity to neighboring India in the south-east, the area is strategically and geography significant. It is the milk lake of Pakistan as it produces the highest amount of milk in the country. This town is the birthplace of many well-known artists and politicians.

4.3.1 History of Okara

The Okara is a historical place, and several historical records suggest that the region is 3000 BC old. Archaeological artifacts and remains of ancient civilizations attract visitors from all over the world. During the Indus Valley Civilization, the area was an agricultural region with forests. The title is attributed to Okan, the name of the tree. According to some historical accounts, it was initially known as Okanwala. This area was under the influence and control of several dynasties. The invasion and settlements of Aryans, Daradas, Kaikayas, Kambojas, Kurus, Madras, Malavas, Pauravas, Saindhavas, and Yaudheyas in this region are mentioned in historical accounts and legends. The Alexander the Great could not only conquered this territory but also due to the bravery of native people. He was defeated in 331 BCE. He died because of the wounded in the battle. Later on, he became the battle ground for people such as the Turks, Mughal Emperors, Arabs, Tughlaqs, Persians, Mangola, Merhattas, Sikhs, Lodhis, and Hindus. Historians described that the Empires, such as Maurya, the Indo-Greek Monarchy, the Kushan, the Gupta, the White Huns, the Kushano-Hephthalites, the Turkish and Hindu Shahi Kingdoms, also ruled Okara. Delhi Sultanate ruled this region from the year 1206 to 1526, the Rajpoots controlled over there. Then

Mughals. Sikh took over this territory from the declining Mughal Empire. In 1849, the British invaders seized control of the region after defeating Sikh rulers. The people of this region stood up against the British Empire in the famous Independence War of 1857. The natives fought gallantly and gave defeat to the British army and their regimes. During the British Empire, the Okara district formed a part of the Montgomery district, first it was known as a small town then it became a tehsil. Till 1918, the Okara was a town, a part of the then Gogera (Gugera) Tehsil of Montgomery district. This town began to develop and expand after the construction of both the Lower Bari Doab Canal (in 1913) and the Pakpattan Canal (in 1925). In 1918, another tehsil (Okara) was created within Montgomery district, called with the Okara city as its headquarters. It remained a part of Montgomery district (now Sahiwal district) till 1982. In 1982, Depalpur, Renala Khurd (called Shergarh at the time), and the Okara Tehsils were formed into one district named Okara. Okara City has been named after a tree called Okaan (tamarisk) which is found in abundance in the area. At first the area was called Okaanwali which transformed into Okara over time. The early history of the district has been recounted in the chapter on Sahiwal district; here, the history of two of its tehsils is being recounted.

4.3.2 History of Satghara

The Satghara located in Okara tehsil is historically home to an ancient civilization. Some coins discovered in the region showed that it was inhabited at the time of the Kushan Dynasty. This town also contains of the grave of Mir Chakar Khan Rind, the Baloch folk hero. There are two theories as to the origins of the name of the town Satghara. It is believed that the village was named Satghara because it was destroyed by floods and then rebuilt seven times. The second account states that some injured soldiers of Alexander the Great (belonging to the ancient town of Stageira of Macedonia) resided in the region and named this town / village Stageira, now corrupted as Satghara. The earliest recorded history of Satghara is linked to the history of Mir Chakar Khan Rind, the Baloch war lord, recounted in brief here. He born in 1468, Mir Chakar Khan Rind lived in Sevi (modern Sibi) in the hills of Balochistan and became the head of the Rind tribe at the age of 18 after the death of his father, Shiahak Khan Rind. The Rinds, under the leadership of Mir Chakar Khan Rind, and the Lasharis led by Mir Gwahram Lashari, had a minor dispute over horse racing, which evolved into a 30-year war which is the main theme of classical Baloch poetry. During this war, both sides made allies with other nations; the Rinds sought help from the Timurids of Herat (the Timurid dynasty was founded by Timur or Tamerlane) and the Lasharis got help from the Sammas of Sindh. Both these allies pressured the Rinds and Lasharis to end the war, so they finally disengaged in 1518. The Lasharis moved towards Thatta and the Rinds towards Multan. Before arriving in Multan, however, Mir Chakar Khan Rind decided to settle near Satghara, choosing the village as his capital city. Here, he constructed a fortification wall around the village with Burj (watch towers) encircling the fort for early warning against impending dangers. Under the command of his son, Mir Shahdad Khan, the Baloch forces joined the Mughal army of Emperor Humayun who had returned to the region in 1555 after a long exile in Persia. Emperor Humayun recaptured Delhi, and ousted the Suri dynasty in 1556. He then conferred a vast Jagir (estate), including horses and slaves, to Mir Chakar Khan Rind. After ruling the area for more than a decade, Mir Chakar Khan Rind died in 1565 and was buried in Satghara. The area was occupied by the Sikh Maharaja Ranjit Singh after the decline of the Mughal Empire. The tomb of Mir Chakar Khan Rind was desecrated and its roof demolished by Maharaja Ranjit Singh, on his way to Multan. In 1849, the area was annexed by the British after the Second Anglo Sikh War.

4.3.3 History of Depalpur

Depalpur Tehsil of Okara district is situated 25 Km from the district capital (Okara) on the bank of the River Beas in the Bari Doab area. The headquarters of the Tehsil Depalpur town has a long and ancient history. The fortified town of Depalpur, in fact, is situated on an old Kushan Site. Coins from the Indo-Scythian era have also been discovered at this site, a discovery that suggests that the region was inhabited as far back as 100 BC. After Multan, this city is probably the oldest city in the Sub-Continent. General Cunningham believed that the mound on which

Depalpur stands may be identified with the Diadala of Ptolemy. According to Shri Avinash Chandra Das (1882-1962; an Indian Historian), the Depalpur was a habitat of the Aryans soon after they entered India around 2,000 BC. However, no recorded history of the region, from the time of Alexander to the time of Mahmud Ghaznavi, exists. Depalpur is located on the route that leads from Khyber to Delhi and as such, was considered to be one of the lines of defense for Delhi. During the Mughal reign, Depalpur Sarkar (the city) had 29 Mahals. According to local traditions, Depalpur was named after Raja Dipa Chand, a one-time ruler of the area. As a fief of Sher Khan (c.1250), it became, with Lahore and Samana, one of the frontier fortresses which defended the Delhi kingdoms against Mongol inroads in the fourteenth and fifteenth centuries. In 1285, Muhammad, son of emperor Balban met his death in a battle with the Mongols near Depalpur and the poet Amir Khusru was taken prisoner. Under Ala-ud-Din, it was the headquarters of Ghazi Malik, afterwards the Sultan Tughluk Shah, and from it he repelled the Mongol raids. Firoz Shah Tughluk visited the town in the fourteenth century and built a large mosque outside the walls, besides bringing a canal from the Sutlej to irrigate the surrounding lands. Near it a Mongol force was defeated in 1358; but though it submitted to Timur (1398) and received a Mongol governor, the people attacked him suddenly, massacred the garrison, and fled to Bhatner. Jusrath, the Khokhar, besieged Depalpur in 1423 and Shaikh Ali, the Mongol leader, tried to take it in 1431; but the Malik-ush-Shark, Imad-ul-Mulk, threw troops into the fortress and the Mongols were forced to retreat. In 1524 it was stormed by Babar, and under Akbar it became the head-quarters of one of the *sarkars* [revenue districts] of the province of Multan. It was still a centre of administration under Aurangzeb. The Marathas seized it in 1758, but abandoned it shortly afterwards. A family of Afghan freebooters held it for three generations, until in 1807 the last of them was expelled by Ranjit Singh (v. 11, p. 359). At the time of the annexation of Punjab by the British in 1849, a district was formed with its headquarters at Pakpattan. This included as much of the territory of the Montgomery district (Sahiwal district) as was part of the Bari Doab. In 1852 some more portions were added and the headquarters was moved to Gogera. In 1865, when the railway was opened, a small town called Montgomery was made the district headquarters and the district was renamed Montgomery. Okara City itself was established in the 19th century and was a small town in Gogera Tehsil at the time of the British annexation of Punjab in 1849. The current city was developed during the British Raj in 06 blocks, with all the houses in each block designed with the same shape and size. This area remained a part of the Montgomery district. It became a tehsil headquarter of Okara Tehsil in 1918 but remained a part of Montgomery district even after Independence, till 1982. Montgomery district was named Sahiwal district in 1967. During the 1857 War of Independence, Gogera tehsil was the scene of an uprising against the British. In 1858 Rae Ahmed Nawaz Khan Kharal, head of the Kharal tribe, led an insurrection against the British in the Neeli Bar area between the Sutlej, Ravi and Chenab rivers. The rebels held the jungles of Gogera and had some initial successes against the British forces, besieging Major Crawford Chamberlain at Chichawatni. A squadron of Punjabi cavalry sent by Sir John Lawrence raised the siege. Ahmed Khan was killed, but the insurgents found a new leader in Mahr Bahawal Fatyana, who maintained the uprising for an additional 3 months until British forces penetrated the jungle and scattered the rebel tribesmen. Present-day Okara district lies on the Radcliffe Line and hence, is militarily very important for Pakistan's defense.

4.3.4 Governmental Structure in Okara

At the Federal level, Okara district is allocated a set number of representatives in both the National Assembly and the Provincial Assembly:

- Number of seats in the National Assembly 5
- Number of seats in the Provincial Assembly 8

Under the Local Government and Community Development Okara district has 1 District Council and 7 Municipal Committees as follows:

- Okara
- Depalpur
- Renala Khurd
- Basirpur
- Hujra Shah Muqem
- Haveli Lakha
- Mandi Ahmadabad

4.3.5 Historical Places in Okara

Following are important historical buildings/ sites of Okara district as well as notable tourist attractions.

4.3.6 Tomb of Hazrat Ghous Muhammad Bala Pir at Satghara

The Tomb of Hazrat Ghous Muhammad Bala Pir at Satghara was a contemporary of Hazrat Bahawal Sher Qalandar of Hujra. His Tomb was built by the Deputy Commissioner of Montgomery (now Sahiwal). An Urs is held every year at the Tomb.

4.3.7 Mound near Depalpur

This mound is connected to the town by a bridge with three arches. The original town was built within four walls with 4 gates facing north, south, east, and west. This wall is still evident in specific patches and some towers are also standing. It is known to have buildings like the temple of Lalu-Jas Rai and an old mosque as well as the tomb of Imam Shah. The ruins of these buildings are still present.

4.3.8 Feroze Shah Tughlaq Palace in Depalpur

This palace is called Naughara. It is occupied by the family of Sayyid Zia-ud Din from Kapurthala.

4.3.9 Badshahi Mosque

The Badshahi Mosque built by Abdur Rahim Khan-i-Khana during Mughal Emperor Akbar's rule, the mosque was turned into a stable during Sikh Rule. A Sufi Saint Hazrat Imam Shah Bukhari, got it vacated, and converted it back into a mosque. His Tomb is also within the mosque premises and a copy of the Holy Quran written out by him is placed with the Gilani family of Depalpur.

4.3.10 Hujra Shah Muqem

This is a town in Depalpur. It is believed that a number of Muslim saints came and preached in this area. One of those priests was Bahawal Sher Qalandar, whose original name was Bahauddin Gilani. He died in 1565 AD. Others include Hazrat Sayed Shah Noor Muhammad, Hazrat Shah Abu Al Ma Ali, Hazrat Shah Muhammad Muqem, Hazrat Saeen Faqir, and Shams Ali Qalandar (who is known as a Sufi saint and Qalandar belonging to the Silsilah Uwaisi, Noshahi Qadiriyya). Qalandar's darbar is located in Shamsabad on the Hujra-Dhuliana Road in Hujra Shah Muqem. This is where his annual Urs is celebrated.

4.3.11 Muaza Akbar Mound

Locals believe that the village was named after Mughal Emperor Akbar the Great who visited this location. The tomb of his spiritual leader Sayed Ghulam Murtaza Shah is located close to Gogera Sahiwal Road.

4.3.12 Tomb of Hazrat Karmanwala

Tomb of Hazrat Karmanwala or Syed Ismael Ali Shah Bukhari called Ghous-e-Zaman Hazrat Sahib Pak Karmanwala, Okara district.

4.3.13 Thatta Kedona or Thatta Ghulamka Dheroka

The Thatta Kedona or Thatta Ghulamka Dheroka village has become famous for dolls and toys made by village residents. Volunteers from a German NGO, DGFK have been working in this village since 1992 to help the local economy. In fact, a large number of foreigners interested in rural culture, social work, and poverty alleviation, as well as experts in different fields of anthropology come to this village regularly

4.3.14 Gogera Fort

The Gogera Fort is notable for its round towers. There are a few rooms and an old Bakhshis Khana inside the fort. The historical origins of the fort (who built it and when) are not known. According to legend, it was built before the Mughal era. UNESCO experts associated with the Lahore Fort assert that “the Fort is at least 400 years old”. It has been accepted that it was most likely built by one of the chieftains in the area as:

4.4 Basic information about Okara

Name of District	Okara District
District Headquarter	Okara City
Population	3,039,139 persons
Area	4,377 km ²
Population Density	668.4 persons/ km ²
Population Growth Rate	1.6%
Male Population	51.5%
Female Population	48.5%
Urban Population	27.4%
Tehsils	03 Tehsils: 1. Okara Tehsil 2. Depalpur Tehsil 3. Renala Khurd Tehsil
Main Towns	Depalpur, Okara, Renala Khurd, Akhtarabad, Gogera, Jaboka, Karmanwala, Mandi Ahmadabad, Satghara, Shergarh, Rajowal, Chuchaq, Thatta Ghulamka Dheroka (Thatta Kedona), Basirpur, Haveli Lakha, Kot Gujjaran, Hujra Shah Muqem, and Lasharian
Literacy Rate	55%
Male Literacy Rate	63%
Female Literacy Rate	47%
Major Economic Activity	Agriculture with its Allied Livestock Breeding, & Fishing 34% Manufacturing 3.7% Construction 36.3%

	Wholesale/Retail Trade, Hotel/Restaurant	6.3%
	Transport, Storage & Communication	2.1%
	Community, Social & Personal Services	15.2%
	Others	2.4%
Main Crops	Wheat, Cotton, Maize, Rice, Sugarcane, Bajra, Maash, Moong, Masoor, Jowar, Rapeseed, Mustard, Barley, Gram, Groundnut, Sesanum, Sugarbeet, Guarseed, Linseed, Sunflower and Sunn Hemp	
Major Fruits	Citrus, Bananas, Mangoes, Guavas, Pomegranates, Jaamun, and Phalsa	
Major Vegetables	Chilies, Onions, Potatoes, Tomatoes, Coriander, Turmeric, Garlic, Peas, Turnip, Cauliflower, Carrots, Okara, Cabbage, Spinach, Radish, Cucumber and Mint	
Forests (area)	3,000 HA	
Total Black Topped Roads	2,584.3 Km	
National Highways	46 Km	
Motorways	– Km	
Provincial Roads	2,351.8 Km	
Sugar Cess Roads	186.5 Km	
No. of Grid Stations	09 Grid Stations, ranging in capacity from 66 KV to 132 KV	
No. of Telephone Exchanges	30 Telephone Exchanges, ranging in capacity from 50 lines to 49,155 lines	
Industrial Estates	There is no Industrial Estate in the district, but there are 395 small, medium, and large enterprises	
	Cold Storage/Ice Factories	104 Units
	Cotton Ginning & Pressing	27 Units
Major Industry	Agricultural Implements	61 Units
	Rice Mills	97 Units
	Surgical Cotton/Bandages	28 Units
Household Size	6.6 persons per house	
Houses with Piped Water Inside	14.6%	
Houses with Electricity	69.4%	

4.5 Climate

The climate of Okara is usually warm and dry. The coldest months are December to February, when temperatures may drop to 3 C (37 F), with moderate rainfall. The hottest months are May to July, when temperatures may reach 45°C (113 F). The annual average rainfall in the city is approximately 548 milli meters (21.6 in).

4.6 Geography

The Okara is situated at a distance of about 127 Km South-West of Lahore on National Highway (G.T. Road) and on Lahore to Karachi Main Railway Line and 39 Km to the East of Sahiwal on the National Highway. Its approximate height above Sea level is 500ft. It's bearing longitude 31° North and Latitude 74° east. There are number of different kinds of grasses and other plant of slow growth is considerable. But there are not more than half a dozen species of trees of spontaneous growing with plenty of water the sounding area of city might became very fairly wooded. Near the river there is a good quality of timber, and along Khanwah Canal and in the villages adjoining it more especially to the south. There is a fine belt of trees, while the abandoned station of Gogera

presents specimens of most trees found in the plains of upper India. The trees commonly met with are Ukkan, Kikar, Beri, Jand, Van and Karil. No special species of animal worth mention are to be found. Only in the riverine tract in the Depalpur Tehsil, stage deer is occasionally seen. Endemic however, is the menacing wild boar in the riverine belt of Sutluj and Ravi Rivers. They damage crops, and are shot down by farmers and occasionally are prey to concerted anti-wild boar campaigns. No special species of animals worth mention are to be found. Only in the riverine track in the Depalpur tehsil, stage – deer is occasionally seen. Endemic, however, is the menacing wild boar in the riverine belt of the Satluj and Ravi. They damage crops, and are shot down by farmers and occasionally are prey to concerted anti-wild boar campaigns. Around the forest plantations, gray partridge is found, and there is duck and teal in the water spots along the river banks of the Satluj and the Ravi during winter.

4.7 Okara Climate

The climate is typically mild and dry. The summers are hot, and temperatures may rise as high as 113°F (45°C) from May to July. The winter is cold when temperatures can drop to 37°F (3°C) from December to February. The average rainfall per year is 200 mm. Environment Conditions The climate of Okara is hot in summer and comparatively cold in winter. May and June are the hottest months when temperature rises up to 44°C. The Monsoon starts at the end of June and remains by the middle of September but the average temperature is 36°C. January is coldest month with average temperature of 6°C. The annual rainfall is 490mm. Water table in Okara city is 40 to 165 ft. and up to this level the water quality is unfit for drinking purposes. From above 165 ft. the water quality is good and fit for drinking. Municipal Wastewater is being disposed through sewerage system. There is also drainage system exist. Untreated waste water is being utilized by the nearest farmers as well as disposed off into seepage drain. TMA, Okara also sale out waste water at two places. There is no proper solid waste management system existed. There is no sanitary landfill available. Poor sanitation can be seen in many areas. District Environment Department arranged public awareness campaigns. But still solid waste is not properly handled by Tehsil Municipal Administration as well as Hospitals and clinic etc. District Environment reports shows that collection and disposal of municipal waste is not being carried out regularly. Dust pollution along the roads is a major problem. The main reasons include lack of proper measures by the road construction department during construction work, also no action against the uncovered tractor trolleys which carries construction material and soil, sand. Smoke and noise pollution by vehicles is the other main issue, emission of smoke from the foundries is degrading the environment level of the Okara City.

4.8 Population

At the time of the 2017 census the district had a population of 3,040,826, of which 1,564,470 were males and 1,476,071 females. Rural population is 2,198,262 while the urban population is 842,564. The literacy rate was 58.28%. Muslims were the predominant religious community with 98.53% of the population while Christians were 1.44% of the population. There are many tribes and clans settled in the Okara District. The majority of the population of Okara are Punjabi speaking Muslims. The main tribes and castes are included, Syed, Malik, Jhujh, Basti Peeran Wali, Depalpur, Shekikhu, Sharif, Channar, Wattus, Mungun, Jhakhar, Klaason, Dhall, Jutt, Rajpoots, Shaikhs, Lodhis, Kharals, Kamyanas, Kumbohs, Khaanzaadas, Noons, Arains, Chaudhary and Baloch are prominent. However, the Jatt population is less compared to other communities. At the time of the 2017 census, 96.10% of the population spoke Punjabi and 2.65% Urdu as their first language. The main Punjabi dialects of the district are Jhangvi or Rachnavi, and the standard dialect. The city is home to 3039139 individuals, according to the 2017 census. The population density of the area is 690/Km² (1,800/sq. mile), the makes it Pakistan's 25th largest city.

4.8.1 Population and Growth Rate

The available population data for MC, Okara is as per 2017 census for the MC boundary notified in 2013, whereas, the study area constitutes the additional areas under extended MC boundary notified in 2019. So, the population for the study area is calculated by first identifying the population of additional areas added in the previous MC boundary of 2013 after extension in MC boundary notified in 2019. Then the population of the 2017 census is projected for the year 2022 (current) on the basis of average Population Growth Rate (PGR) taken from 1998 to 2017. Furthermore, the population projection up to the year 2050 as per project requirement has also been calculated.

4.8.2 Past Population Trends

The population for Okara MC from 1972 to 2017 as per census of respective years have been given below in **Table 4-4**.

Table 4-4: Past Population Trend of MC, Okara (1972-2017)

Year	Population
1972	84,334
1981	127,455
1998	201,815
2017*	358,146

* Population of 2017 indicates the total population within MC boundary of 2013 that is updated as **463,429** persons for the updated boundary of 2019 calculated from the census block of 2017 population

4.8.3 Population Projection Up to Year 2050

The population projection is an estimated calculation of the number of people expected to inhabit a particular place at a future date, based on data on the current population size and the expected natural-growth trends. These trends include births, deaths, fertility rates, occurrences of calamities or natural hazards; political developments, and migration. These projections are a useful tool for policy dialogue and program planning. They help stakeholders plan for the near and distant future and identify potential issues for policy makers.

Average annual growth rate for 1998-2017 taken from Population and Housing Census Report of 2017¹⁶ is 3.06%. This growth rate is used for the population projection up to the year 2022 and it is expected to increase slightly in future as significant development in terms of industrial zones and economic activities are expected during the next ten years. Moreover, the past trends from 1951-2017 (1951-1998 censuses¹⁷ and Census Report of 2017) show fluctuation in growth rate during said period i.e., 1.94% to 4.70% to 2.74% to 3.06% in periods 1961-1972, 1972-1981, 1981-1998 and 1998-2017 respectively. Therefore, based on past growth trends and after mutual consensus of in-house experts and professionals, the growth rate used for the population projection of Okara MC from 2022-2032, 2032-2040 and 2040-2050 is taken as 3.06% (PGR of 2017 census), 3.56% (slight increase from PGR of 2017 census) and 3.25% (slight decrease from assumed PGR for 2032-2040) respectively (**Table 4-5**).

¹⁶ ibid

¹⁷ https://www.pbs.gov.pk/sites/default/files/population/1998/administrative_units.pdf

Table 4-5: Population Projection of MC Okara

Year	Growth Rate	Population Projection
2017	3.06%	463,429
2022	3.06%	538,808
2025	3.56%	598,425
2030	3.56%	712,804
2032	3.56%	764,459
2035	3.25%	841,443
2040	3.25%	987,358
2045	3.25%	1,158,578
2050	3.25%	1,359,488

4.9 Ethnic Group

The society is composed of several ethnic groups with their unique heritage and cultural legacies. The Tribes and clans such as Lashari, Rajpoot, Sial, Jats, Shaikhs, Lodhis, Kharals, Kamyanas, Wattus, Kambohs, Noons, Bhutta, Jakkhar, and Khanzadas are well-known.

4.10 Education

Rural population is 2,198,262 while the urban population is 842,564. The literacy rate was 58.28%. Muslims were the predominant religious community with 98.53% of the population while Christians were 1.44% of the population. The literacy rate in Okara is gradually improving with the government's efforts. The majority of the population resides in villages; therefore, special attention is being given to promote education in this region. The contribution of the district government is commendable. There are 4 universities, 20 colleges and 1571 primary and high schools running the educational activities at their respective levels.

4.11 Economy

The Okara's share in economic growth is significantly seen. A strong network of mills and factories products make it a substantial contributor to Pakistan's economy. There is various economic activity related to the Agriculture with its Allied Livestock Breeding, Fishing (34%). Manufacturing (3.7%), Construction (36.3%), Wholesale/Retail Trade, Hotel/Restaurant (6.3%), Transport, Storage & Communication (2.1%), Community, Social & Personal Services (15.2%) and Others (2.4%).

4.11.1 Industry

Since Pakistan's independence, the city has been a significant contributor to the national economy and human resources. There were two textile mills in the area at that time. One of the Textile Mills, Suttlej Textile Mill, was Asia's largest Textile Mill. There are still several mills and factories in the town, providing employment opportunities in the region. Industries such as the International Food industry, ghee, wellness, and rice mills are prominent.

4.11.2 Agriculture

Okara District is famous for its fertile lands, peaceful natural environment and green fields of Potato, tomato, sugarcane, wheat, rice and maize crops. Oranges and Mangoes orchards are common. The area of district Okara is the gold mine for history seekers, spiritual and curious travellers. One can find archaeological remains of different dynasties of prehistory, Indus Valley civilisation, Persians, Ghaznavids, Sultanates, the Mugal Empire, the Sikh

Confederacy and the British Raj. There is a central ridge, in the centre of Okara District, which marks the old river bed of the Beas, and the boundary b/w the eastern and western half of the district. The ridge descends from Kasur, all the way to Chunian, and then Shergarh in Okara. As you go west of the ridge, into Okara & Renala Khurd, the subsoil water is brackish, therefore the area is dependent on canals for irrigation. However, after you cross the ridge east into Depalpur Tehsil, the subsoil water is sweet and good for agriculture. Other produce grown locally includes the outputs of lemon, guava & grape fruit orchards, belonging to the food processing company, Mitchell's Fruit Farms Limited. The orchard runs for about 6 miles, along with the LBDC, from Renala Khurd all the way up to the Okara bypass. Okara is famous for world-class potato production. Okara ranks on the top in potatoes cultivation along Pakpattan, Sahiwal, Vehari and Multan contribute more than 60% of potato produced in Pakistan. The district is renowned for its fertile land, pleasant natural environment, and green fields of potatoes, tomatoes, sugarcane, Rice, wheat, and maize. The cultivation of Oranges and mangoes is abundant. For irrigation, a well-established network of the canal system is established. It is also famous for its Guava, Lemon and grape fruit orchards that belong to Mitchell's Fruit Farms Limited, a food processing company. The orchard spreads along the Lower Bari Doab Canal (LBDC) from Renala Khurd up to the Okara bypass for approximately 6 miles. Okara is very rich in livestock population and production. It is famous for its breed of cattle known as Sahiwal and a breed of water buffalo known as Nili-Ravi. There is a Livestock Production Research Institute as well as Okara.

4.11.3 Irrigation

The Depalpur Canal, off-taking from River Sutlej, was the main canal irrigating Depalpur tehsil, under the Indus Water Treaty, till the waters of River Sutlej were awarded to India and Depalpur Canal was closed at the head. It was later shifted to the Bombawali-Ravi-Bedian (BRB) Link canal. This canal is still the main canal irrigating the district. The main canal irrigating the farmland of Renala Khurd Tehsil is the Lower Bari Doab Canal (LBDC) originating from Balloki Headworks. The Balloki-Sulemanki Link Canal off-taking from the left bank of Balloki Headworks feeds River Sutlej in order to irrigate the areas which were previously dependent upon River Sutlej for irrigation. Other smaller canals/ water courses irrigating the district include Gashkori Minor, Gogera Distributary, and Akbar Minor.

4.11.4 Livestock

Livestock breeding is the second most important economic activity of the district. The following table shows the livestock population as of the 2010 Livestock Census (included in Punjab Development Statistics 2018-19) (Table 4-6).

Table 4-6: Okara Livestock Statistics

Cattle	304,000 Heads	Buffaloes	942,000 Heads	Sheep	134,000 Heads
Goats	293,000 Heads	Camels	95 Heads	Horses	4,251 Heads
Mules	2,386 Heads	Asses	70,536 Heads		

Sahiwal Cow, Nili Ravi Cow, Awasi Sheep, Beetal Goat, Beetal Spotted Goats, and thoroughbred horses are the indigenous breeds of the district.

4.11.5 Poultry Industry

There are 290 poultry farms in total in the district. In addition, there are a number of privately owned poultry farms in the District as follows:

- 321 broiler
- 27 layer
- 13 poultry breeding farms.

4.11.6 Fishing

Fishing is carried out in River Sutlej, Pond Area Sulemanki Headworks, River Ravi, LBDC, Sem Nullah, Kamma Islampura, Pakpattan Canal, Khush Beas River / Nullah, Fordwah Canal, Siddiqia Canal, Balloki-Sulemanki Link Canal, Khanwah Canal, Lower Sohag Canal, and Gogera Branch Canal.

4.12 Tourism

Archaeological relics of various prehistoric dynasties such as the Indus Valley civilization, the Persians, the Ghaznavids, the Sultanates, the Mughal Empire, the Sikh Raj, and the British Rule mesmerizes the tourists. Weather analysis and reviews suggest that October and November are the best months to visit Okara. The minimum and maximum temperatures vary from 13°C to 27°C. Following is the list of some of the prominent and worth visiting landmarks:

- Depalpur Fort
- Company Bagh (Captain Safder Shaheed Park)
- Yaadgar-e-Shuhda
- Old Mound Grave Yard
- Moza Akbar
- Thatta Ghulamka Dheroka
- Sulemanki Headworks
- Sadki Check Point

4.13 Languages

The people of Okara can speak and understand the following languages according their territory.

- Punjabi
- Haryanvi
- Rangri
- Majhi
- Jhangvi
- Rachnavi
- Urdu
- English

4.14 Travel

The city can be reached from anywhere in Pakistan. Many bus services are operating to carry and bring in people from all over the country. National Highway N-5 links the city for visitors traveling by road. People using rail services can embark and disembark at the Okara Railway Station.

Airports near Okara include:

- Okara Cantonment Airstrip, 11.68 km
- Faisalabad International Airport (LYP), 75.37 km
- Bahawalnagar Airport (WGB), 97.89 km

4.15 Sewerage and Drainage

Okara city comprises a combined sewerage system installed many years ago and covers about 71% of the population. There are few roadside drains connected to existing sewers or nullahs. The wastewater network consists of Laterals, Mains, Trunk mains, Disposal station and Sullage Carriers.

At present, the increased population and improved socio-economic conditions have exerted immense pressure on the city sewerage system. A part of the system is outlived and its capacity has decreased due to additional built-up area and with little capacity available in sewers due to saturation of population for which it was designed. As a result, sewer chocking causing unhygienic conditions are evident in the city. This situation warrants to improve existing sewerage system as well as to enhance the sewerage coverage in unserved areas. The detail of existing sewerage system in Okara city is discussed in the following sub sections.

4.15.1 Boundary of Existing Sewerage System

There exist two boundaries in the Okara city such as MC boundary under PLGA 2019 and MC boundary under PLGA 2013. The previous MC boundary of year 2013 was extended considering the growth of the city.

4.15.2 Sewerage System in Municipal Area

The existing sewerage system in Municipal Area consists of three zones namely Zone 1, Zone 2 and Zone 3, the layout plan has been shown in Figure 2.3. The detail of these zones is as under:

4.15.3 Zone 1

Zone 1 mainly encompasses areas including Eid Gah Road, Depalpur Road, Benazir Road, Stadium Road, Fawara Chowk, Shah Ali Town, Sabri Colony, Mehboob Villas, etc. etc. and is spread over an area of 8.15 Km².

The sewerage network comprises sewers varying in diameters from 12-54 inches with total length of 74.3 Km to provide sewerage facilities to the people in this zone.

(a) Disposal Station at Chak No. 2/4 L

At present, the discharge of trunk sewer under gravity is discharged at Disposal Station (Chak No. 2/4L) from where it is pumped into storm water drain through sullage carrier. Sullage Carrier is built on the LBDC canal to cross the canal. Due to inadequate capacity of sullage carrier, the wastewater from sullage carrier is overflowed to

private lands which is also a source of nuisance for residents of nearby lands. In order to address this issue, the farmers have made diversion of wastewater to the LBDC canal thus causing pollution in the canal. As this canal is main source of water for some water supply schemes in the city, therefore, the contaminated water from the canal for onward supply has become a major issue these days. For resolving this issue, the possibility is to enhance the section of the sullage carrier so that it can contain wastewater without overflowing into land. The detail of the existing sewerage system in Zone 1 is given in **Table 4-7**.

Table 4-7: Existing Sewerage System in Zone 1

Sr. No.	Description	Quantity
1.	Sewer Length (12" - 54" dia)	74.3 Km
2.	Katcha Nullah length	581m

4.15.4 Zone 2

This zone comprises areas including Johar Town, Saad City II, Fawad Villas, Bari Town, Fateh Town, Gulshan Colony, Latifabad, etc. which spreads over an area of 3.68 km². The existing sewerage network comprises sewers with diameters ranging from 12 to 48 inches with total length of 38.31 km length to provide sewerage facilities to the people in Zone 2.

(a) Disposal Station at Chak No. 1/4 L

The trunk sewers in this zone are discharging wastewater at 1/4L Disposal Station. The sewerage system in this zone is relatively new one and no problems of flooding on streets have been observed. The Sullage Carrier is built on the Lower Bari Doab Canal (LBDC) to cross the canal. The ultimate disposal of this wastewater is for broad irrigation of land. When wastewater is not required by farmers for irrigation purposes then this wastewater is diverted into LBDC, thus impacting the water quality of the canal and producing pollution in the canal (**Table 4-8**).

Table 4-8: Existing Sewerage System in Zone 2

Sr. No.	Description	Quantity
1	Sewer Length (12" - 48" dia)	38.38 Km

4.16 Water Supply Service

4.16.1 Existing Water Supply System

The existing water supply system in Okara City is based mainly on groundwater. Total twenty-two (22) tube wells have been installed to meet cities water demand.

In the north of the city eighteen (18) tube wells of one (1) cusec capacity each have been installed on the bank of Lower Bari Doab Canal (LBDC) in between the LBDC and 4-L Distributary, out of which fourteen (14) tube wells are functional while four (4) are non-functional. Four (4) more tube wells of 0.5 cusec capacity have been installed on the eastern side of the city on bank of 4-L distributary, out of which two (2) are non-functional. The depth of water table in the city varies from 50 ft. to 60 ft.

The existing tube wells pump water directly into the distribution system and some fill the ground storage tanks (GST) from where, it is again pumped into the overhead reservoirs to feed into distribution system or pump directly into the distribution system through turbine pumps installed on the GST.

It is inferred that the tube wells and water distribution pipes were installed with the increase in demand. Most of these tube wells were installed during the span of 1980's -1990's, so their discharge is low and machinery is outlived.

To fulfil the water needs of the city PHED has developed two schemes on the east and west side of the already installed tube wells. These schemes comprise of 26 number of tube wells. Scheme No. 1 on western side has 12 tube wells, while Scheme No. 2 on eastern side has 14 tube wells. However, MC has not taken over due to lack of resources. Presently, the tube wells have been capped and can be used in future.

The existing water supply system in Okara City is discussed under the following sub-sections:

- The population of the city both present and future is a prerequisite for determining the water requirements. As per Pakistan Bureau of Statistics (PBS), Data of Census 2017, the population for the year 2017 in Project Area is 463,429 persons. With annual growth rate of 3.06% (as per Census Report 2017), the present population in Project Area for the Year 2022 is about 538,808 persons.
- **Boundary of Existing Water Supply System:** There exist two boundaries in the Okara City such as MC boundary under PLGA 2019 and MC boundary under PLGA 2013. The previous MC boundary of year 2013 was extended considering the growth of the city. As informed, the MC boundary of year 2019 is the updated boundary for provision of water supply facilities and other utilities.

4.16.2 Water Source

4.16.3 Surface Water Source

Lower Bari Doab Canal (LBDC) is flowing at the western periphery of the city with designed discharge of 9800 cusecs. The average flows in this canal vary from 6500 to 8500 cusecs depending upon the water availability in the River Ravi. To meet with the future water demand, this canal may serve as water source for domestic uses after treatment by constructing a water treatment plant of suitable capacity.

4.16.4 Groundwater

The canal is unlined and recharging the ground water in narrow belts on both sides with fresh water. The city has marginally fresh ground water near to the canal but the subsoil water of most of the city is brackish and unfit for human consumption. Skimming tube wells have been installed on the left bank of this canal to harness fresh subsoil water from the shallow aquifers being recharged by the canal. At present, there are about sixteen (16) functional [1] tube wells in the city. The Depth of these tube wells ranges between 370-400 feet. These tube wells are not working with their hundred percent efficiency.

4.16.5 Existing Water Supply System

The existing water supply system of MC Okara comprises tube wells, distribution pipelines, ground storage tanks, pump houses and overhead reservoirs (OHRs). The pumping hours are about 6 hours and daily water production in the city is 2.03 MGD. Some filtration plants have also been installed in the city to facilitate the residents. The details of the System Components under the jurisdiction of MC Okara are given under the succeeding paragraphs:

4.16.6 Tubewells

The water is supplied to the city through direct pumping. The existing tube wells pump water directly into the distribution system and some fill the ground storage tanks (GST) from where it is again pumped into the overhead reservoirs to feed into the distribution system or pump directly into the distribution system through turbine pumps installed on the GST.

4.17 Solid Waste Management

Solid waste generation in Okara is about 105 tons per day. Most of the town is covered by solid waste management system. Detail of service level in Mohallah and roads along with location of container. Solid waste management in Okara comprises of primary collection from streets, secondary collection and final disposal. After sweeping the streets and roads the sanitary workers carry the solid waste in wheelbarrows driven manually and collect at certain collection points. Sanitation staff starts work at 5:30 am each morning and ends the first shift at 9:30 am. Second shift is between 2:00 pm to 5:00 pm. Okara city is observing poor state of Solid Waste Management. Open heaps along the road and nullah are common in the city. The reason for this poor condition rests on the inadequate Human Resource and Equipment. Due to insufficient machinery, lifting frequency of containers is usually once a week. This piled up waste causes the nuisance and is a potential health hazard to the community.

4.17.1 Waste Generation

Estimated daily solid waste generation in the city is 215 tons/day¹⁸.

4.17.2 Waste Collection

The collection efficiency is approximately 66% and remaining 34% remains as a back log which is found scattered at the open spaces, along the railway lines and in the drains. MC Okara waste collection system is container based and filth depot. The city has 15 containers of 5m³ placed at various localities of the city. 7-8 filth depots are also serving as temporary collection points.

4.17.3 Transfer and Transportation

Currently MC Okara does not need to have any transfer station as the dumpsite is located at 3.6 Km away from the center of the city.

4.17.4 Workers transport Disposal

The waste from containers and filth depots is hauled to the existing dumpsite located near Dera Ala Pull (Coordinates 30.824800, 73.427100). The dumpsite is along the bank of Lower Bari Doab Canal and thus pose a serious threat to the environment. The site is 3.6 km away from the city center the waste to the containers or filth depo. From where it is transported to the dumpsite by container carrier or tractor trolley.

4.18 Urban Transport Service

Okara was originally planned as a colony/mandi town on the pattern of radial planning. Commercial zones lead to a central point and residential block on the back. The roads are straight and wide having right of way varying from

¹⁸ Assumed per capita waste generation 0.4kg/person/day

28ft -99ft. Congestion prevails throughout the town especially in central areas due to the lack of proper development control. Major roads passing through the town are GT road and By-pass Road. Lahore-Multan Road: G.T. Road that passes through the city is the main artery of entire road network. Being on the main G.T. Road, has led different land uses to concentrate along the Highway. Its repercussions are twofold. On one hand, lot of traffic both slow and fast moving had been generated on the Grand Trunk Road, causing obstruction in through traffic, accident hazards and lack of flow of fast-moving vehicles. Commercial activity and residential areas have sprung up along the G.T. Road. In addition, present Bus Stand created a lot of congestion. This haphazard development created need for diverting the through traffic outside the city area. Therefore, By Pass Road was constructed in the south of the town. This road diverts from the G.T. Road in the southern direction, runs parallel to the town and then joins the Highway in south west of the town. With the construction of by pass, all of the fast moving through traffic moves without being obstructed by the slow-moving traffic. The roads that are frequently in use but are in extremely bad condition are Tehsil Road, Chamra Mandi Road, 36/2-L Road, Jane Maola Road, 27/2-L Road, Khan Baba Road, Sabzi Mandi Road, Old Mall Mandi Road and Ghalla Godown Road. The surface condition of all of these roads is very poor. There are pot holes, broken surface that causes hindrance in driving and smooth flow of traffic. During rains, due to lack of adequate drainage services water stays for days on the roads. This further deteriorates the surface condition. Only Church Road and Tehsil Road have some partial drainage and street lights available, and all rest of the roads mentioned above are without street lights, drainage and adequate surface condition. There is one major flyover in the centre of the town on Okara - Faisalabad Road. It was Constructed by Highway department. It is very important as it connects the town bifurcated by the railway track. It saves time and energy. Under this an under pass has been constructed on Benazir Road. Another by pass was constructed on GT road and the road passing under in ¾ L road. These structures facilitate flow of traffic in Okara. The entire town of Okara due to lack of proper planning suffers from traffic congestion. The most acute is along Faisalabad - Okara Road. Although a bypass has been constructed that diverts the through traffic outside the city area but due to ribbon development a number of commercial and institutional activities are situated here. This results in generating traffic both fast and slow.⁶ There is no Signal on any Chowk and no urban bus or Vagon services are available. On all roads mostly motorcycle rickshaws or Auto Rickshaws are being used as urban transport services. Due to rapid expansion of the city and 14.38 annual vehicle growths indicating, the immediate attention to improve transport infrastructure and provide urban transport services.

4.19 Historical and Archaeological Places

4.19.1 Astana Alia Ghousia Shaikhu Sharif

This group is created for the lovers of Hazrat Muhammad (PBUH) and its Aal-e-Pak, the purpose of this will to share the real teachings of Oliya Allah (who are the true representative of pure teachings of Islam). There is indirectly attach with astana-e-aliya ghousia shaikhu sharif, Okara a Tomb of great Sufi Saint Hazrat Sarkar Saa'id Muhammad Gilani (R.A) (ulaad pak of sarkar Ghous Pak and having a great tree of oliya Allah). It is one of the great darsgha and khankha of Pakistan and have many devotions for Islam. till now their decaners are working a lot to spread the real preachings of Islam as my peer o murshid (May God give him long life) who is one of the great personalities of Shaikhu Sharif of this time always tell us that "Islam is not the name Sectorism so be true Muslim and don't divide yourself in the boundaries of Sunni, Shia and Wahabi but just make yourself a true lover of Prophet Muhammad (PBUH), ***"if u want success, it the life here and here after respect everyone and be a true ghulam-e-punjtan so that at that day you can stand under the flag of Imam-e-Zamana Hazrat Imam Mehdhi (A.S) and that day is not so far"***. So our mission will be spread this voice of truth (a real massage of aliya Allah). so promote this page as much as can it is a *sadqa-e-jariya dua hai k Allah (JSH) hamen rahay seratemustakeem ata kary aur hamara shumaar ghulaman-a-punjtan mein kary na k dusmanany punjtan me kuenk ghulaman-e-punjtan thu Imam-Zamana (A.S) k jhanday talay hun gay or dushmanany punjtan lashkary dajjaal*

me note: here you can also put your questions regarding any issue or your religious thought and i take your questions to my peer-o-murshid (a present representative of *astana-e-aliya ghousia shaikhu sharif*).

4.19.2 Hazrat Karmanwala Sharif

the Dargah of Hazrat Karmanwala Sharif, which is a part of the Naqshbandiyya Order. It is an empirical discussion of the Naqshbandiyya order and its role in social structure, also rethinking of spiritual practices at the Dargah. This study tries to find out the answers of the following research questions: Why do people visit Dargah of Karmawala Sharif? What sort of practices is carried out at the Dargah? How does the culture influence the religion? The study argues that the Sufis of Karmawala Sharif were above prejudice in their dealings with the masses, irrespective of their caste, creed, religion and gender. These Sufis were of the view that Sufism is only way to access Allah in light of the teachings of Holy Quran and Sunnah, therefore they spread message of love, peace and harmony across the humanity. These were the Pirs of Karmawala Sharif which kept in the balance in the Muslim rule, the colonial and postcolonial period. The Sufi dargah noble mausoleum (mazar-i-sharif) (also formally known as "Darbar Mubarak") of Syed Ismael Ali Shah Bukhari (formally: Ghose-e-Zaman Hazrat Sahib Pak Karmanwala), is situated on G.T. Road, Okara in the direction of Renala Khurd leading to Lahore. This mausoleum is formally known as 'Aastana Alia Hazrat Karmanwala Sharif'. Along with the dargah (tomb) or mazar-e-sharif (shrine), there is a main Mosque, Masjid, both of which were constructed under the supervision and according to the guidance of Hazrat Syed Mohammed Ali Shah Bukhari Naqshbandi Sahib, in honour of their late mentor, master, spiritual and biological father, Hazrat Syed Mohammed Ismael Ali Shah Bukhari, Naqshbandi Sahib, who is respectfully referred to as "Hazrat Sahib Pak Karmanwala". Date of Urs: The main Urs Mubarak is held annually on 26th, 27th and 28th February, and on & 10th, 11th, 12th of Islamic month of Rabi-ul-Awal Sharif, annually, Salana (yearly) Khatam Sharif of Ahl-e-bait on 10 Muharram (every year) and program of AITEKAF on every last 10 days of Ramzan al Kareem. Wisaal Mubarak: Syed Muhammad Ismael Ali Shah Bukhari Naqshbandi Sahib, known as Hazrat Sahib Pak Karmanwala - 27 Ramzan 1385 Hijri, Syed Usman Ali Shah Bukhari Naqshbandi Sahib - 15 July 1978 and Syed Mohammed Ali Shah Bukhari, Naqshbandi sahib, 1st Sajjadah Nasheen 10th June, 1993.

4.19.3 Shrine of Daud Bandagi Kirmani (Shergarh)

Shergarh is an historic town, union council and major administrative subdivision of Depalpur Tehsil, Okara District, Punjab, Pakistan. Sher Garh (literally "Lion's Den") is one of the most historic towns of the district, along with Haveli Lakha, Hujra Shah Muqem, Basirpur, Depalpur and Satghara among others. The 16th century governor of Multan, Fateh Jang Khan, named the town after the Afghan ruler of India, Sher Shah Suri, who built a mud fort and had an encampment around the town. This is recorded in Abbas Khan Sarauni's book, "Tarikh-e Sher Shah Suri" (History of Sher Shah Suri). Ancient coins & artefacts have been found, proving that the town must have been inhabited in the time of the Kushan Dynasty. The town is well known all around the Punjab, for a famous late-sixteenth century Qadiriyyah Sufi saint, Daud Bandagi Kirmani, who lived and died in the town. He was born in Sitpur, village of modern-day Muzaffargarh District. His family had migrated from Kerman Province in Persia, and claimed descent from Prophet Mohammad (PBUH). After receiving his formal religious and spiritual education from the pirs of Uch, he established himself in Shergarh, where he lived from then on until his death. He converted many tribes in the present-day districts of Faisalabad, Sialkot Sheikhupura, Hafizabad, Sahiwal & Gujranwala, and although he lived in Shergarh, he did not carry out much of his work in that area because most of the native tribes, such as the Wattu and Joiya had already previously been converted by Baba Farid of Pakpattan. The tribes converted by Daud Bandagi Kirmani include mainly Rajput & Jat clans of the above-mentioned areas. Some of these are Virks, Bajwas, Cheemas, Chatthas and Sahis. He is claimed to have converted 35,000 people to Islam, and 365 people to sainthood in all. Some of his prominent murids include Bala Pir, Abd al-Qadir Bada'uni, Wahab Chishti & Kamal Chishti. The saint died in 1575, after which his nephew and son-in law, Shah Abul Mu'aali, had a beautiful, large mausoleum erected for his grave. This mausoleum is visited by many "murids" in the month of

March, when his urs is held. Apart from his murids, the mausoleum attracts the attention of many curious travellers, artists & calligraphers all year round, as this mausoleum is one of the rare monuments in the country which has calligraphy and tile work in the "Naqashi style". The shrine used to be in the care of the local "Gaddi Nashin" (eldest direct descendant), but after the land reforms of Ayub Khan, it was turned to the Auqaf Department, Okara.

4.20 Sports Activities

One of the sports that some viewers of the Asian Games might not be too familiar with, is kabaddi, which is very popular in Pakistan. So, Danial Khan went to the city of Okara to learn about the discipline's history, and follow its modern evolution, as the country's national team prepares to head to Hangzhou. Kabaddi, often called "Kaudi" in the local Punjabi dialect, has a history that dates back centuries. Rana Imran Ahmad Khan, Faisalabad Kabaddi Association Secretary General "Kabbadi" is in our blood, in Punjab, India, Pakistan, Sri Lanka. It is a game of soil and dust; it is the most popular game in this region. Originating in India, this exhilarating sport was played to develop physical strength, endurance, and mental sharpness among warriors. Over time, it evolved into a competitive team sport. Danial Khan, Okara "Kabbadi" is more than just a sport here, it's a way of life. It brings people together. The cheers of the spectators, the cries of the raiders, and the tackles of defenders create a symphony of emotions that resonate with the rich history of Punjab. One of the most fascinating aspects of Kabaddi is its deep-rooted traditions. From the loud beats of the dhol, to the soul-stirring war cries that echo through the fields, Kabaddi is a symbol of Punjab's rich cultural heritage.

4.21 Traditional Women Art Work

Thatta Ghulamka Dhiroka known as Doll village of Pakistan, is a village in Okara District of Pakistani Punjab. It is situated 27 Km from Okara City on the Faisalabad - Okara Road, 7 Km from Bangala Gogera stop on Faisalabad to Okara Road. It is about 91 Km from Faisalabad International Airport 190 Km from Province Capital Lahore and 400 Km from national capital Islamabad of Pakistan. Thatta Kedona, Doll Village or Toy Village of Pakistan. In this village people make handmade traditional Punjabi dolls and other toys as per Pakistani culture and art work exported all over the world. In the 1990s, famous German artist and designer, visited Pakistan with her husband on request of their student Amjad Ali this visit they saw a handmade doll made by a local woman It gave Siller the ambition to empower this village. She lived in Pakistan for almost five years around 1993, to support the women of the village through handicrafts.

4.22 Results of Socio-Economic Baseline

The baseline for subproject area was established considering physical, biological and socio-economic aspects along the subproject area. The information of environmental parameters was gathered from government departments, through review of literature, and site visits. In addition to this, consultations were held with the general public and major stakeholders of the subproject area in order to seek the public opinion on the implementation of the proposed subproject. Designed questionnaires and focus group discussions were used to interview stakeholders.

4.22.1 Gender Ratio of the Respondents

The gender ratio of the respondents reflected that a majority 88 % were males and remaining 12% were females in the sub project area (**Table 4-9**).

Table 4-9: Gender Ratio of Respondents

Sr. No.	Gender Type	No. of the Respondents	Percentage (%)
1.	Males	177	88
2.	Females	23	12
	Total:	300	100

The demographic characteristics of the sample survey showed that 33% of the respondents were age between 26 to 35 years. 30% of the respondents were up to 36 to 45 years of age. 20 % of the respondents were aged between 40 and above years and 17% were 15 – 25 years. **(Table 4-7).**

4.22.2 Age group of the Respondents

Table 4-10: Age Group of the Respondents

Sr. No	Age Group	Respondents	Percentage (%)
1	15 – 25	34	17
2.	26 – 35	67	33
3	36 – 45	59	30
4	46 and above	40	20
	Total:	200	100

Table 4.11 showing the castes of the male respondents reflected majority of the respondents 30% were Rajput Bhatti and Rao, 20% were Arian, 14% were Gujar 10% were Syed Bokhari, 8% were Jutt and remaining were belong to Baloch, Sheikh, Pathan and Ansari.

4.22.3 Caste of the Respondents

Table 4-11: Caste of the Respondents

Sr. No.	Caste	Respondents	Percentage (%)
1	Rajput / Bhatti / Rao	61	30
2	Arian	39	20
3	Gujjar	28	14
4	Syed Bokhari	21	10
5	Jutt	16	8
6	Baloch	13	6
7	Sheikh	9	5
8	Pathan	7	4
9	Ansari	6	3
	Total:	200	100

4.22.4 Religion of the Respondents

Table 4-12 reflected 97% of the respondents were Muslims and only 3% of the respondents were non-Muslims like Christian.

Table 4-12: Religion of the of Respondents

Sr. No.	Religion	Respondents	Percentage (%)
1	Muslims	193	97
2	Non-Muslims (Christian etc.)	7	3
	Total:	200	100

4.22.5 Educational Status and Facilities

The level of education attainment respondents is shown in **Table 4-13**. From the data showed that the majority of the respondents 28% were Illiterate, 25% were Primary, 22% of the respondents were middle, 18 were matric and 7 were Intermediate and above.

Table 4-13: Educational Status and Facilities

Sr. No.	Education Level	Respondents	Percentage (%)
1	Illiterate	57	28
2	Primary	49	25
3	Middle	44	22
4	High	37	18
5	FA/F.Sc	8	4
6	B.A and Above	5	3
	Total:	200	100

4.22.6 Marital Status of the Respondents

Table 4-14 shows the marital status of the respondents. The majority of the male respondents 77% were married and 19% were unmarried and only 4% were widow or divorced.

Table 4-14: Marital Status

Sr. No.	Marital status	Respondents	Percentage
1.	Married	154	77
2.	Unmarried	39	19
3.	Widow / Divorced	7	4
	Total:	200	100

4.22.7 Number of Dependents of Respondents

Table 4.15 revealed that 560 in number of male respondents were dependent to their parents while 540 females were also dependents to their parents.

Table 4-15: Number of Dependents of the Respondents

Sr. No.	Number of Dependents	Male Respondents	Grand Total
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1	Male Dependents	560	560
2	Female Dependents	540	540
	Total:	1100	1100

4.22.8 Occupation of the Respondents

Table 4-16 depicted that about 35% respondents were labour, 28% of the respondents were businessman, 18% were unemployed, 15% were Agrarian, only 4% were office worker's/Govt. or Private job

Table 4-16: Occupation of the Respondents

Sr. No.	Type of Occupation	Respondents	Percentage (%)
1	Unemployment	36	18
2	Labour	69	35
3	Businessman	56	28
4	Agriculture	31	15
5	Govt/Private. Job	8	4
	Total:	200	100

4.22.9 Monthly Income of the Respondent

Table 4-17 showed that 73% of the male respondents were monthly earning Rs.20, 000-30,000, 19% earning between Rs.31, 000 – 40,000, Only 8% fall in the last two category of income.

Table 4-17: Monthly Income of the Respondents

Sr. No.	Income Level (Rs.)	Males Respondents	Percentage (%)
1	2,000-30,000	147	73
2	31,000-40,000	37	19
3	41,000-50,000	11	5
4	51,000 and Above	5	3
	Total:	200	100

4.22.10 Monthly Expenses of the Respondents

Table 4-18 showed that the 66% of the male respondents were spending their monthly expenses below Rs.30,000, 24% spending between Rs.31,000 – 40,000, 6% fall in the income group of Rs.41,000 and above

Table 4-18: Monthly Expenses of Respondents

Sr. No.	Expenses Level (Rs.)	Respondents	Percentage (%)
1	2,000-30,000	132	66
2	31,000-40,000	48	24

3	41,000-50,000	13	6
4	51,000 and Above	7	4
Total:		200	100

4.22.11 Social Amenities of the Respondents

Table 4-19 shows overall basic amenities of life utilized by the male respondents of Okara. It showed 100% of the respondents were utilizing railways and bus terminal, 82% of the respondents were utilizing electricity, 76% of the respondents were using Sui Gas, 55% of the respondents were still using different land line for internet purposes. 47% of the respondents were used old and choked sewerage system, while 48% of the respondents were using water supply facilities and finally 65% of the respondents were approaching city market for shopping at Okara.

Table 4-19: Social Amenities of the Respondents

Sr. No.	Type of Social Facility	Amenities utilized	Amenities not utilized	Percentage	Percentage	Total Percentage
1.	Electricity	164	36	82	18	100
2.	Sewerage	93	117	47	53	100
3.	Telephone (Land Line)	109	91	55	45	100
4.	Water Supply	96	104	48	52	100
5	Sui Gas	151	49	76	24	100
6	Railways	200	0	100	00	100
7	Tube well	31	161	16	84	100
8	Truck, Bus Terminal	200	0	100	00	100
9	Drainage	0	0	0	0	100
10	Strom Water drain	0	0	00	0	
11	Shopping	129	71	65	35	
12	Disposal station	0	0	00		

4.22.12 Drinking Water Source of the Respondents

Table 4-20 revealed that majority 68% of the respondents were used drinking water from filtration plants of the government or privately installed, 17% were using hand pump or motor 15 % were using public water supply and 17.5% and 70% of the female respondents using water from filtration plant and 30% were using hand pump or public water supply.

Table 4-20: Drinking Water Source of the Respondents

Sr. No.	Source of Water Supply	Respondents	Percentage
1	Hand Pump/ Motor	34	17
2	Public Water Supply	29	15
3	Filtration plant	137	68
	Total:	200	100

4.22.13 Construction Type of the Houses

During the Socio-economic survey of male respondents were also inquired about their house construction type to see the living standard of the respondents. 76% respondents were lived in pacca houses constructed with superior materials (Table 4.21). 10% respondents were living in semi-pacca houses that are made of bricks masonry with mud mortar. 14% of the respondents were living in Kacha (Mud) houses that were made of mud (un-burnt bricks) and with traditional beams.

Table 4-21: Construction Type of the Houses

Sr. No.	Construction Type	Respondents	Percentage (%)
1	Kacha	29	14
2	Pacca	151	76
3	Semi Pacca	20	10
	Total:	200	100

4.22.14 Sensitive Receptors within the Sub-Project Area

Sensitive receptors refer to anything that can be adversely impacted by the disposal of wastewater. Typical sensitive receptors include permanent Schools, Colleges, Mosques, Church, Graveyard. Archeological sites and health providing units. Sensitive receptors are dealt with during a feasibility study. The details of sensitive receptor are given in Table 4-22.

Table 4-22: Sensitive Receptors within the Sub-Project Area

Sr. No.	Response	Number
1	School (Govt. / Private)	5
2	Colleges (Govt. / Private)	1
3	Mosques	5
4	Shrines	2
5	Graveyard (Muslim)	2
6	Graveyard (Christian)	2
7	Archaeological Sites	0
8	Health	DHQ

4.22.15 Utilization Time of the Sewerage Facilities by the Respondents

The Table 4-23 showed that the 37% of the respondents utilized sewerage system facilities for last 21 and above years and 46% of the respondents still have no facility of sewerage. While 6% of the respondents utilizing newly constructed sewerage in the newly settled colonies.

Table 4-23: Availability of the Sewerage System

Sr. No.	Age of sewerage /Period of utilizing	Respondent	Percentage
1	10 Years old	12	6
2	20 Years old	21	10
3	21 and above Years old	74	37
4	Unserved	93	46
	Total	200	100

4.22.16 Current Type of the Sewerage System using by the Respondents

Table 4.24 depicted that 54 % of the respondents were availing covered sewerage, 28% of the respondents were used open drains for their waste water and 18 % of the respondents were still deprived of these facilities.

Table 4-24: Type of Sewerage System Exists

Sr. No.	Responses	Respondents	Percentage
1	Covered	107	54
2	Open Drain	57	28
3	No Sewerage	36	18
	Total	200	100

4.22.17 Which types of Current Issues Confronting by the Respondents

Table 4-25 showed the issues confronting by the community from current sewerage system. Among the 54% of the served community 13.5% respondents replied desilting and 13% of the respondents told old choked sewerage system were major issues causing problems with the system. and remaining 46% of the respondents are still unserved with sewerage facilities.

Table 4-25: Current Issues related to the Sewerage

Sr. No.	Responses	Respondents	Percentage
1.	Need desilting	27	13.5
2.	Chocked pipe lines	26	13
3.	Worsted condition of sewerage	13	6.5
4.	Leveling issues	7	3.5
5.	Rapid increase in population	7	3.5
6.	Shortage of Manhole covers	9	4.5
7.	Problems in current disposals	7	3.5
8.	Shortages of sewer man	7	3.5
9	Unserved	93	46
	Total:	200	100

4.22.18 Level of Satisfaction from Current Sewerage System provided to the Respondents

Table 4-26 revealed that majority 41% the respondents were unsatisfied with the current sewerage system provided by MC to the community other 46% of the respondents were still unserved.

Table 4-26: Level of Satisfaction of Local Community Services Provided

Sr. No.	Responses	Respondents	Percentage
1	Satisfied	26	13
2	Un satisfied	81	41
3	Unserved	93	46
	Total:	200	100

4.22.19 Opinion of the Respondents bout the current existing sewerage system

Table 4-27 reflected the community opinion about the current status of choked and damaged sewerage the majority 39% of the respondents said that the system is very badly damaged and choked. Only 4% of the respondents were in the favor of current system. 43% of the respondents were unserved.

Table 4-27: Current Status of Damaged and Choked Sewerage

Sr. No.	Responses	Respondents	Percentage
1	Good	6	3
2	Very Good	9	4
3	Neutral	6	3
4	Bad	8	4
5	Very bad	78	39
6	Unserved	93	46
7	Total	200	100

4.22.20 Perceptions of the respondents about Drinking Water Contamination Occur with Waste Water Mixing

Table 4-28 depicted that 52% of the respondents said the waste water of current sewerage system is not mixing with drinking water. Only 2 of the male respondents replied in positive manners. The remaining 43% of male and female respondents are still unserved.

Table 4-28: Drinking Water Contamination Occur with Waste Water Mixing

Sr. No.	Responses	Males Respondents	Percentage
1	Mixing	3	2
2	Not Mixing	104	52
3	Unserved	93	46
	Total	200	100

4.22.21 Need Assessment of the Respondents about Current Sewerage System need to Repair/Maintenance/Rehabilitation

Table 4-29 showed that 50% of the respondents replied the dire need to repair and maintenance of the current sewerage system. While 46% of the respondents are still unserved with sewerage facilities.

Table 4-29: Does Current Sewerage System need to Repair/Maintenance/Rehabilitation

Sr. No.	Responses	Respondents	Percentage
1	Dire need	101	50
2	No need	3	2
3	Uncertain	3	2
4	Unserved	93	46
	Total:	200	100

4.22.22 Representation of (in Percentage) the Respondents Availing Current Sewerage Services

Table 4-30 showed 34% of the respondents of the community is being served by the current sewerage system up to 50% to 60%. in spite of 46% of the respondents were unserved.

Table 4-30: Percentage of the community is being served by the sewerage system

Sr. No.	Percentage of the Community Availing Current Sewerage Services	Respondents	Percentage
1	50%	67	34
2	60%	20	10
3	70 %	20	10
4	Unserved	93	46
	Total:	200	100

4.22.23 Paying Bill to the Government by the Respondents

Table 4-31 depicted the whole served community utilizing sewerage services of MC. The majority 54 % of the respondents were not paying any type of bill. While 46 % of the respondents were not realize the importance of bill.

Table 4-31: Is Community Paying Bill to the Government

Sr. No.	Responses	Respondents	Percentage
1	Yes	0	
2	No	107	54
3	Unserved	93	46
	Total:	200	100

4.22.24 Opinion of the Respondent about the Current Requirements of Local Community are being fulfilled by Current Sewerage System

Table 4-32 reflected that the majority 67% of the respondents said the current sewerage system is fulfilled the need of the community up to 50%. 19 % of the respondents don't know.

Table 4-32: How much of current requirements of local community are being fulfilled by Current Sewerage System

Sr. No.	Percentage of Sewerage Fulfilling the Community Need	Respondents	Percentage
1	50 %	135	67
2	60%	18	9
3	70%	10	5
4	Do not Know	37	19
	Total	200	100

4.22.25 Opinion of the Respondents about Fulfil Future Sewerage System Requirements

Table 4-33 is showing that the community is interested by the government initiatives in future for sewerage infrastructure development within their vicinity. 97% of the respondents were replied in yes.

Table 4-33: What the Government should do to fulfil future Sewerage System Requirements

Sr. No.	Responses	Respondents	Percentage
1	Yes	194	97
2	No	6	03
	Total:	200	100

4.22.26 Knowledge of the Respondents about storm water drain present in the area

Table 4-34 showed the storm water drains existing within the area of sub project. The data showed 100% of the respondents said no storm drain present within sub-project area.

Table 4-34: Does storm water drain present in the area

Sr. No.	Responses	Respondents	Percentage
1.	Yes	00	0
2.	No	200	100
	Total:	200	100

4.22.27 Knowledge of the Respondents about Ultimate Disposal for Waste Water

Table 4-35 showed the community awareness about the appropriate disposal of their waste water so the information reflected 100% of the respondents knew that the ultimate disposal of their waste water in the nearest field/ Crops for environment degradation.

Table 4-35: Ultimate Disposal for Waste Water

Sr. No.	Responses	Respondents	Percentage
1	Field/Crops	164	82
2	Irrigation channel/seepage drain	00	
3	Seepage Drain	0	
4	Do not Know	36	18
	Total:	200	100

4.22.28 Thinking of the Respondents about Treatment of Waste Water before Disposal

Table 4-36 reflected about the importance of the WWTP of Okara. The data of male respondents revealed that majority 93% of the respondents were in the favour of waste water should be treated before its final disposal, only 7% of the respondents said no need to treat the water.

Table 4-36: Do you think there should by treatment of waste water before disposal

Sr. No.	Responses	Male Respondents	Percentage
1.	Yes	186	93
2.	No	14	7
	Total:	200	100

4.22.29 View of the Respondents about Acceptance/Opposition for the Sub-Project

Table 4-37 reflected 80 of the female respondents were in the favour of the subproject while remaining respondents opposed the subproject.

Table 4-37: Acceptance/Opposition for the Sub-Project

Sr. No.	Response	Males Respondents	Percentage
1	In favor	160	80
2	Not in favor	40	20
	Total:	200	100

5 Environmental Impacts & Mitigation Measures

5.1 General

The potential environmental impacts anticipated due to the proposed project have been studied related to the construction and operational stages of the project and are presented in this section. In order to ensure environmentally sustainable development, it is imperative that all potential impacts related to the proposed project are identified at an early stage and their mitigation measures are designed and implemented.

5.2 Impact Prediction and Evaluation

Impacts include any changes in the physical or natural environment brought about by the proposed development. The prediction and evaluation of impacts has considered the following:

- **Permanent impacts** - impacts that result from an irreversible change to the baseline environment or which persist for the foreseeable future.
- **Duration of temporary impacts** - impacts that persist for a limited period only. Where possible, these have been classified as temporary, short-term, medium term or long-term.
- **Beneficial Impacts** - impacts that have a beneficial influence on receptors and resources.
- **Adverse Impacts** - impacts that have an adverse influence on receptors and resources.
- **Cumulative Impacts** - the accumulation of effects within the same environmental topic at different locations or the accumulation of effects on different environmental topics at a given location.
- **Inter-related impacts** - where interactions between environmental topics magnifying or reduce an impact, such as landscape and human beings, flora and fauna, water, air and climate etc.

The environmental impact matrices have been developed to indicate magnitude of impacts on different environmental settings for construction and operation phase of the proposed subproject as presented in **Table 5-1** and **5-2**. The following scale has been used for evaluation of impacts:

LA	=	Low Adverse (low/short-term damage to the environment)
MA	=	Moderate Adverse (moderate damage to the environment)
HA	=	High Adverse (severe damage to the environment)
LB	=	Low Beneficial (low beneficial to the environment)
MB	=	Moderate Beneficial (moderate beneficial to the environment)
HB	=	High Beneficial (more beneficial to the environment)
N/A	=	Not Applicable
O	=	Insignificant/No Impact

5.3 Environmental Sensitivity

Environmental sensitive receptors of the subproject area such as schools, mosques, offices, graveyards, shrine, etc. Proper tree plantation will be carried out to reduce the impact of proposed project on the receptors. After the construction of the proposed subproject, the problems of drainage system will be very much solved.

Table 5-1: Environmental Impacts Evaluation Matrix during the Construction Phase

Sr. No.	Project Activities	Physical Environment								Biological Environment		Socio-economic Environment						
		Soil Quality/Erosion	Land scape	Surface Water Quality	Groundwater Quality	Land use	Solid Waste	Air Quality	Noise & Vibration	Flora	Fauna	Worker Health & Safety	Disruption of Public Utilities	Employment	Relocation	Loss of Agricultural activities	Cultural/Religious Values	Breeding grounds for disease vector
1	Removal of Vegetation/trees/crops	O	LA	O	O	LA	LA	LA	O	MA	MA	O	O	LB	O	O	O	O
2	Construction camps, workshops etc.	LA	MA	MA	MA	MA	MA	LA	LA	LA	LA	LA	O	LB	O	LA	O	LA
3	Excavation operations	MA	MA	O	O	MA	MA	MA	MA	LA	LA	LA	LA	MB	O	O	O	O
4	Transportation of construction materials	LA	O	O	O	O	LA	LA	LA	LA	LA	LA	O	MB	O	O	O	O
5	Dumping of excavated material	LA	LA	LA	LA	LA	MA	LA	LA	LA	LA	LA	O	LB	O	O	O	O
6	Open storage of construction materials, fuel etc.	MA	LA	LA	MA	O	MA	LA	O	LA	LA	LA	O	LB	O	O	O	O
7	Earthwork operations	MA	LA	LA	LA	LB	LA	LA	LA	LA	LA	LA	O	LB	O	O	O	O
8	Installation of power generators/Construction machinery/equipment	MA	LA	O	O	O	LA	MA	MA	LA	LA	LA	O	LB	O	O	O	O
9	Construction of Disposal Station at Jahanian Bypass	MA	LA	O	LA	LB	LA	LA	MA	LA	LA	LA	LA	MB	O	LA	O	LA
10	Laying of Force Main	MA	MA	LA	O	LB	LA	LA	MA	O	LA	LA	LA	LB	O	O	O	O
11	Rehabilitation of WWTP	MA	LA	O	O	O	LA	MA	MA	LA	LA	LA	O	LB	O	O	O	O

Legend:

O - Insignificant / no impact

LA = Low Adverse

NA - Not Applicable

LB = Low Beneficial

MA = Moderate Adverse

MB = Moderate

Beneficial HA = High Adverse

HB = High Beneficial

Table 5-2: Environmental Matrix for Operation Phase

Sr. No	Project Activities	Environmental Components		Physical Environment							Noise & Vibration	Biological Environment		Socioeconomic Environment	
		Topog raphy	Soil Quality	Land scape	Surface Water Quality	Ground water	Land use	Solid Waste	Air Quality	Odo r		Flora	Faun a	Public Heal th and Safety	Breeding ground s for disease vec to
1	Resources and Infrastructure	O	O	MB	O	LA	O	O	O	LA	LA	LA	LA	MB	O
2	Screening of wastewater	O	O	O	LB	O	O	LA	LA	LA	O	O	O	LB	LB
3	Retention of wastewater in wet wells	O	LA	O	LB	MB	LA	LA	MA	LA	O	O	O	LB	LB
4	Periodic sludge removal	O	LA	O	LB	LB	O	LA	O	O	LA	O	O	LB	LB
5	Maintenance of Force Main	O	O	O	LB	LA	LA	LA	LA	LA	LA	O	O	MB	MB
6	Maintenance of equipment's	O	LA	O	LB	LB	O	LA	O	O	LA	LA	LA	MB	MB

Legend

O - Insignificant / no impact

NA - Not Applicable

LB = Low Beneficial MA = Moderate Adverse

MB = Moderate Beneficial HA = High Adverse

HB = High Beneficial

5.4 Potential Impacts and Mitigation Measures During Design Phase

5.4.1 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 generation of wastewater by considering population corresponding to the Project Area has been calculated. The proposed waste water treatment plant is designed to deal with increasing population up to the year 2032. The selection of machinery will be for at least 10 years for smooth functioning of disposal station.

Mitigation

The leakages will be controlled by appropriate selection of materials for pipe and accessories suitable for local conditions and provision of optimum pipe sizes.

5.4.2 Selection of Poor Construction Material

Ground water quality may be affected significantly due to leakages by selection of poor material for sewerage pipes and force main. In the end, it can result in health and hygiene problems in the service area. This impact is moderate adverse and permanent in nature.

Mitigation

Public health problems can be overcome by appropriate selection of the locally available construction material, which is safe for human use, and choice of pipe material and sizes fulfilling the requirement of the area.

5.4.3 Inadequate Buffer Zone

Inadequate buffer zone around the disposal stations may cause inconvenience to the local population due to the running of heavy-duty pumps resulting in noise levels and odor generated by sewage especially in areas, which are comparatively densely populated. The magnitude of this impact is considered to be high adverse and permanent in nature.

Mitigation

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 odor.
- Landscaping and plantation will improve the aesthetic value and ecological habitat of the subproject area as well as reducing the impact of noise on the surrounding environment.

5.4.4 Land Use

Land use includes residential, commercial, industrial, recreational, and Institutional activities, among others. A suitable arrangement of the physical elements of land use ensures that a town offers convenience, health and a better quality of life. The city comprises buildings, transportation channels, utilities, social services, and also barren land, which may be used for agriculture purposes. The land use of study area is residential cum commercial along

with agriculture land at some places, barren land for WWTP and some commercial buildings including schools and college, mosques, hospitals/ clinics and shops are present at different locations.

Mitigation:

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

5.4.5 Land Acquisition

No land acquisition is involved in this subproject.

5.4.6 Flora

A number of trees of Sufaida, Bakain, Keekar, Toot, and Sumbal are growing along the alignment of improvement and rehabilitation of sewer lines, but outside the Corridor of Impact (Col). No tree cutting is involved during the execution of the subproject.

Mitigation:

The proposed mitigation measures will include:

- Incorporate technical design measures to minimize removal of these trees, if required;
- Landscaping and plantation will improve the aesthetic value and ecological habitat of the subproject area.

5.5 Potential Impacts and Mitigation Measures During the Construction Phase

Various types of environmental impacts are expected to occur during the construction phase of the proposed Project, which are elucidated hereunder.

5.5.1 Improper Construction Techniques/Monitoring

Monitoring for different environmental and health & safety parameters is very important during different construction operations like excavation and laying of pipes, installation of machinery and construction of WWTP. Provision of inadequate arrangements for monitoring and supervision of construction works may cause damage to the local environment in the form of enhanced public inconvenience, traffic jams, disposal of excavated material, etc. The magnitude of this impact is moderate adverse and temporary in nature.

Mitigation

Proper planning to mitigate these adverse impacts is, therefore, imperative. The supervisory/ monitoring staff should be experienced and qualified enough to handle the excavated material and its disposal in designated places without harming local environment. In addition, trainings may be provided. Supervision and training for the contractor's staff shall also be required. The significance of this impact after considering mitigation measure will be slight adverse.

5.5.2 Soil

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

- Excavation process can destabilize the surrounding land surface, particularly is excavated area is left unfilled for 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 gadgets, machinery and equipment without proper drainage of the washout water can adversely affect the soil quality.

Mitigation measures will include:

- All spoils will be disposed off as desired and the site will be restored back to its original condition;
- Excavation would be kept confined to the specified foundation spots as per the engineering drawings;
- Site camps for the resident labor should not be setup on the land marked for developing green belts;
- Oils, lubricants, chemicals and other listed hazardous materials should be stored safely at the designated spots; enclosures of store rooms, which should be safe from rainfall and away from any potential source of fire; and
- Septic tanks of adequate capacities should be constructed for receiving and treating wastewater from all temporary worksite toilets and the temporary container offices. The toilet wastewater should not be discharged untreated onto the adjacent lands.

5.5.3 Disposal of Excavated Soil

The construction activities and buried infrastructure will require the excavation of significant quantities of soil. This will result in excavated material that can be used for refilling or be disposed of. The impacts on the loss of resource are considered to be moderate adverse and temporary in nature.

Mitigation

Where possible, material should be reused on site for refilling to minimize the amount of virgin soil used and soil disposed off.

5.5.4 Air Pollution

During the construction phase of the Proposed Project, it is envisaged that dust pollution and exhaust gases of vehicular emissions may be generated, which may affect the environment of the proposed Project area. The magnitude of this impact is considered to be moderate adverse and temporary in nature.

Mitigation

The mitigation measure will include monitoring and supervision for strict enforcement/ fulfillment of contractual obligations by the construction contractor regarding control of dust and gaseous emissions to minimize public nuisance, recording and mitigation of all legitimate community complaints, involvement of local community and proper system for addressing their concerns.

The following specific mitigation measures shall be taken into account in order to combat this problem:

(a) Gaseous Emission

All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition and properly tuned and maintained in order to minimize the exhaust emissions. In addition, the vehicles carrying construction materials and the construction material storage areas should be covered with tarpaulin. Locate all openings, e.g., ventilation intake/exhaust and door, away from sensitive receivers;

Open burning of any kind of material will be banned on the site. Speed limits would be defined for the vehicles at the construction site. Maximum efforts will be done to keep the pollutants level within the defined limits of NEQS.

(b) Dust Emission

The construction contractor of the proposed Project will ensure regular spraying of water on all temporary service and access roads to minimize the dust generation. These measures will be implemented by the Contractor and Supervisory staff and will ensure that they are carried out as part of its contract supervision function.

5.5.5 Noise and Vibration

Noise is most pervasive environmental problems in the urban areas. Noise is a by-product of human activity and area of exposure increases as function of mobility and construction activities. The main sources are heavy machinery such as bulldozers, excavators, stabilizers, concrete mixing plant, drills, asphalt plants and other equipment's. The above machinery is expected to generate noise levels that would be severe in the areas where previously no roadside construction was done. The magnitude is moderate adverse and temporary in nature.

Mitigation

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

- Selection of up to-date and well-maintained plant or equipment with reduced noise levels ensured by suitable in-built damping techniques or with appropriate muffling devices;
- Providing the construction workers with suitable hearing protection like ear cap, or earmuffs and training them in its use;
- Preferably, restricting construction vehicle movements during night time;
- Machinery with low noise level or machinery with noise shielding and absorption should be used;

- 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 at least 2 km away from residential areas, particularly schools, hospitals, and nursing 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;
- The plants and equipment used for construction will strictly conform to noise standards specified in the NEQS;
- Vehicles and equipment used will be fitted, as applicable, with silencers and properly maintained;
- In populated areas, the construction activities will be restricted to be carried out in daytime.
- Hedges and high boundary walls will be used as noise barriers in sensitive areas such as schools, hospitals and mosques;
- Public hearings should be held to discuss appropriate solutions and materials to control noise (e.g., mud or brick walls, bushes, etc.); and
- Schedule the construction works such that the number and usage times of noisy equipment are reduced;
- Physically separate the noise sources and the sensitive receivers (both existing and planned) as far as practicable;
- 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.

5.5.6 Disposal of Mucking Material

Inevitable earthwork operations during construction will open up scars on the land around the subproject area. This impact is temporary and minor negative in nature.

Mitigation

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 off appropriately at designated sites.

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

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.

5.5.8 Transportation and Access

Vehicle Travelers

Open excavations shall be required for connection of Trunk sewer with disposal station and laying of new sewer lines, which may disrupt the flow of traffic. 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.

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

Mitigation

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 site;
- Close liaison with Contractors to ensure minimal interruptions;
- Implementation of site speed limits and introduction of speed humps; and
- Contractors to manage their sites, deliveries and waste such that they are reducing the amount of traffic on the local roads.

5.5.9 Employment and Economic Impacts

Initially, local economic impact of the proposed Project would occur through construction employment. Rapid and extensive development activities will create economic improvements to the region as a whole due to increases in labor requirements and job placement for a large number of construction workers, consultants and contractors. Given the scale of the Development, a moderate beneficial effect is expected to occur in relation to direct employment impacts during construction and local expenditure of worker incomes.

Mitigation

Impacts to employment and economics during construction are seen as beneficial and hence no mitigation measures are discussed here.

5.5.10 Solid and Hazardous Waste

Construction activities such as excavation, laying of sewerage pipes 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 off to landfill, the waste generated during construction would have a moderate adverse and temporary in nature.

Mitigation

Construction debris and demolition material will not be allowed to accumulate during construction phase. All such material is to be disposed off on daily basis. Waste piles will only be allowed if they meet the following requirements:

- 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 net/tarpaulin or similar to stop waste from blowing around; 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.

5.5.11 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 subproject 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. Therefore, the magnitude of this impact is expected to be low adverse and temporary in nature.

Mitigation

- 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 off 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 subproject should be given clear orders, not to shoot, snare or trap any bird; and
- The Contractor will arrange to minimize the vibration, noise pollution through good engineering practices.

5.5.12 Flora

The subproject area comprises of residential and commercial along with some agriculture land around, but outside the Col. No tree cutting is involved for land clearing. There will be no impact on agriculture land and surrounding trees and vegetation. However, there efforts will be made to enhance landscaping of the subproject area.

Mitigation

The proposed mitigation measures will include:

- Incorporate technical design measures to minimize removal of these trees, if required;
- Landscaping and plantation will improve the aesthetic value and ecological habitat of the subproject 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.

5.5.13 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. Therefore, the magnitude of this impact is considered to be moderate adverse.

Mitigation

In order to prevent and/or alleviate these issues, Occupational Safety measures such as use of well-maintained machinery and equipment and training of the workers in the construction safety shall be taken. Ensure provision of protective clothing for laborers handling hazardous materials, e.g., helmet, adequate footwear, protective goggles, gloves, etc. Moreover, 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.

5.5.14 Disturbance to the Residents

The construction activities and vehicular movement may cause public inconvenience and disturbance to the residents during the execution of the proposed subproject in performing their routine activities. The general mobility of the locals in and around the subproject area will be affected especially near the subproject active sites. This is a temporary and moderate adverse impact.

Mitigation

- During the construction phase, mobility of workers in the nearby areas should be strictly restricted by the contractor to avoid any inconvenience to the local communities;

- The contractor should select specific timings for construction work to cause least disturbance to the local population considering their peak movement hours;
- Contractor will take care of the concerns of the local community and the sensitivity towards the local customs;
- The contractor and traffic police will implement the approved traffic management plan; and
- Local vendors will be provided with regular business by purchase campsite goods and getting services from them.

5.5.15 Ground Water

Construction waste, if left unattended will result in forming leachate that will percolate through the soil strata, will reach underground water table, and hence, will end up contaminating it. In addition, the water for construction and consumption may come in conflict with local water demand. There is a probability that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater, if they are not handled properly.

Mitigation

Mitigation measures will include; protection of groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality. The solid waste will be disposed off at designated landfill sites to sustain the water quality for domestic requirements. Water required for construction may be obtained in such a way that the water availability and supply to nearby communities remains unaffected.

5.5.16 Impacts of Heavy Vehicles on the Existing Road Network

The plying of heavy vehicles on the 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. However, the impacts would be temporary and moderate negative in nature.

Mitigation:

- 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; and
- 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.

5.5.17 Physical/Social/Cultural Disturbances

Problems for the residents of the area/nearby communities may occur due to increased construction/commercial activity. People might think that their family life and traditional rituals are at jeopardy.

Mitigation:

Mitigation measures will include: Adequate training of especially for the transitive workforce of the station (involved both in the construction process and in the commissioning) to regard the rituals of the area so that the locals do not feel insecure and local people will be involved by employing them during the construction process.

5.6 Potential Impacts and Mitigation Measures During the Operational Phase

Various types of environmental impacts are expected to occur during the operation phase of the proposed Project, which are elucidated hereunder.

5.6.1 Resources and Infrastructure

The proposed Project will include laying of new sewer lines, construction of waste water treatment plant, replacement of existing sewer lines, replacement of old and out lived machinery at disposal station. The service delivery in Zone-1 & 2 is satisfactory. However, the north eastern area of the south zone is facing poor service delivery because of;

- Crown failures and blockades in the 66" dia main outfall sewer.
- The area lies in remote end of the system and sewers are being silted up because of water stagnancy and very low velocity of water.
- In 29% of the city area no service is rendered.
- Waste water disposal in zone-1 & 2 is problematic and polluting the LBDC water/ seepage drain.
- No treatment facility is available at all discharge points which is polluting the streams and lands.

Given the increased demands of proper sewerage system and to cater the need of sewerage system in the subproject area, the proposed subproject of rehabilitation and improvement of sewerage in Okara city would therefore, create moderate beneficial effects in relation to this facility.

Mitigation

Impacts to resources and infrastructure during operational phase of the proposed Project are seen as beneficial and hence no mitigation measures are discussed here.

5.6.2 Air Pollution

During operational stage of the proposed subproject, minor significance of impact on air quality is anticipated which will be generated from standby generators installed at pumping station. The magnitude of this impact on environment is considered to be minor adverse and permanent in nature.

Mitigation

Air quality monitoring should be carried out on monthly basis for parameters like CO, CO₂, H₂S, NO₂, SO₂ and PM₁₀. The residual impact after implementing the mitigation will be slight adverse. Plantation of trees inside and outside the boundary of the WWTP shall be carried out and low sulfur fuel shall be used in the plant to minimize the effect of air pollution.

5.6.3 Groundwater

Currently, the sewerage is being disposed in open fields and the chances of infiltration to ground water are higher to contaminate the ground water quality. The implementation of the proposed subproject will reduce the chances of ground water contamination; however, contamination of groundwater source may occur in case of leakage of sewerage pipes. The magnitude of this impact during operational phase of the proposed subproject is considered to be minor adverse.

Mitigation

The impact should be minimized by regular checks for leaks etc. and maintenance of damaged pipes should be done periodically. Moreover, monitoring of groundwater should be conducted on quarterly basis.

5.6.4 Surface water

The surface water may be contaminated by disposal of wastewater from the disposal station. However, in this Proposed Project, the machinery of disposal station will be replaced and wastewater from disposal station will be discharged into the collection chamber. From Collection Chamber wastewater directly goes to the Treatment Plant through gravity. Water from treatment plant is mainly used for irrigation including recharge of groundwater. The leakage or contamination may result in detrimental health impacts to the consumers by contaminated drinking water and crops irrigated by Canal. Proper laying of Force Main will be done so that leakage will be prevented. The magnitude of this impact on environment is considered to be major.

Mitigation

Proper laying of Force Main will be done so that leakages will be prevented. Proper Joints will be provided so that the risk of ground water contamination through leakage of Force Main will be prevented.

5.6.5 Odour

The operation of disposal station and WWTP results in generation of odour which causes nuisance to the residential community in the surroundings of the disposal station and the people passing by this area for schools, mosque and shops etc. The magnitude of this impact will be moderate adverse.

Mitigation

- Screening of wastewater should be regularly done and screening waste should be disposed off safely;
- Landscaping and plantation will improve the aesthetic value and ecological habitat of the subproject 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 and odour problems would be most needed in the areas where ground level concentrations of the pollutants are expected to rise.
- Vegetation barrier may also help reducing odor in the surroundings of the area.
- Floating wetland in WWPT would reduce odor significantly

5.6.6 Breeding Ground for Disease Vector

Currently, as the partial sewerage water is being disposed through temporary force main to the collection chamber. In rainy days, the wastewater becomes stagnant which acts as breeding grounds for disease vectors. After the completion of the proposed subproject, the sewerage water will be collected in wet wells and disposed off into the WWTP through Force Main ultimately eliminating the breeding grounds. This aspect is highly beneficial for the reduction in health impacts of communities.

Mitigation

This aspect is considered to be beneficial and hence no mitigation is discussed here.

5.6.7 Energy Consumption

The main source of power supply during operation of the proposed new WWTP will be through Multan Electric Power Company (MEPCO). Diesel generators will be installed as standby energy source to be used during power failure or load shedding.

Mitigation

During operational stage of the proposed subproject, minor impact on air quality is anticipated which will be generated from standby generators installed at WWTP. Generators will be maintained properly. Air quality monitoring shall be carried out on monthly basis for parameters like CO, CO₂, NO₂, SO₂ and PM₁₀ to reduce the impact on environment.

5.6.8 Noise and Vibration

Due to the operation of existing disposal station, noise and vibration may be produced due to the running of pumping machinery and standby generators which will be a constant source of nuisance to the local population. Therefore, the magnitude of this impact on local community especially to the adjacent school is considered to be moderate adverse.

Mitigation

Mitigation measures may include maintenance of vibrating parts through a well-coordinated operation and maintenance procedure which consists of checking periodically all parts of the pumping machinery, its oiling to remove friction, replacement in case of malfunctioning and periodic noting of noise levels. Enclose all plant and equipment in the pump hall or machine room as far as practicable. A landscape will be properly designed with provision of new trees/plantations around the boundary, roadside and stretches of open land. It will certainly reduce the impacts of air, noise pollution and odour problems due to the proposed subproject in the surrounding environment. The residual impact after implementing the mitigation will be slight adverse.

5.6.9 Solid Waste

Solid waste will be generated from the WWTP, screens installed in the disposal station or sludge during maintenance/cleaning of disposal station and de-silting of sewer lines. Sludge is semi solid material settled at the bottom of the ponds due to anaerobic decomposition of biomass. The solid waste and sludge will result in foul odour and attract disease vectors. The growth of pathogens and associated risks will increase, which may affect health of the community if handled improperly. The magnitude of this impact on environment is considered to be moderate adverse.

Mitigation

- Regular inspection and maintenance should be schedule and implemented to ensure removal of solid waste and sludge when accumulated;
- Proper disposal of sludge to the designated solid waste dumping site; and
- Implementation of sludge handling and storage procedures should be ensured.

5.6.10 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. The magnitude of this impact is considered to be major adverse

Mitigation

The following mitigation measures are proposed for workers health and safety:

- 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;
- Provision of First Aid Kits at work sites;
- Provision of safe drinking water; and
- Provision of PPE's to the employees including masks, gloves, etc.

5.6.11 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. The magnitude of impact is moderate beneficial. Presence of adequate flora will absorb emissions, through photosynthesis, emitted from generators and odour from sewage thus purifying the air.

Mitigation

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

5.6.12 Emergency Preparedness and Response

The operation of the disposal station 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. The impact is moderate adverse. Management will develop an Emergency Response Plan for floods, earthquakes, and manmade disasters. 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. Further following should be considered:

- 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.

6 Environment, Social Management and Monitoring Plan

6.1 General

This section provides brief description of environmental issues, mitigation measures to eliminate and/ or reduce environmental and social impacts to an acceptable level, institutional arrangement for the implementation of the mitigation measures and also carrying out environmental monitoring for air quality, water quality, and noise pollution related parameters. A budgetary plan is also to be developed indicating estimated costs to be incurred to mitigate potential negative impacts of the proposed Project.

6.2 Objectives of the Environmental and Social Management and Monitoring Plan

The Environmental and Social Management and Monitoring Plan (ESMMP) will help PMDFC/MC to address the future likely negative impacts of the proposed Project, enhance the Project's overall benefits and introduce standards of good environmental practice. The primary objectives of the ESMMP are:

- Define the responsibilities of the Project Proponent and other role players during the design, construction and the 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;
- 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 ESMMP and outline corresponding financing arrangements; and
- Providing a cost estimate for all the proposed ESMMP actions.

6.3 Role of Contractor in ESMMP

The Contractor will be responsible for the implementation of the proposed Project under the supervision of the PMDFC, MC Okara & Consultant. The Contractor will be bound to follow the provisions of the contract documents especially about environmental protection and apply good construction 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.

6.4 Specific Implementation Responsibilities

This section describes the implementation and supervision responsibilities for the different phases of the Project.

6.4.1 Design Phase/Pre-Construction Phase

ESIA consultant and its staff are responsible for ensuring that the Project design and specifications adequately reflect the ESMMP. They will ensure the Project's compliance with environmental regulations; and ensure stakeholder participation. The responsibilities of PMDFC may be briefly described as follows:

- To supervise environmental and social assessment reports, and provide substantial inputs and guidance to the ESIA consultant;
- To get the Environmental Approval from the EPA Punjab; and
- To ensure that the design consultant have incorporated all the mitigation measures proposed for the design phase in the design and included in the contract documents.

6.4.2 Construction Phase

The Contractor(s) will be responsible for compliance of environmental mitigation measures for the proposed Project. The Supervision Consultants, along with the District Officer (Environment) will oversee the working of contractor in accordance with the ESMMP.

1. The Supervision Consultant will liaise with the Project staff to monitor environmental compliance during the construction;
2. They will supervise the construction and provide technical support to help ensure compliance with the ESMMP;
3. The Supervision Consultants will assess the environmental impact;
4. They will monitor the progress of work and adherence of the contractor to the ESMMP; and
5. They will direct the Contractor to work in such a manner that all Project activities are in compliance with the ESMMP and NEQS.

6.4.3 Operation Phase

The MC Okara will be responsible for the following:

- Coordinating with the operational staff working under the Project Director to monitor environmental compliance;
- Reporting on the progress of environmental compliance to the EPA Punjab;
- Assessing the long-term environmental impacts of Project operation;
- Sustaining a working partnership among PMDFC, EPA Punjab, Forest, Wildlife, Irrigation and Power Departments of Punjab, NGOs and other related public private sector organizations; and
- Reporting to PMFC about progress of the work.

6.5 Training and Capacity Building

6.5.1 Environmental Committee and its Responsibilities

PMDFC will be responsible for the environmental management and supervisory affairs during the construction phase of the proposed Project.

The responsibilities are as follows:

- To ensure implementation of all the proposed mitigation measures during and after the proposed Project;
- To organize routine monitoring of construction vehicle emissions, air quality, noise and vibration; etc. In case, the noise and emission levels exceed the acceptable levels; a ban must be enforced;
- To develop operational guidelines and implementation schedule;
- Receiving complaints from residents and institutions and assisting the local environmental authority including liaison with EPA;
- To ensure that the proposed Project is implemented in an environmentally friendly manner, causing least harm to the existing environment including flora and fauna, sites of religious and cultural significance, etc.

6.5.2 Technical Training Programs

In order to raise the level of professional and managerial staff, they need to upgrade their knowledge in the related areas. The Environmental Committee should play a key role in this respect and arrange the trainings.

Contractor's environmental awareness and appropriate knowledge of environmental protection is critical to the successful implementation of the ESMMP because without appropriate environmental awareness, knowledge and skills required for the implementation of the mitigation measures, it would be difficult for the Contractor(s) workforce to implement effective environmental protection measures. A domestic training program is proposed to train the Contractor(s) staff who will be involved in the construction phase and the professional staff from the TMA involved at the operational stage of the Disposal Station.

6.6 Key Environmental Issues

Following are the key issues, which are envisaged for the proposed Project at the design, construction and operational stages:

- Inadequate design of the proposed Project;
- Air pollution;
- Noise pollution;
- Disposal of solid waste;
- Disposal of wastewater; and
- Health and safety of workers.

Environmental and Social Management and Monitoring Plan: The Environmental and Social Management and Monitoring Plan (ESMMP) is developed to eliminate and/or mitigate the impacts envisaged at the design, construction and the operational stages and provide specific guidelines for long-term monitoring by identifying the

roles and responsibilities of the Proponent, Design Consultant, and Contractor(s). **Tables 6.1, 6.2 and 6.3** present the environmental aspects, issues, mitigation measures, implementation responsibility and the costs incurred at all the stages.

Table 6-1: Environmental and Social Management Plan (Design Phase)

Sr. No.	Aspect	Sub-Project Impact	Mitigation Measures	Responsibility
1	Inadequate design	Inadequate design may not meet the quantity of sewage generated, pumping equipment and accessories, selection of proper pipe material	Correct generation of wastewater by considering population corresponding to the Project Area The selection of machinery for at least 10 years for smooth functioning of disposal station. The number of considerations for selecting design period of sewers and allied civil work, which includes expansion trends and financial position of the sponsoring/client institution.	Design Consultants
2	Selection of poor construction materials	Health and hygiene in the service area	Selection of construction material safe for human use	Design Consultants
3	Inadequate buffer zone	Noise and vibration due to running of heavy-duty pumps resulting in inconvenience to local people	Provision of buffer zone in the form of raised walls and plantation and oiling of parts of machinery causing noise and vibration	Design Consultants

Table 6-2: Environmental and Social Management Plan (Construction Phase)

Sr. No.	Aspect	Sub-Project Impact	Mitigation Measures	Responsibility
1	Improper construction techniques and monitoring During -Replacement of old/choked sewer line with new sewer line - Construction of New Manholes	Public inconvenience, traffic jams, unmanaged excavated material and dust problem due to excavation	The supervisory/monitoring staff should be experienced and qualified enough to handle the excavated material and its disposal in designated places without harming local environment. In addition, further training may be provided. Supervision and training for the contractor's staff shall also be required.	Supervision Consultant (SC) and Construction Contractor (CC)
2	Air pollution Due to Desilting of sewer lines -Operation of subproject machinery and equipment	Dust and exhaust emissions may cause nuisance to the local resident	Gaseous Emissions - All vehicles, machinery, equipment and generators, used during construction activities, shall be in good condition and shall be properly tuned and maintained by the Contractor in order to minimize the exhaust emissions; - Open burning of solid waste from Contractor's camps shall not be allowed. Dust Emission - The construction contractor of the proposed Project will ensure regular spraying of water on all temporary service and access roads to minimize the dust generation.	SC and DC
3	Noise and vibration	Disturbances to local residents in the form of increased noise	Selection of up to-date and well-maintained plant or equipment with	SC and CC

Sr. No.	Aspect	Sub-Project Impact	Mitigation Measures	Responsibility
	During all replacement/rehabilitation activities due to operation of subproject related machinery and equipment	levels and vibration due to movement of construction machinery	reduced noise levels ensured by suitable in-built damping techniques or with appropriate muffling devices;	
			Providing the construction workers with suitable hearing protection like ear cap, or earmuffs and training them in its use;	SC and CC
			Preferably, restricting construction vehicle movements during night time;	SC and CC
			Use Silenced Plants and equipment;	SC and CC
			Physically separate the noise sources and the sensitive receivers (both existing and planned) as far as practicable.	SC and CC
			Machinery with low noise level or machinery with noise shielding and absorption should be used;	SC and CC
			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;	SC and CC
4			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;	SC and CC
5			The plants and equipment used for construction will strictly conform to noise standards specified in the NEQS;	SC and CC
			Vehicles and equipment used will be fitted, as applicable, with silencers and properly maintained;	SC and CC
			In populated areas, the construction activities will be restricted to be carried out between 6:00 a.m. and 20:00 p.m.	SC and CC
			Hedges and high boundary walls should be used as noise barriers in sensitive areas such as schools, hospitals and mosques;	SC and CC
			Public consultations should be held to discuss appropriate solutions and materials to control noise (e.g., mud or brick walls, bushes, etc.); and	SC and CC

Sr. No.	Aspect	Sub-Project Impact	Mitigation Measures	Responsibility
			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.	SC and CC
6	Disposal of soil collected during excavation	Negative impacts including change of land use and loss of aesthetic values may be caused on the receiving lands due to improper disposal of soil.	- The soil will be disposed of in an environment acceptable manner by transporting in enclosed containers and dumping at sites approved by the executing agency. - Where possible, material should be reused on site for refilling to minimize the amount of virgin soil used and soil disposed off.	SC and CC
7	Accidental damage to utilities in excavated areas	Damage to existing utilities like sui gas, telephone etc. causing inconvenience to the local people	- 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 also be provided those utility maps and Supervision Consultant will supervise the construction activities to avoid any accidental damage to the lines; - Provision shall be made in the cost estimate for restoration/ replacement of damaged utilities and relocation to minimize the negative impact and restoration of excavated road to its original condition.	SC and CC
8	Transportation and Access for execution of project activities	Vehicle Travelers: Open excavation for laying of Force Main may disrupt the flow of traffic. The operation of excavator and movement of vehicles carrying construction materials hampering the existing traffic movement. Driver's Stress: The lower speeds, possible delays and queuing would exacerbate levels of stress	- Inclusion of further access routes to facilitate the accessibility of vehicles and pedestrians to and from the proposed Project site - 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 into the Project area during rush hours, which could be possible at night hours. Continuous and coordinated monitoring of traffic shall be required to minimize the impact. - Contractors to manage their sites, deliveries and waste such that they are reducing the amount of traffic on the local roads	SC and CC

Sr. No.	Aspect	Sub-Project Impact	Mitigation Measures	Responsibility
9	Employment and Economic Impacts	Direct employment impacts during construction and increase in local expenditure of worker incomes	Impacts to employment and economics during construction are seen as beneficial and hence no mitigation measures are discussed here.	CC
10	Solid and Hazardous Waste	Construction activities generating waste materials like excavated soil and domestic waste from workers.	Construction debris and demolition material will not be allowed to accumulate during construction phase. All such material is to be disposed off on daily basis.	SC and CC
11	Fauna	Construction area may represent a barrier to the species and result in the splitting up of populations	- 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 subproject should be given clear orders, not to shoot, snare or trap any bird; and - The Contractor will make arrangements to minimize the vibration, noise pollution through good engineering practices	SC and CC
12	Flora	Loss of habitat	It will be appropriate to collect seed and samplings from the plants growing within the proposed Project site prior to site clearance. These will be planted in areas within the proposed disposal station to create areas of natural vegetation as part of the overall landscaping design	CC
13	Health and Safety of Workers	Construction machinery and equipment and storage of flammable materials may cause minor and 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 goggles, gloves, etc. - 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	CC

Table 6-3: Environmental Management Plan (Operational Phase)

Sr. No.	Aspect	Sub-Project Impact	Mitigation Measures	Responsibility
1	O&M deficiencies	Communicable diseases in the service area, which will be a major public health hazard. This is possible through intrusion of contamination	Regularly checking the water quality at source. Leaking pipes shall be immediately repaired by the TMA staff;	MC Staff

Sr. No.	Aspect	Sub-Project Impact	Mitigation Measures	Responsibility
		from leaking pipes and deficiency in operation and maintenance procedures.	- Pumping Machinery shall be maintained properly; - Stagnation of water shall be prevented through an efficient and effective O&M program - Generators shall be maintained and tuned properly so that emissions can be controlled	
2	Resources and Infrastructure	Upgrading the infrastructure facilities in order to provide sewerage system	Impacts to resources and infrastructure during operational phase of the proposed Project are seen as beneficial and hence no mitigation measures are discussed here	MC Staff
3	Air Pollution	Minor significance of impact on air quality generating from standby generators installed at pumping station. Degradation of organic matter in the wastewater treatment process would accompany by a large amount of hydrogen sulfide (H ₂ S) emissions, which is the source of foul odor spread. Hydrogen sulfide is generated mainly during anaerobic treatment of wastewater.	- Air quality monitoring will be carried out on regular basis for parameters like CO, CO₂, NO₂, SO₂ and PM₁₀. - Tree belts would be established around the subproject area to minimize the impacts odor for the WWTP - Laboratory analysis of wastewater will be carried out periodically;	MC Staff
4	Groundwater	Contamination of groundwater source may occur in case of corrosion or leakage of Force Main.	- Laboratory analysis of wastewater will be carried out periodically; - 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	MC Staff
5	Surface water	The surface water may get contaminated by disposal of wastewater from the disposal station.	The water must be treated before disposing according to NEQS. The wastewater will directly go into the Wastewater Treatment Plant before disposing it.	MC Staff
6	Odour	Generation of odor which causes nuisance to the residential community in the surroundings of the disposal station and the people passing by this area for schools, mosque and shops etc.	- Screening of wastewater should be regularly done and screening waste should be disposed off safely. - Installation of ventilating shafts after enclosure of collection chambers parallel to the wind direction. - Vegetation barrier may also help reducing odor in the surroundings of the 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 & odor Problems would be most needed in the areas where	MC Staff

Sr. No.	Aspect	Sub-Project Impact	Mitigation Measures	Responsibility
			ground level concentrations of the pollutants are expected to rise. Vegetation barrier may also help reducing odor in the surroundings of the area. A tree plantation plan is given in Annex. I.	
7	Breeding Ground for Disease Vector	Currently, the city has main and branch sewers on main roads and streets most of the streets are not equipped with lateral sewers. In Rainy days the wastewater becomes stagnant which acts as breeding grounds for disease vectors.	- After the construction of WWTP and new sewer lines, the wastewater will be disposed off to WWTP, which will eliminate the breeding grounds for disease vectors. - Regular checks for any spots which may serve as breeding grounds and spray of insecticides if any such spots are found	MC Staff
8	Energy Consumption	Loss of natural resource	- Regular maintenance of the equipment should be ensured to avoid excessive fuel consumption or leaks; and - Switch off machinery/ appliances when not in use	MC Staff
9	Noise and vibration	Nuisance to the local population	- Maintenance of vibrating parts through a well-coordinated operation and maintenance procedure which consists of checking periodically all parts of the pumping machinery, its oiling to remove friction, replacement in case of malfunctioning and periodic noting of noise levels - Enclose all plant and equipment in the pump hall or machine room as far as practicable. - A landscape will be properly designed with provision of new trees/ plantations around the boundary, roadside and stretches of open land. It will certainly reduce the impacts of Air, - Noise pollution and odor problems due to the proposed subproject in the surrounding environment.	MC Staff
11	Solid Waste	Solid waste generating from the screens installed in the disposal station or sludge during maintenance/ cleaning of disposal station	- Regular inspection and maintenance will be scheduled and implemented to ensure removal of solid waste and sludge when accumulated - The solid waste shall be disposed off safely and dumping or burning of municipal solid waste in the surroundings should be strictly prohibited Implementation of sludge handling and storage procedures should be ensured	MC Staff

Sr. No.	Aspect	Sub-Project Impact	Mitigation Measures	Responsibility
12	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, - Proper storage and handling of fuel - First Aid Kits should be provided - Provision of safe drinking water - Staff training, maintenance of machinery and equipment, and other preventive measures - Provision of PPE's to the employees including masks, gloves 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;	MC Staff
13	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. Presence of adequate flora will absorb emissions, through photosynthesis, emitted from generators and odor from sewage thus purifying the air.	Not Required	MC Staff
14	Emergency Preparedness and Response	The operation of the disposal station 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	MC Staff

Key: DC = Design Consultant
SC = Supervision Consultant
CC = Construction Contractor
MC = Municipal Committee

6.7 Environmental Monitoring

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

6.7.1 Objectives

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

- Monitor the actual impact of the works on the subproject site physical, biological and socio-economic receptors. This will indicate the adequacy of the ESIA;
- Recommend mitigation measures for any unexpected impact or where the impact level exceeds the anticipated impact;
- Ensure compliance with legal obligations including safety on construction site; and
- Monitor the rehabilitation of borrow areas and the restoration of construction campsites as described in the ESMMP; and
- Ensure the safe disposal of excess construction materials.

The main objectives of monitoring during the operational phase will be to:

- Appraise the adequacy of the ESIA with respect to the subproject's predicted long-term impacts of operation of the Plant on physical, biological and socio-economic environment;
- Evaluate the effectiveness of the mitigation measures proposed in the ESMMP and recommend improvements, if and when necessary; and
- Compile periodic Environmental Monitoring reports on the basis of recommendations in ESMMP.

6.7.2 Monitoring Parameters

The following environmental parameters will be monitored at locations identified during the construction phase (e.g., location of asphalt plants, batching plant, construction camps, etc.).

- Ambient Air Quality (NO_x, SO_x, CO and PM₁₀);
- Ambient Noise Levels; and
- Ground Water Quality.

6.7.3 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 Report to PMDFC. The Supervision Consultants will be responsible for submitting a monthly report for the Project to PMDFC.

Table 6-4: Environmental Monitoring Plan at the Construction and the Operational Stages

Components	Parameters	Location	No. of Samples	Frequency	Responsibility	Duration	Budget (Rs)
• Construction Phase (Six Months)							
Ambient Air Quality	CO, NO _x , SO _x , PM ₁₀	- Inside the Disposal - Station Site & WWTP - Centre Point of Construction area	2	Quarterly	CC	24 hours	600,000
Noise Level	-	- Inside the - Disposal - Station Site, WWTP - Nearby - Receptors	4	Monthly	CC	Reading taken at 15 seconds Intervals over 15 minutes every hour and then averaged	7,200
Ground Water Quality	For parameters given in NEQs	- Sample from nearby - Receptor (near - Disposal - Station)	2	Monthly	CC		120,000
• Operation Phase (Yearly)							
Air Quality	CO, NO _x , SO _x , PM ₁₀	- Inside the - Disposal - Station Site	1	Quarterly	MC	24 hours	1,200,000
Ground Water Quality	Total Coliforms, Fecal E. Coli, Total Colonial Count, Fecal Enterococci/	- Sample from nearby - Receptor (near - Disposal Station)	1	Quarterly	MC	-	240,000
	Streptococci, Conductivity, Carbonates, Bicarbonates, Arsenic, Chloride, Fluoride, Manganese, Iron, Nitrates, Nitrites, pH, TDS, Sulfate, Ammonia, Copper, Magnesium, Phenol, Zinc, DO	Station)					
Noise Level	-	Disposal Station	6	Monthly	MC	24 hours	3,600

6.8 Environmental Technical Assistance and Training Plan

An environmental and social training program will be carried out to build the capacity to effectively implement this ESMMP, as well as to facilitate the improved environmental management of future projects by increasing the environmental and social awareness of MC staff in general. MC with the collaboration of Supervision Consultants will arrange the environmental training sessions for their staff. The objective of these sessions will be to help establish appropriate systems, and to train MC staff responsible for managing environment, operations, and planning, who can then impart training at a broader level within and outside the MC (i.e., the training of trainers). The details of this training program are presented below:

Table 6-5: Personnel Training Program/TA Services

Components	Audience	Level	Modality	Frequency	Responsibility
ESMF Site Specific requirements and E&S Management and Mitigation Plan	MO-I & S MO-P and MC field staff ¹⁹	Training	Briefing Presentations Mock Activities	Before execution of sub-project and time to time instructions	CSC
ESMP Implementation and Monitoring Plan	MO-1 MO-P MC field staff	Training	Briefing Presentations Mock Activities	Before execution of sub-project	CSC
	Contractor	Awareness and sensitization	Briefing	At the time of Contract signing and before execution	CSC
	Labor	Awareness and sensitization	Briefing	Before execution and time to time during execution	CSC
EHS SOPs for Labor/Workers (including women workers)	Contractor	Awareness and sensitization	Briefing and Illustrations	Before execution and time to time during execution	CSC
	Labor/workers	Awareness and sensitization on SOPs Training on Use of PPEs	Presentations Illustrations Mock activities Resource material	Before execution and time to time during execution	CSC
GRM	Contractor	Awareness and sensitization	Briefing	Before execution and time to time during execution	CSC
	Labor/workers	Awareness and sensitization	Briefing and resource material	Before execution and time to time during execution	CSC
	Public/ communities	Awareness	Briefing during public consultation Resource material	Before and during execution	CSC

¹⁹ For ESFPs and MC field staff, PMDFC will organize time to time trainings and a training/ capacity building program has been designed in this regard

7 Public Consultation and Information Disclosure

7.1 Introduction

This Section outlines the consultation and participation activities that have been undertaken as part of the impact of sub-project. Early and ongoing consultation, disclosure and meaningful stakeholder meetings is a key requirement of developing a sub-project. The logic behind the consultation is to get feedback from the stakeholders and address their concerns about the sub-project. The consultation process consists of initiating dialogues among all the stakeholders. The process covers, starting from awareness campaign to the identification, inclusion and participation of Sub-project affected communities. Stakeholders including institutions and concerned communities are generally able to understand the implications of the Sub-project activities.

The present report has been prepared by consulting with local communities and concerned government departments / organizations to ensure that their views and concerns about the sub-project have been taken into account in the study.

7.2 Consultation Requirements

7.2.1 Overview

This sub-section provides an overview of the international consultation, disclosure and stakeholder engagement requirements of the national, provincial and World Bank Guidelines for consultation.

7.2.2 National and Provincial Consultation Requirements

The Government of Pakistan (GOP) and Government of Punjab places great importance on involving institutional and community stakeholders for determining the impacts associated with the sub-project implementation. In order to understand sub-project affected stakeholder's perceptions regarding impacts and mitigations of the project and participation of stakeholders has been taken as integral part of the study. An attempt has been made to consult with a full range of stakeholders to obtain their views on sub-project interventions and impacts thereon.

7.3 Specific Objectives of Consultation Process

The consultation process provides a meaningful understanding of local social issues for the environmental and social impact analyses. The consultation process helps to minimize adverse environmental and social impacts, reduces the expected conflicts, minimizes the risk of Sub-project delays and enables to make the Sub-project more economical and socially acceptable. Moreover, public consultations create a sense of ownership among the stakeholders regarding the Sub-project and ensure the transparency in Sub-project activities. The consultative process for the "ESIA" has included not only the institutional stakeholders, but also the local community of the area. Meetings with institutional stakeholders like government departments, and line agencies has been organized and conducted to discuss Sub-project interventions and potential impacts on the local communities and environment. Public consultations have been carried out with the stakeholders keeping in view the overall objective of evolving their participation. The public consultation aimed to achieve following specific objectives.

- Information disclosure to create awareness among various stakeholders about Sub-project development objectives and proposed interventions;
- To start interaction process with stakeholders;

- To elaborate environmental and social impacts to the stakeholders;
- To establish communication and an evolving mechanism for the resolution of social and environmental issues at local and Sub-project level;
- To involve Sub-project stakeholders in an inclusive manner at every stage of Sub-project implementation; and
- To receive feedback from all types of stakeholders on adopting mitigation and enhancement measures for environmental and social impacts.

7.4 Identification of Stakeholders

Stakeholders include all those who can affect and are being affected by policies, decisions or actions while implementing any development project. Stakeholders can be individuals, group(s) of people, organizations and institutions. During consultation meetings stakeholders reveal their concerns, apprehensions and demands regarding the adverse project impacts mitigation and enhancement of project benefits to the stakeholders. Stakeholders can be broadly divided into primary and secondary stakeholders.

7.4.1 Primary Stakeholders

The primary stakeholders are the intended beneficiaries or communities expected to be affected directly by the project interventions. In this case, people living within Tehsil Gojra are considered as Primary Stakeholders. Primary stakeholders identified and consulted include local leaders/ influential, community members (men and women), local representatives, imams, teachers, union council and village council members.

7.4.2 Secondary Stakeholders

This category of stakeholders pertains to those who may not be directly affected but have interests that could contribute to the initiation, implementation at some stage, or affect decision making on Project aspects. The Secondary Stakeholder include, federal/provincial government departments and organizations dealing with education, health, irrigation, agriculture, forest, wildlife, fisheries, and transport etc. Stakeholder consultations meetings were conducted in two stages:

7.5 Public Consultation

Consultations mainly in form of “Focus Group Discussions” (FGD) with Primary Stakeholders in those communities which is near to the Sub-project at public places. It was important to provide meaningful input for the public into the decision-making process through consultation. Representatives of the communities, potential vulnerable groups such as women and youth has been consulted to understand their specific issues and concerns. The findings and recommendations have been discussed and disclosed in an open and transparent manner with the communities in order to solicit their comments and suggestions on the sub-project interventions.

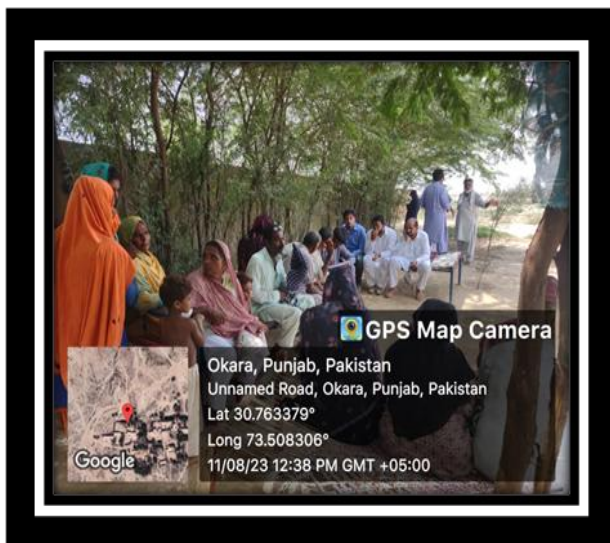
Participants were first briefed about the Sub-project objectives and major interventions associated with the sub-project implementation. Afterward, people were asked to express their views regarding the proposed Sub-project. In general participants appreciated the sub-project and offered comments & suggestions to enhance the expected environmental and social benefits and to mitigate the adverse impacts. The community perception of the sub-project is very good but most of the people wish to implement the sub-project in a sustainable and safety manner. The number of participants involved in each locality and major issues raised by communities during meetings are provided in **(Table 7-1)**.

Table 7-1: Consultation with Stakeholders

Sr. No.	Settlement	Tehsil	District
1.	49/2L	Okara	Okara
2.	51/2L		
3.	Imran town		
4.	Karim Town		
5.	Ghazi Abad		
6.	Bokhari Basit		
7.	Naimet Town		
8.	Rehan Town		
9.	Gulshan Gulzar		
10.	Choungi No.6 and 7		
11.	Abid Town		
12.	Makha Madina Town Phase1,2,3,,4		
13.	Bokhari Basti (Women Consultation)		
14.	Sabir Pia Town		
15.	Khaibayan Haseeb		
16.	Basti Mehar Dins		

Pictorial View of Public Consultation





7.6 Stakeholder, Feedback and Concerns

Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
Was there any Anti Encroachment Drive carried out by the Government in last four years from 2018?	Most of them replied that they are living here since many years (more than 20 yrs.) while no such drive they have observed in previous 04 years.
The residents showed their concern about the project.	The project team briefed that this project would be completed on urgent basis for the best interest of the community.
The stakeholders requested the concerned authorities to ensure the project will be completed on a fast-track basis and hoped it would not suffer any delays. There is dire need to construct update sewerage system as during rainy season water gets stagnated around the area and becomes life threatening.	The team briefed this issue will be resolved after construction of wastewater treatment plant.
How will you define the right of way and scope of work for the WWTP?	Due to the project, all houses / encroachments will made by the local community on the Government owned land, will have to be demolished for site clearance. Anyhow, this Project is financed by World Bank and according to the health environment and social safeguard policies of WB, the compensation cost for loss of structure will be paid to the Affected Persons before the start of the project.
What is the meant by Affected Persons?	Any person or household adversely affected by any project related change in terms of use of land, water or other natural resources, or who loses any asset or property movable or fixed, in full or in part including land, with or without displacement or anyone who losses his source of livelihoods or means of livelihoods or if he/she may face any dimmish in his/her livelihoods or any other person who establishes his/her right as an affected person to the MC.
Why is this cash compensation given to us while we have encroached the Government owned RoW and MC has right to restore their land back by removing the encroachments and it is not objectionable for us?	- This project is financed by World Bank and according to the policies of WB, compensation cost for loss of structure will be paid to the Affected Persons who have no entitlement of land but their structures will lost due to site clearance. - According to the WB policy, in case of partial loss of structure, restoration to original use (if its functionality will be viable) and cash compensation for affected structure will be made while in case of loss of full structure, compensation cost of full structure will be given to the Affected Persons and in both cases, APs will have the right to get salvage material.
Unskilled/ semi-skilled labour should be taken from the local population. This opportunity will help to increase household income of local population of the sub-project area.	Requisite unskilled labor will be engaged from local population preferably APs.
Compensation for the houses and other private/ community assets should be fixed in accordance with current market rates/replacement cost.	the valuation of built-up structures is based on current market value but with consideration of the cost of new construction of the structure, with no deduction for depreciation.

Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
Religious and educational structures like mosques, madrassas and graveyards should be saved from demolishing as such as possible.	Generally, relocation of Mosques, graves, residential structures has been avoided except those ones which are unavoidable to relocate. However, re-building/ re-settlement of such social, religious structures will be ensured.
Transport for relocation of assets and timely compensation to all the displaced persons must be ensured.	To take care of the relocation and compensation matters, Entitlement Matrix has been developed in consultations with the DPs for the compensation of their structures and their source of livelihood.
In addition to compensation the livelihood assistance to the DPs should also be provided.	Allowance should be paid.
People inquired that how and when the cost of assets lost will be paid?	The team answered that compensation amount will be paid before the start of construction activities.
In case of a complaint what a common people can do?	Resettlement expert explained the GRM in detail to the local and affected people.
What will be O&M mechanism after completion of the project?	MC will carry out O/M services through their annual budget.
If the community disagrees and have some complaints regarding the project then how and where they should approach?	Survey team briefed about the different tiers of GRM in detail.
Sub Divisional Officer Irrigation has no issue about the WWTP but has concern about disposal of untreated sewage in to canal.	He was informed that the sewage will not be disposed of in to the water bodies.
Assistant Forest asked that whether any forest tree will be cut/uprooted. In doing so replenishment cost has to be paid to the Forest Department prior to execution of the subproject. He provided copy of SOP for cutting of forest trees.	He was informed that No forest tree will be cut/uprooted
Why did you feel the need of this sub-project?	Appropriate disposal of waste water is dire need of the society. To ensure that the sector provides good-quality services, the water and wastewater networks must be constructed and old one rehabilitated and upgraded.
Which mechanism will be adopted for dissemination of information among the public?	Keeping in view the public will be informed about the sub-project through timely and meaningful information updates related to project progress, challenges, and construction impacts.
Which types of benefit of the wastewater treatment plant community can get?	The project will help the community to keep her water clean and safe, and it will help to protect the friendly environment. A wastewater treatment system will receive, store, treat and dispose of waste water from toilets, sinks, washing machines, baths and all other domestic water-using appliances on daily bases.
How you can predict positive and negative impacts of sub project?	- The negative and positive impacts of the project will be seen on the physical, biological and socio-economic environment prevalent in the project area which also be visualized at the design, construction and operational phases; and - The adequate mitigation measures and implementation mechanisms are proposed so that the proponent will be incorporated before and in after the design phase.
Is improper sewerage disposal and stagnant water caused health diseases for the local community?	This project will help the community to get rid of stagnant water and water borne diseases penetrating with in the community. Finally, treatment of wastewater will be initiated through this PCP program for better and improved standard of living for the community.

Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
How and which department or team is approaching the community at grass root level before the start of the project?	Mostly the community knows about the Government of Punjab (GOP) have enacted a range of laws, regulations, policies and procedures for management and mitigation of social and environmental impacts for infrastructure development Sub-projects.
How well you may be reducing your impact on the environment and social issues.	The purpose of Environmental and Social Management and Monitoring Plan (ESMMP) for sewerage system (which is to be rehabilitated and improved) will ensure that all necessary identified measures will be adopted in order to protect the environment and social situations and to comply with country environmental legislation and applicable The World Bank Core Principles. After the preparation of ESMF, PMDFC, ESM Wing outlined site-specific ESMMP, ESIA and IEE for the Contractors and executing agency. Environmental and social checklist was prepared by MMP and PMDFC ESM Wing with the help of the field teams and was used to assess the potential impacts of Sub-project on the basis of its scale/size, nature and significant negative impacts.
What are the main constraints of the existing sewer system in this city?	The MC Okara is experienced a frequent overload of their sewer systems, resulting in choke the system and also the discharge of untreated sewerage water. This sub-project will rehabilitate the old sewer system with adequate network.
Do you think current Improper waste water disposal is causing contamination of ground water.	After the completion of the sub-project, it will eventually help to improve the ground water conditions better than the previous one.
Which method will cause decrease in noise pollution and social disturbances during construction?	The contractor will use latest well tunned new machinery in the project and will use noise monitoring instrument around the heavy vehicles. The contractor's staff will note Nosie and vibration on daily bases.
- What are the problems for the nearby communities during the construction activities? - Can government will give alternative places for the DPs?	- The local and business community will be suffered with noise, dust and vibration during construction. - Roadside visibility can be reduced and dusty environment leads to respiratory diseases. - Safety issues. - ARAP is prepared will complete compensation plan and acted before the start of the project.
Old and chocked sewerage system adversely affecting our business in current circumstances?	Proper Sewerage system with wastewater treatment plant will be initiated to cater the problems related to sewerage system
What are your hidden objectives to conduct a meeting?	To share information with stakeholders on the construction of the proposed sub-project and expected impacts on the physical, biological and socio-economic environment of the sub-project.
Current without level and commercial used sewerage system is thrown waste water in open plots causing water borne diseases?	Proper rehabilitation of sewerage system will be initiated through this sub-project for better living conditions for the locals. Job creation, eradication of poverty.
What plan will be developed for the mobility of the community at peak hours during construction?	All the adverse impacts of the proposed project have properly been mitigated and a comprehensive ESIA has been formulated.
Is there any traffic management plan will be executed during construction stage?	They were briefed that the Contractor will be contractually bound to give a schedule of its activities, and will not be allowed to start sewer/drain laying activities at once in the entire project area, thereby keeping alternate routes open. They were informed that they may have to bear some inconvenience in this regard.
- How to protect the public amenities of other departments like sui gas during the process of sewers laying? - How to protect a shrine of Bokhari Basti?	They were informed that the depth of sewer in smaller streets is about 15 to 20 feet and the pipe will be laid in the middle of the streets or may be one side of the road to avoid possible damages to the assets of community.

Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
	The sensitive respecter with in the AIO will be projected at the level best.
Can contractor will provide the job opportunities to the local community?	They were informed that a condition in the Contract Document will be imposed that the maximum skilled and un-skilled employment is offered to the local community at first preference.
How the community will protect herself form dust and noise during excavation of trenches for sewer laying.	They were informed that Contractor will be bound to undertake frequent sprinkling of water to minimize the hazards of dust etc.
Is any type of document will cover the males and females issues during labour at site or camp office?	It was clarified that strict discipline would be exercised on the labour force by providing stringent clauses in the contract document.
How to resolve the safety of material use for construction and manhole covers?.	Their fear was removed by informing them that heavier manhole covers would be proposed in the design to minimize the possibility of removal/stealing.
The people told us that, the old Sewerage pipes collapsed, chocked and blocking the Sewerage line. Most of city's sewer pipes are old, and have outlived their potential utility.	This project will improve the city Sewerage system problems drastically.

7.7 List of Public Stakeholder

Sr. No.	Name of Respondent	Father Name of Respondent	Cell #
1.	Muhammad Azhar Iqbal	Muhammad Iqbal	0300-0520051
2	Muhammad Ashraf	Baqar Ali	0305-6328587
3	Ghulam Sarwar	Muhammad Hussain	0325-0520152
4	Muhammad Mumtaz	Muhammad Aslam	0300-4865521
5	Ayub Jutt	Taj Din	0300-8085464
6	Abdul Ghaffar	Muhammad Fazal	0309-0587238
7	Syed Tahir Hussain Shah Bukhari	Syed Abdul Aziz Shah Bukhari	0301-3134693
8	Muhammad Aslam	Rehmat Ali	0301-5942907,
9	Goga	Kamer Ali	0320-7286906
10	Bashir Ahmed	Kamer Ali	0307-5316389
11	Muhammad Naeem	Wali Muhammad	0347-9221706
12	Arshad Ali	Anayat Ali	0348-4403325,
13	Muhammad Rafiq	Din Muhammad	
14	Muhammad Akhtar	Anayat Ali	0301-1812486
15	Khushi Muhammad	Kharat Ali	0301-7865149
16	Muhammad Saleem	Anayat	0327-4234847
17	Muhammad Anwar	Nadir	0305-5643212
18	Jhanghir Sh		

Sr. No.	Name of Respondent	Father Name of Respondent	Cell #
19	Muhammad Yousaf	Muhammad Kamair	0300-8344130
20	Rehmat Ali	Muhammad Yousaf	0343-6400515
21	Muhammad Mushtaq	Bashir Ahmed	0302-9765270,
22	Ghulam Haider	Bashir Ahmed	0302-9502834,
23	Nazir Ahmed	Shahbaz Ahmed	
24	Pervez Maseh	Sohial Maseh	
25	Shaukat Ali	Mhummad Sultan	
26	Haleema Bibi	Wife of Jilal Din	
27	Shaffan	Saifullah	0301-7358134
28	Zahid Ali	Murad Ali	-
29	Muhammad Idrees	Muhammad Ramzan	0342-5648029,
30	Faryad Ali	Nausher	0303-0245449,
31	Mistry Mumtaz	Muhammad Hamid Ali	0346-0648751
32	Rehana Kauser	W.O Jaffer	0301 5495125
33	Zafar Ali	Shahid Ali	0342-0853170,
34	Shahban	Sultan	0326-6575698
35	Muhammad Iqbal	Sher Muhammad	0307-8099844
36	Syed Muhammad Mustansir Hussain	Abdul Aziz	0304-3355103
37	Abdul Aziz Shah	Syed Ahmed Ali Shah	0302-7133493
38	Muhammad Sharif	Muhammad Yar (Late)	0308-8439717
39	Faqir Muhammad	Naveed Ahmed	
40	Muhammad Siddique	Imran Ali	0345-3014749
41	Munawar Ali	Riaz Ahmed	0302-2098980
42	Muhammad Sharif	Haji Khalil Muhammad	0303-5228980
43	Muhammad Irfan	Abdul Rehman	0300-8815114
44	Muhammad Suffyan	Shakir Ali	0315-7816895
45	Muhammad Nadeem	Ali Asgher	0303-9291286
46	Khadam Hussain	Muhammad Aslam	0303-1286624
47	Muhammad Akhtar	Abdul Aziz	0324-2436904
48	Abdullah	Jumma Din	0306-7888512
49	Muhammad Anwar	Muhammad Ashraf	
50	Shahid Ali	Zahid Mehmood	0320-7916538
51	Hassan Ali	Muhammad Ali	0308-6539499
52	Muhammad Sarwar	Sadiq Ahmed	0303-3141306
53	Muhammad Akram	Asgher Ali	0343-6770033
54	Aqeel Ahmed	Munir Ahmed	0343-6779377

Sr. No.	Name of Respondent	Father Name of Respondent	Cell #
55	Abdul Rehman	Kramat Shah	0309-7961017
56	Muhammad Sadiq	Abdul Khaliq	0308-8979154
57	Muhammad Amir	Abdul Raouf	0322-6913903
58	Muhammad Jamal	Muhammad Latif	0301-7929231
59	Sajjad Hussain	Muhammad Aslam	0300-6962096
60	Khalid Chisiti	Muhammad Sharif	0334-1011293
61	Abu Bakar	Khalid Mehmood	0315-2466882
62	Abdul Jabbar	Hassan Din	0301-5471964
63	Shahfaqt Hussain	Hussain Ali	0322-7177732
64	Muhammad Abdullah	Bashir Ahmed	0304-4253778
65	Muhammad Wasim Ali	Gulzar Ahmed	0334-1011293
66	Muhammad Qasim	Jaffar Shah	0321-7081095
67	Iqbal Hussain	Muhammad Hussain	0304-7878629
68	Qurban Hussain	Syed Faqir Hussain	0304-7697381
69	Talha Ismail	Muhammad Ismail	0322-3233312
70	Naveed Ahmed	Faqir Muhammad	0315-7403714
71	Zaighum Ali	Ghulam Haider	0305-8846266
72	Muhammad Mehboob	Muhammad Fazal Din	0321-7086282
73	Usman Anwar	Muhammad Anwar	0306-6446807
74	Muhammad Jamil	Muhammad Ibrahim	0304-7184391
75	Aqeel Ahmed	Muhammad Amin	0315-3956353
76	Shakil Ahmed	Muhammad Amin	0315-6478179
77	Malang Jan Khan	Hazart Ali	0301-8811924
78	Ahsan Nawaz	Nawaz Ahmed	0334-6314008
79	Muhammad Tufail	Muhammad Zaman	0312-7531560
80	Muhammad Munir	Zaka Ullah	0300-6643720
81	Muhammad Amin Bhatti	Mushtaq Ahmed	0300-6959849
82	Hafiz Afnan	Muhammad Aziz	0308-6242890
83	Noor Ahmed	Liaquat Ali	0345-7542730
84	Muhammad Jaffar	Muhammad Irshad	0321-6973249
85	Muhammad Saleem	Mushtaq Ahmed	0300-8406465
86	Wazir Ali	Muhammad Siddiq	0301-7357423
87	Usman Fareed	Wazir Ali	0305-7056723
88	Bashir Ahmed	Dilawar Ali	0300-4881728
89	Muhammad Siddique	Khushi Muhammad	0324-4011749
90	Ahmed Mushtaq	Ali Wazir	0300-6971249
91	Muhammad Razzaq	Mukhtar Ahmed	0300-7537449
92	Muhammad Yaseen	Mushtaq Ahmed	0300-4007649
93	Muhammad Sadique	Muhammad Ali	0302-4965143
94	Muhammad Azhar Iqbal	Muhammad Iqbal	0300-0520051
95	Mushtaq Ahmed	Allah Yar	0300-0205051
96	Mirza Yaseen	Muhammad Din	0300-6977151

Sr. No.	Name of Respondent	Father Name of Respondent	Cell #
97	Manzoor Ahmed	Fateh Muhammad	0301-7327151
98	Ali Sardar	Fateh Muhammad	0300-7865151
99	Muhammad Tufail	Allahyar	0301-4031713
100	Muhammad Younas	Wali Muhammad	0300-7530651
101	Khurram Iqbal	Muhammad Iqbal	0323-5151551
102	Shoukat Ali	Allah Yar	0303-7865151
103	Muhammad Ali	Sardar Chuhan	0301-0515151
104	Muhammad Farooq	Abdul Aziz	0300-2976745
105	Muhammad Iqbal	Amir Ali	0300-6895151
106	Muhammad Asim	Hakim Ali	0306-3995238
107	Hafiq Irfan	Munir Ahmed	0300-8389093
108	Tanvir Ali	Muhammad Ali	0300-5315651
109	Mubarik Ali	Noor Ahmed	0300-5351751
110	Muhammad Shakil	Abdul Shakoor	
111	Abdull Sattar	Abdul Ghaffar	
112	Muhamad Naveed	Zahid Ali	
113	Muhammad Arshad	Nazim Ali	
114	Muhamma Ibrahim Ch.	Din Muhammad Ch.	03007950534
115	Baba Sadiq	Muhammad Naeem	0345-6780971
116	Mumtaz Babi	Muhammad Yaseen	0314-5330334
117	Maryyam Babi	Muhammad Ashraf	0342-4165149
118	Shamim Sarwar	Ghulam Ahmed	0303-8670152
119	Rehmat Babi	Muhammad Mumtaz	0312-7129727
120	Mehwish	Muhammad Akhtar	0301-1812486
121	Asma Babi	Khushi Muhammad	0301-7865149
122	Rimshah	Muhammad Saleem	0322-4284847
123	Rehana Babi	Muhammad Sajjad	-
124	Karim Babi	Muhammad Anwar	0305-5643212
125	Tahira Babi	Rehmat Ali	0343-6400515
126	Raj Babi	Muhammad Mushtaq	0302-4231235
127	Yasmeen	Ghulam Haider	-
128	Ruksana Anjum	Nazir Ali	-
129	Maqboolan Babi	Shoukat Ali	-
130	Haleema Babi	Jalal Din	-
131	Shahnaz Akhtar	Mehran Ali	0300-6908360
132	Nabeela Babi	Ahsan Ali	-
133	Rani Bibi	Abdul Ghaffar	-
134	Shahnaz Begum	Rehmat Ali	-
135	Syeda Horia	Tahir Hussain	0301-3134693
136	Syeda Tahira	Tahir Hussain	0301-3134693
137	Kishwar Ali	Muhammad Aslam	-
138	Kaneez Fatima	Goga	-

Sr. No.	Name of Respondent	Father Name of Respondent	Cell #
139	Mukhtaran Babi	Bashir Ahmed	-
140	Nusrat Babi	Munir Ahmed	-
141	Hajran Babi	Muhammad Naeem	0347-9221706
142	Shahzia Aslam	Arshad Ali	-
143	Sabiran Babi	Muhammad Idrees	0344-4227250
144	Sakeena Babi	Faryad Ali	0346-0648751
145	Afshan Babi	Muhammad Ali	0346-0648751
146	Zohrain Babi	Zafar Ali	0341-4472715
147	Rana Muhammad Nawaz	Rana Abdullah	0300-6957324
148	Abdul Rasheed	Nazir Ahmed	0300-7951372
149	Tahir Sattar	Muhammad Sattar	0315-6953433
150	Arshad Maseh	Gulzar Maseh	0302-5945420
151	Rehmat Maseh	Reldo Maseh	0303-0996203
152	Aaqash Maseh	Baber Maseh	0328-7172329
153	Rafiq Maseh	Shafi Maseh	0316-6775904
154	Asif Maseh	Shoukat Maseh	0322-7022158
155	Maqsood Maseh	Masstan Maseh	0306-2523844
156	Younus Maseh	Lal Maseh	0305-6561872
157	Khurram Maseh	Miraj Maseh	0306-1790926
158	Javed Maseh	Boota Maseh	0308-9120560
159	Aslam Pervez	Boota Maseh	0309-7817492
160	Baber Maseh	Anwar Maseh	0305-6723597
161	Muhammad Sharif	Khadim Ali	0301-7337607
162	Amjid Farooq	Muhammad Farooq	0302-3583542
163	Akram Ali	Noor Muhammad	0301-7398052
164	Shoukat Ali	Gulzar Hussain	0322-0842581
165	Ali Imran	Taj Din	0317-1803103
166	Nadeem Anjum	Anwar Khan	0300-6953856
167	Amir Rafiq	Muhammad Rafiq	0346-4700360
168	Naseem Abbas	Muhammad Aslam	0322-6917251
169	Rao Farman	Rao Furqan	0308-8325185
170	Sohail Arshad	Muhammad Arshad	0302-3586332
171	Muhammad Ramzan	Abdullah	0306-9186266
172	Naveed Ahmad	Rehmat Ali	0315-0972827
173	Muhammad Aslam	Muhammad Ghani	0300-7951740
174	Shan Ali	Javed Akhtar	0311-2765622
175	Muhammad Asif	Bashir Ahmed	0301-7951740
176	Naseer Ahmed		03068020506
177	Shahbaz Ahmed		03067851626
178	Muhammad Bilal		03004838325
179	Nouman Ikram		03036021840
180	Muhammad Asim		03006975109

Sr. No.	Name of Respondent	Father Name of Respondent	Cell #
181	Zafar Ali		03085098917
182	Muhammad Afzal		03257500063
183	Amir Jamil		03011201439
184	Muzzamil		03016938422
185	Nadeem		03007531388
186	Muhammad Shabbir		03006975381
187	Muhammad Riaz		03017805964
188	Tahir Mehmood		03438455028
189	Maqbool Hussain		
190	Muhammad Fiaz		03217294003
191	Muhammazd Riaz Ali		03017049691
192	Rao Umer Daraz		03476355169
193	Muhammad Imran		
194	Rao Imran		03152769771
195	Muhammad Tariq		03030138374
196	Muhammad Nawaz		03006957234
197	Abdul Ghaffar		03005305749
198	Muhammad Zubair		0322-9957162
199	Muhammad Yasin		0303-6506965
200	Basit Hussain		0303-9820816
201	Sajid Hussain		0303-7378979
202	Muhammad Shaid		0307-9784138
203	Ch Nazir Ahmed		0333-8586819

7.8 Institutional Consultation

The consultant environmental and social team visited various organizations and offices located in the tehsil and district level for information disclosure and to get feedback. Institutional stakeholder consultations were more formal as they involved government personnel and non-governmental organization, who were consulted. They were briefed on the ESIA process, the proposed Sub-project, proposed interventions and the potential negative and positive impact of the Sub-project on the area's environment.

The public sector representatives of the different line departments expressed their complete support towards the sub-project development and mentioned the intent to ensure the sub-project was completed at the earliest to the highest quality standards. In addition, these officials expressed the commitment to ensuring the support and would adhere to all environmental and social compliance standards with no leniency in this regard to be expected from the relevant Government line departments. The digest of comment and suggestions received is given as under, whereas, complete list of offices visited, official consulted and feedback received.

Department	Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
Environment Protection Agency Department	What is owner of this project?	LG&CDD with assistance from the Punjab Local Government Board (PLGB) and PMDFC will have

Department	Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
		overall responsibility for Program reporting, monitoring and evaluation (M&E), regulation setting, and coordination with Program MCs. LG & CDD will also take up Annual Performance Assessment (APA) of the MCs by appointing an independent Agency.
	What is the role of contractor to protect the environment during the construction?	The Contractor will ensure implementation of ESIA provisions in its true essence. The Contractor will ensure site safety, occupational safety, use of best equipment's and machinery and public convenience during the course of the Sub-project. The Contractor team will be comprised off following personal for E & S management onsite; Environmental Manager HSE Supervisor
	The official said that environmental awareness in Pakistan is very low therefore raising awareness among the general public about the importance of environment is necessary.	Defiantly, the consultant has been initiated the awareness campaign about the environment and social issues during the consultation.
Irrigation Department	What are the objectives of the project?	The proposed project will provide a socially, environmentally and economically sustainable solution for disposal of sewerage and wastewater. The Project intends to ensure efficiency in safe and quick disposal of sewage/wastewater by laying of Trunk Sewerage System and construction of wastewater treatment plant.
	What are the benefits of the project on the local population?	With the improvement in sewerage system, improvement in health, hygiene and sanitation will also be observed.
	Where the treated water will be disposed off? Do you know the rates of canal and drainage act 2023 for disposal of waste or treated waste water?	The treated water will be disposed off in the nearest seepage Sukhara drain The MC will bound to pay charges according to C&D Act, 2023 in the light of EPA rules and regulation.
Agriculture Department	To make the Sub-project environment friendly, more trees should be planted and whenever possible cut down of trees during the construction phase should be minimized.	Yes, it is suggested that plantation of native trees are considered after the construction activities and the suggestion has been forwarded to the design team and MC officials. The risks and impacts of the sub-project have been summarised.
	The official said that it is good opportunity for the local people in the surrounding of the proposed Sub-project as this Sub-project will create employment opportunities.	Yes definitely this project will create the new opportunities for the local residents and will boost their economy. Comment has been incorporated in the ESIA report
	Communities and decision-makers should access to information about future challenges.	An Environment Social Management and Monitoring Plan has been prepared to ensure the adequacy and effectiveness of the identified

Department	Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
		impacts and proposed mitigation protocol by clearly identifying the roles and responsibilities of the agencies responsible for implementation, monitoring and auditing of ESIA activities, existing and suggested framework. The information regarding the project will be disclosed accordingly through consultation and information will be accessed to everyone.
Wildlife Department	There is no protected area regarding the wildlife in the vicinity of the sub-project.	Explained in the ESIA report
Forest Department	A friendly environment between the residents and the environment is required for the coexistence and preservation of the ecology of the area.	With rapid urbanization, climate change and population growth in the 21st century, is important to minimize human impact on the planet. Nevertheless, despite that this is a very well-designed project for the residents, which will create the healthy environment.
	Moreover, he added that the proposed Sub-project should invest in development of green belts and green areas. Investing in green structures will help in making the Sub-project environment friendly.	These local authorities are responsible for implementing a Green Belt Initiative in their local planning when seeking to build new in infrastructure development. The suggestion has been forwarded to the design team and MC. Comment has been incorporated in the ESIA report
Sui Gas	What is project and who is sponsoring?	The team replied it is funded by World bank and implementing through PMDFC under PCP project. Under this project 4 roads, two disposals and some sewerage lines
	How to develop a coordination between two departments?	When the project will start before the excavation. The field staff of Sui Gas department will develop a close liaison with the MC for time identification of critical and problematic areas of high-pressure Gas lines.
PTDC	Do you know the harmful impacts of Waste Water Treatment plant?	The SDO and foreman of PTDC department briefed about the waterlogged and saline land situation clearly. Then they talked about the harmful impacts of their lives, grid station machinery and as well as houses and their vehicles.
	How the Grid station can be protected from the waste water effluents?	They said there is only salutation to the protect grid station. First the whole station shifted away from the current station. The Government should invest more money on current station to make it full covered and safe from waste water impacts outside the grid station.
	Is there any alternative place for WWT in Okara?	They discussed one or two alternative places for the WWTP in Okara. But these are not under the custody of government land. It is private or may be

Department	Feedback and Concerns	Proposed Measures to address the Stakeholders' Concerns
		Under the position of ARMY.
	How the transmission line and pools protected?	The Government spent a huge amount these pools, conductors and wires, it is impossible to protect them with in waste water environment. So, the whole transmission line cannot shifted from current place to another. It is need to protect them without installing Waste water treatment plant there.
	Is it a good effort for the government to the community of Okara?	The officials of PTDC appreciated the effort of government. But they afford of and of the view the whole money in both projects will be gone useless.



Consultation meeting with Administrator MC Okara



Consultation meeting with ADCR Okara



Consultation meeting with SDO, Irrigation Department



Consultation meeting with Superintendent Forest Department



Consultation meeting with Xen Irrigation Okara



Consultation meeting with SDO PTDC

7.9 List of Institutional Stakeholders

Sr. No.	Name	Designation	Department	Contact Number
1	Kamran Bashir	Administrator/ADCR	MC	0321-8987608
2.	Umer Nasim	Chief Officer	MC	0333-8402836
3	Hafiz Talat Mehmood	MO(I)	MC	0308-4986443
4	Ali Raza	Sub Engineer	MC	0312-6062810
5	Hafiz Umair	Sub Engineer	MC	0322-4250645
6	Imran Rao	Sanitary Supervisor	MC	0315-2769771
7	Ghulam Abba	EXN	NTDC	0335-7401538
8	Muhammad Waqas	SDO	NTDC	0335-7402626
9	Muhammad Saqib	SDO	NTDC	0322-6918932
10	Hafiz Ali Raza	Foreman	NTDC	0300-6975863
11	Syed Ahmed Raza Zaidi	Grid Operator	NTDC	0347-4429377
12	Bagh Zaman Khan	Sub Engineer	Sui Gas	0300-5045621
13	Muhammad Sulman	Development In charge	Sui Gas	0335-4740889
14	Muhammad Tariq	District Officer	EPA	0334-4373146
15	Zahid Iqbal	ADCG	District Administration	0449-200035
16	Zaheer Liaqat Baig	Administrator	MC Okara	0301-4488600
17	Muhammad Nasim	Chief Officer	MC Okara	0333-8402836
18	Rana Irfan Ali Masood	Executive Engineer	LESCO	
19	Ahsan Bilal	Circle Head Draftsman	LESCO	0322-6990702
20	Sarfraz Ali	Sub Divisional Officer	Irrigation	0345-7490533
21	Javaid Suleman	Assistant	Forest	0345-7501415
22	Rashid Ahmad	Head Clerk	Forest	0347-6744971

7.10 Women Stakeholders Consultation

Gender issues are gaining importance in development Sub-projects because female members of the community are generally neglected while designing, assessing and implementing such Sub-projects. Females are generally more vulnerable than male members of the society. This Sub-project is also no exception to it. Conducting women consultations in the Sub-project area was a challenging task. However, the process has been carried out by holding consultation sessions with women of local communities randomly. A participatory and consultative approach has been employed for information gathering and data collection. Female participants were first briefed about the Sub-project objectives and interventions and then were requested to give their views. Women's main concerns were generally related to the existing hardships they are facing and suggestions, as under:

- Completely deprived of females reflected fears about the project and dismantle of their houses showed their concerns as follow
- When the MC will be demolished their houses under this project?
- The Government can provide them clean drinking water and electricity on urgent bases?
- Can the women carry the dismantled material with them?

- Is there any payment procedure will be adopted for the DP?
- Is there any social development plan for the residents and affectless of WWT Plant?
- Will the government give them an alternative place for rebuilt their houses in the nearest place to the current location?
- How is responsible for their livelihood in future?
- The establishment of primary school for boys and girl are essentials for the community.
- Women, mother and child health care is burning issue for the female community.
- How the males can registered their complaint for the grievances?
- Can women of locality get job as labour in the project?

The team of MMP and PMDFC replied their question in details.



8 Grievance Redressal Mechanism

This Section outlines the policy and procedure for documenting, addressing, responding and employing methods to resolve subproject grievances and complaints that may be raised by the subproject affecters or community members arising from environmental and social performance, the engagement process, resettlement and/or unanticipated environmental or social impacts resulting from subproject activities that are performed and/or undertaken by PMDFC. The Section describes the scope and procedural steps and specifies roles and responsibilities of the parties involved in addressing the grievances.

8.1 Principles

A GRM is established to address any complaints or grievances arising during the implementation period of the subproject. People of the subproject area may perceive risks to themselves or their property or their legal rights or have concerns about the possible adverse environmental and social impact that a project may have. Any concerns or grievances will be addressed quickly and transparently, and without retribution to the subproject affected persons or community members or complainant.

The primary principle of GRM is that all complaints or grievances are resolved as quickly as possible in a fair and transparent manner.

8.2 Objectives

The objectives of the GRM are to:

- Develop an organizational framework to address and resolve the grievances of individual(s) or community(s), fairly and equitably;
- Provide enhanced level of satisfaction to the aggrieved;
- Provide easy accessibility to the aggrieved/affected individual or community for immediate grievance redress;
- Ensure that the targeted communities and individuals are treated fairly at all times;
- Identify systemic flaws in the operational functions of the subproject and suggest corrective measures; and
- Ensure sustainability of the subproject.

8.3 Type of Complaints

The major complaints that may arise during the execution of the proposed subproject at site include but not limited to:

- E&S issues (dust, noise, air pollution, social and cultural issues);
- Damage and blockage of public utilities;
- Traffic inconvenience;
- Gender based violence (GBV) and harassment;

- Resettlement issues including loss of livelihood; and
- Issues related to compensation of resettlement impacts.

8.4 Disclosure of GRM

The GRM will be disclosed at PMDFC, and MC office, and concerned subproject engineers, as well as at subproject sites.

8.4.1 Structure of Grievance Redress Mechanism

The subproject will establish a three-tier GRM comprising Community GRC, subproject GRC; and PMDFC-GRC. These tiers are described below.

8.4.2 Community GRC (Tier-1)

The community-GRC will provide a platform for subproject affectees or community members to raise and discuss their concerns, resolve the E&S including resettlement issues at the community level and coordinate with subproject management to communicate these issues and concerns. Community-GRC will be established to maintain a close rapport and coordination with affected persons and community members throughout the subproject implementation. The social development specialist (SDS) of PMDFC with the assistance of SC will facilitate the establishment of community-GRC that is representative of the ethno-cultural and gender diversity within the community. The community-GRC will comprise the following six members with one as the committee convener:

- Three female members (from the subproject affectees or community members); and
- Three male members (from subproject affectees or community members).
- The subproject E&S and engineering staff will coordinate with community-GRC to review and resolve the issue or concern related to resettlement planning or implementation as well as environmental and social concerns preferably within five (05) working days from receipt of the grievance. Any complaints that cannot be resolved at community-GRC will be forwarded to the next tier.

8.4.3 Sub-Project GRC (Tier-2)

PCP will constitute a GRC headed by concerned Project Manager (PM) at each subproject site to resolve all grievances and complaints of the subproject affectees or community members received either directly or through the Tier-1. The subproject GRC will comprise of the following members:

- 1) Project Manager (PM), as head/convener of sub-project GRC;
- 2) Environment, SDS and Gender specialists of PMDFC;
- 3) E&S specialists of Supervision Consultant (SC)
- 4) Resident Engineer of supervision consultant;
- 5) A representative (E&S specialist) of contractor (if required); and
- 6) A representative of local community.

Representative from any other district government department may be called as and when required by the sub-project GRC. Environmental Specialists of PMDFC and SC will join sub-project GRC meeting related to environmental issues only.

The subproject GRC will meet once a month and when the need arises. The sub-project GRC will review grievances involving all E&S issues including resettlement issues that may arise due to subproject implementation. Sub-project GRC will perform the following functions:

- Record, categorize and prioritize the grievances that need to be resolved by the committee and resolve them within ten (10) working days;
- Invite and hear aggrieved persons/parties to produce evidence of their claims and record their view point;
- Communicate its decisions and recommendations on all resolved issues to PIU and the aggrieved persons for smooth implementation;
- Forward the unresolved cases/ complaints to PMDFC-GRC within an appropriate time frame with reasons recorded and its recommendations;
- Develop an information dissemination system and acknowledge the aggrieved persons/parties about the development regarding their grievance;
- Maintain a complaint register accessible to the subproject affectees or community members with brief information about complaints and sub-project GRC decision with status report; and,
- Maintain complete record of all complaints received by the sub-project GRC with actions taken.
- Any complaint that cannot be resolved by the sub-project GRC, will be forwarded to the next tier – the PMDFC-GRC.

8.4.4 PMDFC-GRC (Tier-3)

At the third tier, the PMDFC has already constituted a GRC (PMDFC-GRC). The PMDFC GRC will receive complaints either directly or through the Tier-2 GRC. The committee has the following composition:

- 1) Project Director PCP, (Chairman of PMDFC-GRC);
- 2) SDS, Member
- 3) Gender Specialist, Member;
- 4) Concerned Project Manager – PMDFC, Member;
- 5) SDS of CSC, Member; and
- 6) Representative of Civil Society.

Representative from any other district government department may be called as and when required by the PMDFC-GRC. Environmental Specialists of PMDFC and SC will join PMDFC-GRC meeting related to environmental issues only.

The PMDFC-GRC through authorized representative, will acknowledge the complainant about his/her complaint, scrutinize the record, investigate the remedies available and request the complainant to produce any record in favor of his/her claim. After thorough review and scrutiny of the available record on the complaint, field visit will be conducted to collect additional information, if required. Once the investigations are completed, the PMDFC-GRC

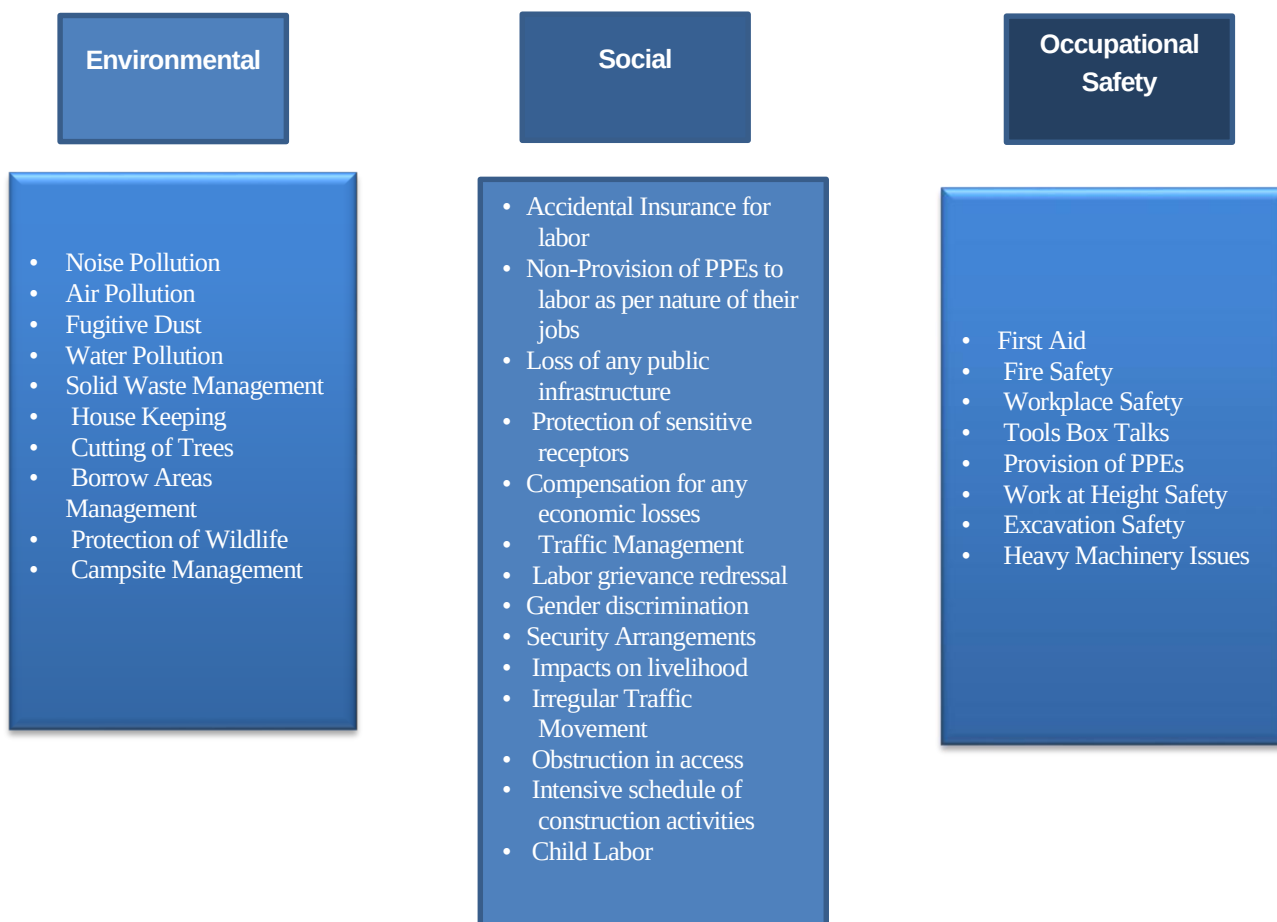
will give decision within twenty (20) working days of receipt of the complaint. If the complainant is still dissatisfied with the decision, he/she can go to the court of law, if he/she wishes so.

Organization of the GRC is shown in Error! Reference source not found.

Figure 8-1: Organogram of GRC

Gender representation will be ensured by inducting a female member in all GRCs. The mechanism will ensure the access of subproject affectees or community members to a GRM that openly and transparently deals with the grievances and makes decision in consultation with all concerned that are consistent with the WB ESF requirements.

8.4.5 Types of Grievances



Gender Based Violence (GBV) Committee

Besides PMDFC-GRC, a GBV committee has also been established and notified within PMDFC consisting of the following members:

- 1) Concerned Project Manager, Head/ Convener of GBV Committee;
- 2) Gender Expert, PMDFC, Secretary; and
- 3) SDS PMDFC, Member.

The GBV Committee will address the gender related issues caused by the subproject activities during ESIA and subproject implementation.

Grievance Redress Procedure / Mechanism

The intention of GRM is to resolve a complaint as quickly and at as low a level as possible to avoid a minor issue becoming a significant grievance. Irrespective of the stage of the process, a complainant has the option to pursue the grievance through the court as is his/her legal right in accordance with law.

The GRCs will work at site, sub-project and PMDFC levels. The E&S and engineering staff of PPMDFC, in coordination with site staff will inform the subproject affectees and community members about the GRCs and its mechanism through consultations and by posting at prominent places. The complaints received through any media will be screened by type and category. These complaints will be registered in Community Complaints Register (CCR), where the name and address of complainant, date, description of complaint and action taken will be recorded. The following procedure will be used to redress the grievances:

- First, complaint resolution will be attempted to be addressed at community-GRC through the involvement of the field E&S/engineering staff. The community-GRC shall give decision within five working days of receipt of the complaint. If unsettled, grievance can be lodged to the sub-project GRC by the complainant or by the GRC;
- Sub-project GRC will acknowledge the receipt within two working days of lodging of complaint. Initial review and consultation with the sub-project GRC will be conducted within five working days of receipt of complaint. If required, sub-project GRC will advise the E&S/engineering specialists to conduct field visits in consultation with the aggrieved persons/parties and local community and submit a fact-finding report. Preferably, the fact finding will be completed within eight working days from receipt of complaints. Sub-project GRC shall give decision within 10 working days of receipt of the complaint. If unresolved, a grievance will be lodged to the (PMDFC-GRC) by the complainant or by the GRC; and
- The PMDFC-GRC shall give decision within 20 working days of receipt of the complaint. If the complainant is still not satisfied, he/she can pursue further by submitting the case to the appropriate court of law.
- All E&S issues will be dealt according to the above GRM procedures. The GRCs will hear and clarify with the complainant (if required so) about the E&S issue and shall conclude and communicate their recommendations for further implementation in due course of time. Complainant will be kept informed during the process and the GRC decision will be communicated to him/her accordingly. In case of any delay, the complainant will be informed on the progress and process about his/her grievance. The GRC proceedings will be documented step by step and all records will be maintained and summarized in the subproject progress and internal monitoring reports.

8.4.6 Lodging of Complaint

The complainant(s) can lodge their grievances through a number of ways/channels including online, mail, phone, and WhatsApp, e-mail and complaint box. Moreover, PMDFC has established an e-Portal for filing and tracking progress of the application online; the details are provided below.

- It is an electronic complaint lodging system (application) that will be accessible through a link on the PMDFC website;
- The focus of the e-portal is the quick complaint lodging for all types of primary stakeholders;
- Any subproject affectee or community member with internet access can lodge a complaint with option for anonymous complaints. Uploading of photos for better understanding of the problem will also be an option;
- Each complainant will get a unique Grievance Number to track their complaints through the e-portal;
- Each complaint will go through a quick resolution mechanism being managed by a dedicated team at the PMDFC. Each complainant will be contacted to ensure that his/her issue is resolved;

- The portal will differentiate between types of complaints for targeted decision-making and action on behalf of PMDFC; and
- The portal will allow a quick and easy method for monitoring of the entire complaint lodging and resolution mechanism.

8.4.7 Institutional Framework

Following institutions of Govt. of Punjab/ others are related to the implementation of environmental and social management of PCP.

8.4.8 Local Government and Community Development Department (LG&CDD)

LG&CDD with assistance from the Punjab Local Government Board (PLGB) and PMDFC will have overall responsibility for Program reporting, monitoring and evaluation (M&E), regulation setting, and coordination with Program MCs. LG & CDD will also take up Annual Performance Assessment (APA) of the MCs by appointing an independent Agency.

8.4.9 Punjab Municipal Development Fund Company (PMDFC)

PMDFC will act as the lead technical agency and will be tasked to:

- Provide capacity building support to partner MCs to achieve DLI results.
- Deployment and maintenance support for e-governance and improved judiciary systems, and training of MC staff on new systems.
- Consolidate information related to service delivery, finances and accounts, expenditure, and complaint resolution, and communicate the compiled information to finance department FD and LG via reporting dashboards set up at these agencies.
- Conduct procurement of consultancies for capacity building of MCs and for design and supervision consultants. The mode of procurement of goods and works for the partner municipal committees will however be decided by Program Steering Committee (PSC). Provide technical assistance in areas such as service delivery standards, and own source revenue mobilization, manage regular M&E processes and provide consolidated information to LG&CDD on progress of activities per M&E requirements.
- Assist with Program reporting, including the mid-year and annual program reports. Assist with day to-day coordination of the Program.

8.4.10 Central Program Management Team (CPMT)

PMDFC has Central Program Management Team in Lahore, which will have overall responsibility for the above tasks. This ESM team comprise of:

- Senior Program Officer Environment & Social Management
- Program Officer Environment & Social Management

8.4.11 Regional Program Management Team

PMDFC has Regional Program Management Team in Faisalabad, Gujranwala and Jhang regions, which will have overall responsibility for the ESM tasks. This ESM team comprise of:

- Deputy Program Officer Environment & Social Management (Faisalabad)
- Deputy Program Officer Environment & Social Management (Gujranwala)
- Deputy Program Officer Environment & Social Management (Jhang)

8.4.12 Municipal Committee Okara

Environment & Social Focal Persons (ESFPs) will play a key role in true implementation of E & S prospects of ESMP. ESFP are following nominated officials;

- Municipal Officer Infrastructure (For Environmental Aspects)
- Municipal Officer Planning (For Social Aspects)

8.4.13 Environment Protection Department (EPD)

Environment Protection Department (EPD) will play key role towards making Sub-project environmentally sustainable and socially acceptable. EPD will assign focal persons to give their part in making PCP a success story.

8.4.14 The Contractor

The Contractor will ensure implementation of ESMP provisions in its true essence. The Contractor will ensure site safety, occupational safety, use of best equipment's and machinery and public convenience during the course of the Sub-project. The Contractor team will be comprised off following personal for E & S management onsite;

- Environmental Manager
- HSE Supervisor

This section presents conclusions of the ESIA study of proposed Project. The overall objective of this ESIA is to carry out a detailed environmental assessment of the subproject area; to assess impacts caused by the different activities of the proposed subproject and to address measures to mitigate adverse environmental impacts arising from the execution of the proposed subproject.

The conclusions mentioned below are based on the findings of detailed environmental assessment, which has been carried out as per requirement of Pak EPA.

8.5 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 subproject. Residents and stakeholders were also contacted for obtaining salient information of the subproject. Following is the list of main issues and concerns:

- Disturbance to the public movement during construction;

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

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

9 Environmental and Social Management Cost

The cost for implementation of environmental management plan is given in the following **Table 9-1**.

Table 9-1: Estimated Cost for Implementation of ESMMP

Item	Quantity	Tentative Cost/ Item- PK Rs. /-	Total Cost
(A) PPEs for Labor/Workers			
Face Masks (3 PLY) - box	50	300	15,000
Safety Hard Helmets	100	3,000	300,000
Safety Shoes	100	3,000	300,000
Hand Gloves	100	1,000	100,000
Ear Plugs	50	500	25,000
Reflective Safety Vest	100	1,000	100,000
Safety Goggles	50	500	25,000
Total of Component A			865,000
(B) Community Health and Safety			
First Aid Box Complete	2	10,000	20,000
Infrared Thermometer (Benetech GM-2200 or equivalent)	1	40,000	40,000
Safety Signs	50	10,000	500,000
Safety Cones	100	1,000	100,000
Safety Tapes	50	1,500	75,000
Portable Delineator with chain	10	2,000	20,000
Emergency Portable Lights	10	3,000	30,000
Solid Waste Collection Drums with Cover	5	12,000	60,000
Fire Fighting Equipment Purchase and refilling	2	10,000	20,000
Hiring of Environmental Manager (for the total length of subproject i.e.,14 months)	14	75,000	1,050,000
Hiring of Safety Officer (for the total length of subproject i.e.,14 months)	14	50,000	700,000
Hiring of Qualified Dispenser (for the total length of subproject i.e.,14 months)	14	25,000	350,000
Medicines	Lump sum		200,000
Pole Hanging Waste Bins	5	12,000	60,000
Labor Campsite Management	1	300,000	300,000
Water Sprinkling	1	100,000	100,000
Social and Behavior Change Campaign and Labor Awareness/Training	1	100,000	100,000
Total of Component B			3,082,500
(C) Environmental Quality Testing /Monitoring during and After Construction			
Ambient Air Quality-Before, during, and after construction	15	85,000	1,275,000
Noise Quality-Before, during, and after construction	15	1,000	15,000
Water Quality-Before, during, and after construction	15	32,000	480,000
Total of Component C			1,770,000
(D) Training sessions with contractor labor force and with local communities at site on code of ethics and GRM			
Boarding and Lodging	Lump sum	100,000	100,000
Transportation	Lump sum	50,000	50,000
Training Material	Lump sum	50,000	50,000
Entertainment	Lump sum	200,000	200,000
Misc.		50,000	50,000
Total of Component D			450,000
(E) Tree Plantation cost			690,000
Total (PKR)-A+B+C+D+E			7,500,000

10 Conclusion and Recommendations

7.1 Conclusion

After the completion of the proposed subproject, residents of the subproject area will get the following benefits:

- Improvement in environmental conditions of the area;
- Environmental nuisance created by temporary disposal stations in the subproject area will be minimized;
- Improvement in health conditions of the residents of the subproject area;
- Decrease in health budget of the residents of the area;
- Elimination of existing water ponds by the provision of proper sewerage system; and
- Provision of sewerage system in the proposed subproject area will improve the existing living condition.

It is concluded that the proposed subproject will not cause potential environmental and social adverse impacts on the local environment after implementation of the mitigation measures. Results of the ESIA Study have shown that overall, the subproject 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.

7.2 Recommendations

- The construction activities shall be phased to confine the disruption of traffic. Traffic diversion/ re-routing plans, if found necessary, would 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 into the town during rush hours which could run at night hours.
- Inclusion of further access routes to facilitate the accessibility of vehicles and pedestrians to and from the proposed subproject site.
- Strict supervision of the excavation process should be carried out and residents should be informed in advance about the excavation activity.
- Noise measurements should be carried out at locations and schedule specified to ensure the effectiveness of mitigation measures.
- Oduor should minimize by installing ventilators and vegetation arrangements.
- Water quality discharged from the waste water treatment plant should be checked periodically.

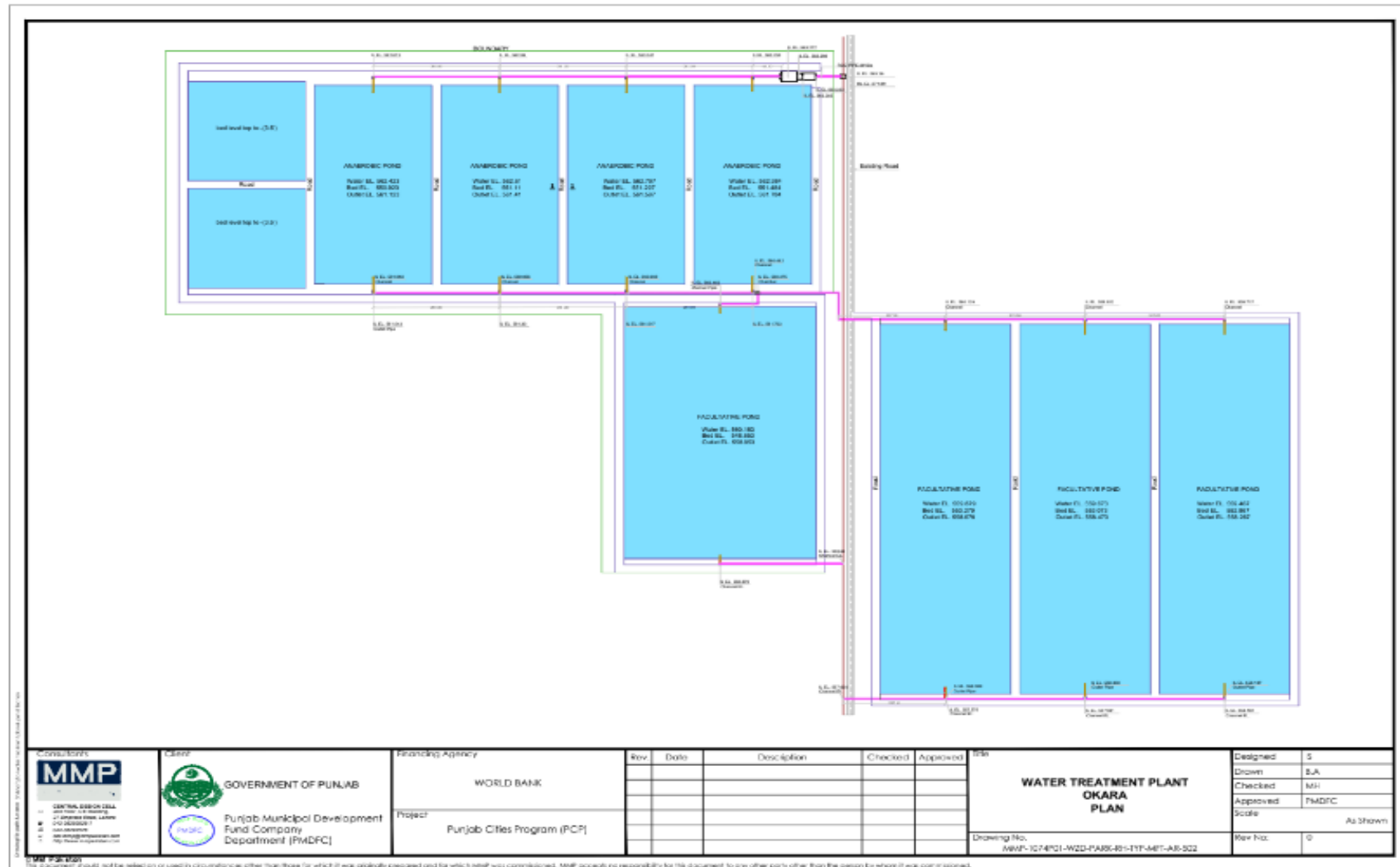


Figure 10-1: Site Layout Map

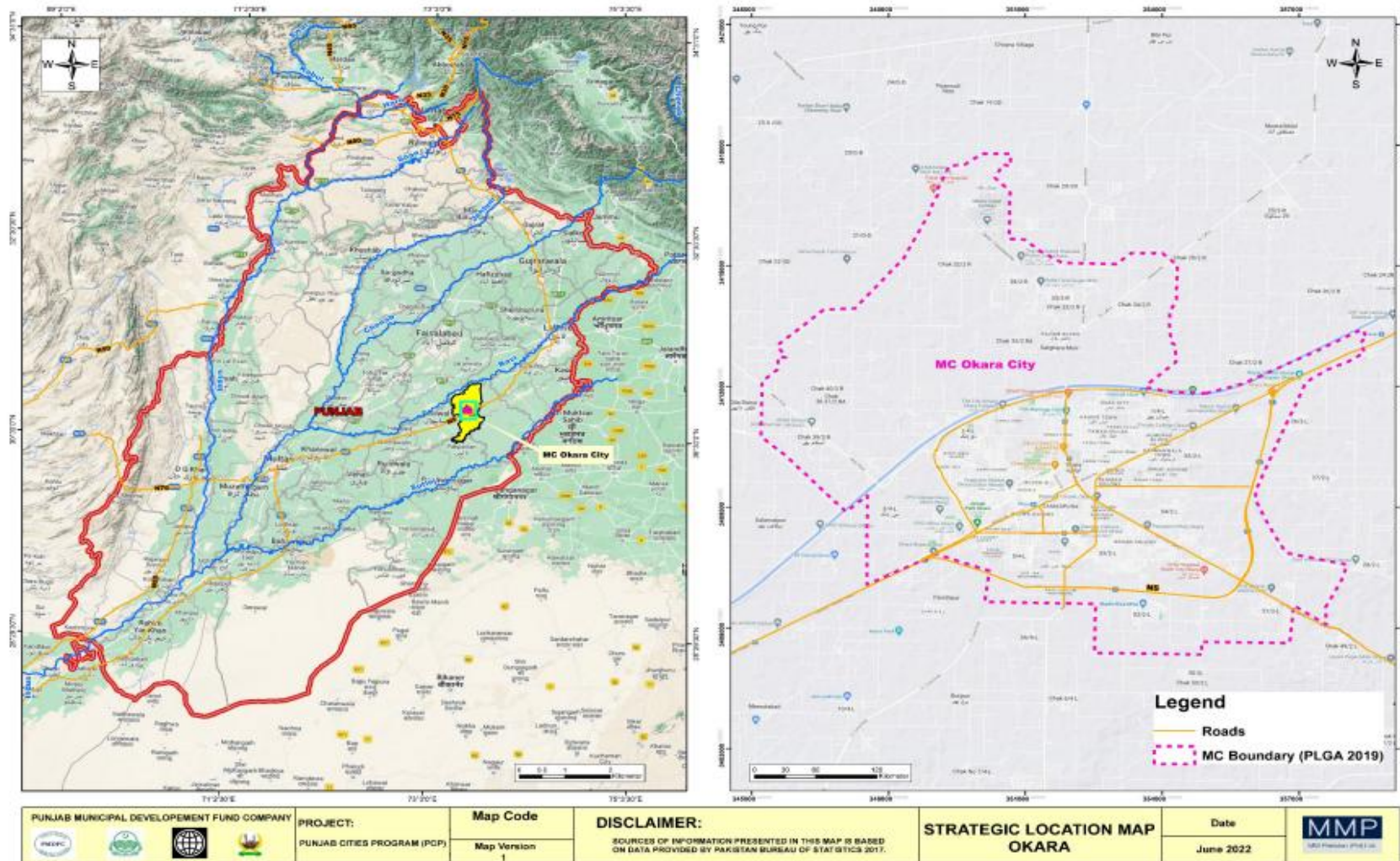


Figure 10-2: Layout of Municipal Corporation Boundary Okara

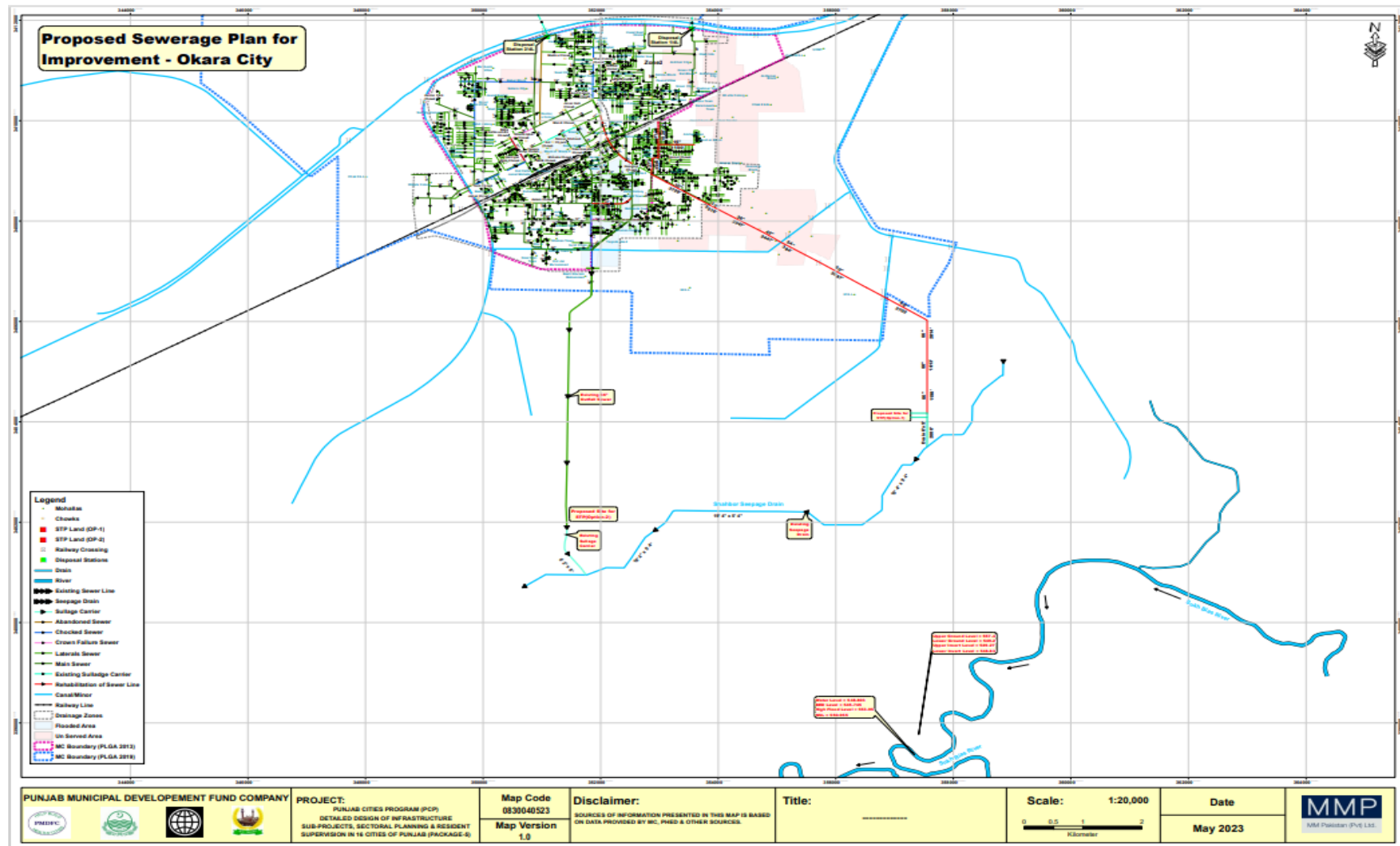


Figure 10-3: Site Layout Plan of New Sewer Lines to be Laid

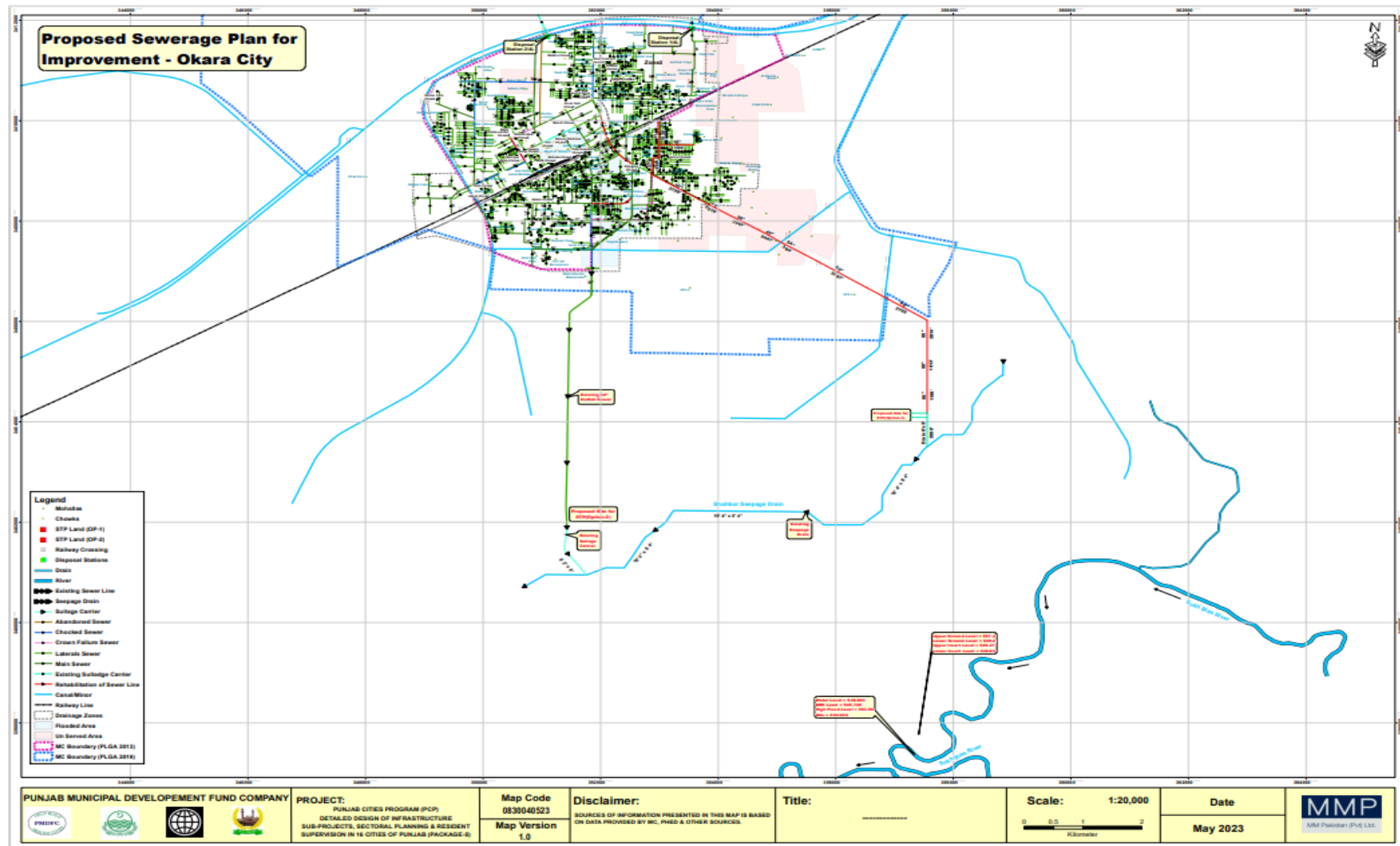


Figure 10-4: Site Plan of Replacement of Old Sewer Lines

11 Annexures

Annexure A: Socio-Economic Survey for Baseline Data Collection of Water Supply System

**Socio-Economic Survey for Baseline Data
Collection of Water Supply System
Under Punjab Cities Program**

Date_____

Name of Sub-Project: _____

Proposed Activities:

Q.1 Name of the Respondent:_____ Q.2 Fathers Name_____

Q.3 Residential Address: _____

Q.4 Mobile Number: _____ Q.5 Age (years): _____

Q.6 Caste: _____

Q.7 Education: _____

Q.8 Languages Spoken: i. Urdu _____ ii. Punjabi _____ iii. Other _____

Q.9 Union Council: _____ District _____

Q.10 Marital Status:

i. Married _____ ii Un-Married _____ Divorced _____

Q.11 Total No. of Dependents: _____

Q.12 Age Group and Education Level of Dependents:

Age Group (Years)	Male	Education	Female	Education	Age
1-4					
5-9					
10-19					
20-39					
40-59					
60+					

Q.13 Occupation & Sources of Income:

Sr. No.	Name of Business		Income from Business (Pak Rs./Month)	
	Main	Secondary	Main	Secondary
i.				
ii.				
iii.				
Total				

Q.14 Estimated no. of houses in the Subproject area.

.....

Q.15 Housing structure

Pacca houses

¹Kaccha houses

² Semi-pacca

Q.16 Estimated Households size:

.....

Q.17. Estimated Population: Household³ size × No. of houses:

.....

Q.18. Infrastructure present in the settlement

Truck/ bus terminals	☐	Railway tracks	☐	Gas pipelines	☐
Shopping area/market	☐	Tube wells	☐	Telephone lines	☐
Banks	☐	Sewerage system ⁴	☐	Drains(5open/closed)	☐
Electricity transmission Lines	☐	Storm water ⁶ drains	☐	⁷ Disposal stations	

¹ refers to dwellings that are designed to be solid and permanent

² made up of mud, bamboo, leaves

³A household is composed of the group of people living in the same dwelling space and who acknowledge the authority of a man or woman who is the head of household.

⁴ Sewage collection and disposal systems transport sewage through cities and other inhabited areas

⁵ Drain (plumbing) is a plumbing fixture that provides an exit-point for waste water or water that is to be re-circulated

⁶ drain system is designed to drain excess rain and ground water from paved street

⁷ water and sanitation Agency

Q.19. Mode of Transportation

.....

.....

Q.20. Availability of social services in the area

School/University

Name of School	Education Level ⁸	For Boys/Girls

Q.21. Hospital /Dispensary/Clinic

i. Name of Hospital

/Dispensary/Clinic.....

Government

☐

Private

☐

ii. Name of Hospital

/Dispensary/Clinic.....

Government

☐

Private

☐

Offices

Name of

Office.....

Government

☐

Private

☐

Q.22. Current issues related to water supply?

⁸ Primary, Secondary or higher secondary

Q.23 Water availability time duration?

Q.24 Is water contaminated? If yes, how do you know?

Q.25 Any waterborne diseases in the area?

Q.26 Reasons of water contamination in your area?

Q.27 Is there mixing of industrial / household effluents?

Q.28 Are water supply pipelines contaminated and need repair / maintenance / new installation?

Q.29 Are government installed tube wells less in number and need to install more tube wells?

Q.30 Reasons of less availability of water?

Q.31 Are you using water from government's water supply system? If yes, are you satisfied with this water?

Q.32 Are you using private systemic water (private / household water motors etc.)? If yes, are you satisfied with this water?

Q.33 Percentage of community using water from personal / private water system?

Q.34 Percentage of community using water from government's water supply system?

Q.35 Are you paying bill for government's water supply system? If yes, how much?

Q.36 How much is your water requirement?

Q.37 How much of your requirements are being fulfilled by current water supply system?

Q.38 For which purposes you need more water?

Q.39 With current water supply system, how do you see your future after 20 years?

Q.40 What government should do to fulfill future water supply requirements providing

clean drinkable water?

Q.41 What project do you think that government should initiate to fulfill future's clean
water requirements?

Q.42 What is average rainfall in your area?

Q.43 Are you willing to place containers on your rooftops during rain to use that stored
water?

Q.43 If government initiates a campaign on stopping the wastage of water, what will
be your concerns?

Q.44 If government installs a system that stores water for reusing purposes, what will
beyour concerns?

Socio-Economic Survey for Baseline Data Collection of Water Supply System Under Punjab Cities Program

Date _____

Name of Project: _____

Proposed Activities:

Q.1 Name of the Respondent: _____ Q.2 Fathers Name _____

Q.3 Residential Address: _____

Q.4 Mobile Number: _____ Q.5 Age (years): _____

Q.6 Caste: _____

Q.7 Education: _____

Q.8 Languages Spoken: i. Urdu _____ ii. Punjabi _____ iii. Other _____

Q.9 Union Council: _____ District _____

Q.10 Marital Status:

i. Married _____ ii Un-Married _____ Divorced _____

Q.11 Total No. of Dependents: _____

Q.12 Age Group and Education Level of Dependents:

Age Group (Years)	Male	Education	Female	Education	Age
1-4					
5-9					
10-19					

Annexure B: IFC EHS Guidelines for Construction and Decommissioning

General EHS Guidelines [Complete version] at: www.ifc.org/ehsguidelines
Environmental, Health, and Safety (EHS) Guidelines
 GENERAL EHS GUIDELINES: CONSTRUCTION AND DECOMMISSIONING


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Applicability and Approach

This section provides additional, specific guidance on prevention and control of community health and safety impacts that may occur during new project development, at the end of the project life-cycle, or due to expansion or modification of existing project facilities. Cross referencing is made to various other sections of the General EHS Guidelines.

4.1 Environment{ TC "4.1 Environment" \f C \l "2" }

Noise and Vibration

During construction and decommissioning activities, noise and vibration may be caused by the operation of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people. Some recommended noise reduction and control strategies to consider in areas close to community areas include:

- Planning activities in consultation with local communities so that activities with the greatest potential to generate noise are

planned during periods of the day that will result in least disturbance

- Using noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, and exhaust muffling devices for combustion engines.
- Avoiding or minimizing project transportation through community areas

Soil Erosion

Soil erosion may be caused by exposure of soil surfaces to rain and wind during site clearing, earth moving, and excavation activities. The mobilization and transport of soil particles may, in turn, result in sedimentation of surface drainage networks, which may result in impacts to the quality of natural water systems and ultimately the biological systems that use these waters.

Recommended soil erosion and water system management approaches include:

Sediment mobilization and transport

- Reducing or preventing erosion by:
 - Scheduling to avoid heavy rainfall periods (i.e., during the dry season) to the extent practical
 - Contouring and minimizing length and steepness of slopes
 - Mulching to stabilize exposed areas
 - Re-vegetating areas promptly
 - Designing channels and ditches for post-construction flows
 - Lining steep channel and slopes (e.g. use jute matting)
- Reducing or preventing off-site sediment transport through use of settlement ponds, silt fences, and water treatment, and modifying or suspending activities during extreme rainfall and high winds to the extent practical.



Environmental, Health, and Safety (EHS) Guidelines

GENERAL EHS GUIDELINES: CONSTRUCTION AND DECOMMISSIONING



WORLD BANK GROUP

Clean runoff management

- Segregating or diverting clean water runoff to prevent it mixing with water containing a high solids content, to minimize the volume of water to be treated prior to release

Road design

- Limiting access road gradients to reduce runoff-induced erosion
- Providing adequate road drainage based on road width, surface material, compaction, and maintenance

Disturbance to water bodies

- Depending on the potential for adverse impacts, installing free-spanning structures (e.g., single span bridges) for road watercourse crossings
- Restricting the duration and timing of in-stream activities to lower low periods, and avoiding periods critical to biological cycles of valued flora and fauna (e.g., migration, spawning, etc.)
- For in-stream works, using isolation techniques such as berming or diversion during construction to limit the exposure of disturbed sediments to moving water
- Consider using trenchless technology for pipeline crossings (e.g., suspended crossings) or installation by directional drilling

Structural (slope) stability

- Providing effective short term measures for slope stabilization, sediment control and subsidence control until long term measures for the operational phase can be implemented
- Providing adequate drainage systems to minimize and control infiltration

Air Quality

Construction and decommissioning activities may generate emission of fugitive dust caused by a combination of on-site excavation and movement of earth materials, contact of construction machinery with bare soil, and exposure of bare soil and soil piles to wind. A secondary source of emissions may include exhaust from diesel engines of earth moving equipment, as well as from open burning of solid waste on-site. Techniques to consider for the reduction and control of air emissions from construction and decommissioning sites include:

- Minimizing dust from material handling sources, such as conveyors and bins, by using covers and/or control equipment (water suppression, bag house, or cyclone)
- Minimizing dust from open area sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content
- Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements
- Selectively removing potential hazardous air pollutants, such as asbestos, from existing infrastructure prior to demolition
- Managing emissions from mobile sources according to Section 1.1
- Avoiding open burning of solid (refer to solid waste management guidance in Section 1.6)

Solid Waste

Non-hazardous solid waste generated at construction and decommissioning sites includes excess fill materials from grading and excavation activities, scrap wood and metals, and small concrete spills. Other non-hazardous solid wastes include office, kitchen, and dormitory wastes when these types of operations are part of construction project activities. *Hazardous solid waste* includes contaminated soils, which could potentially be encountered on-site due to previous land use activities, or small


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amounts of machinery maintenance materials, such as oily rags, used oil filters, and used oil, as well as spill cleanup materials from oil and fuel spills. Techniques for preventing and controlling non-hazardous and hazardous construction site solid waste include those already discussed in Section 1.6.

Hazardous Materials

Construction and decommissioning activities may pose the potential for release of petroleum based products, such as lubricants, hydraulic fluids, or fuels during their storage, transfer, or use in equipment. These materials may also be encountered during decommissioning activities in building components or industrial process equipment. Techniques for prevention, minimization, and control of these impacts include:

- Providing adequate secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids,
- Using impervious surfaces for refueling areas and other fluid transfer areas
- Training workers on the correct transfer and handling of fuels and chemicals and the response to spills
- Providing portable spill containment and cleanup equipment on site and training in the equipment deployment
- Assessing the contents of hazardous materials and petroleum-based products in building systems (e.g. PCB containing electrical equipment, asbestos-containing building materials) and process equipment and removing them prior to initiation of decommissioning activities, and managing their treatment and disposal according to Sections 1.5 and 1.6 on Hazardous Materials and Hazardous Waste Management, respectively
- Assessing the presence of hazardous substances in or on building materials (e.g., polychlorinated biphenyls, asbestos-containing flooring or insulation) and decontaminating or properly managing contaminated building materials

Wastewater Discharges

Construction and decommissioning activities may include the generation of sanitary wastewater discharges in varying quantities depending on the number of workers involved. Adequate portable or permanent sanitation facilities serving all workers should be provided at all construction sites. Sanitary wastewater in construction and other sites should be managed as described in Section 1.3.

Contaminated Land

Land contamination may be encountered in sites under construction or decommissioning due to known or unknown historical releases of hazardous materials or oil, or due to the presence of abandoned infrastructure formerly used to store or handle these materials, including underground storage tanks. Actions necessary to manage the risk from contaminated land will depend on factors such as the level and location of contamination, the type and risks of the contaminated media, and the intended land use. However, a basic management strategy should include:

- Managing contaminated media with the objective of protecting the safety and health of occupants of the site, the surrounding community, and the environment post construction or post decommissioning
- Understanding the historical use of the land with regard to the potential presence of hazardous materials or oil prior to initiation of construction or decommissioning activities
- Preparing plans and procedures to respond to the discovery of contaminated media to minimize or reduce the risk to health, safety, and the environment consistent with the approach for Contaminated Land in Section 1.6
- Preparation of a management plan to manage obsolete, abandoned, hazardous materials or oil consistent with the approach to hazardous waste management described in Section 1.6.


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Successful implementation of any management strategy may require identification and cooperation with whoever is responsible and liable for the contamination.

4.2 Occupational Health and Safety

TC "4.2 Occupational Health and Safety" \f C \l "2" }

Over-exertion

Over-exertion, and ergonomic injuries and illnesses, such as repetitive motion, over-exertion, and manual handling, are among the most common causes of injuries in construction and decommissioning sites. Recommendations for their prevention and control include:

- Training of workers in lifting and materials handling techniques in construction and decommissioning projects, including the placement of weight limits above which mechanical assists or two-person lifts are necessary
- Planning work site layout to minimize the need for manual transfer of heavy loads
- Selecting tools and designing work stations that reduce force requirements and holding times, and which promote improved postures, including, where applicable, user adjustable work stations
- Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks

Slips and Falls

Slips and falls on the same elevation associated with poor housekeeping, such as excessive waste debris, loose construction materials, liquid spills, and uncontrolled use of electrical cords and ropes on the ground, are also among the most frequent cause of lost time accidents at construction and decommissioning sites. Recommended methods for the prevention of slips and falls from, or on, the same elevation include:

- Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths
- Cleaning up excessive waste debris and liquid spills regularly
- Locating electrical cords and ropes in common areas and marked corridors
- Use of slip retardant footwear

Work in Heights

Falls from elevation associated with working with ladders, scaffolding, and partially built or demolished structures are among the most common cause of fatal or permanent disabling injury at construction or decommissioning sites. If fall hazards exist, a fall protection plan should be in place which includes one or more of the following aspects, depending on the nature of the fall hazard⁹⁵:

- Training and use of temporary fall prevention devices, such as rails or other barriers able to support a weight of 200 pounds, when working at heights equal or greater than two meters or at any height if the risk includes falling into operating machinery, into water or other liquid, into hazardous substances, or through an opening in a work surface
- Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support 5000 pounds (also described in this section in Working at Heights above), as well as fall rescue procedures to deal with workers whose fall has been successfully arrested. The tie in point of the fall arresting system should also be able to support 5000 pounds
- Use of control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as

⁹⁵ Additional information on identification of fall hazards and design of protection systems can be found in the United States Occupational Health and Safety Administration's (US OSHA) web site: <http://www.osha.gov/SLTC/fallprotection/index.html>



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securing, marking, and labeling covers for openings in floors, roofs, or walking surfaces

Struck By Objects

Construction and demolition activities may pose significant hazards related to the potential fall of materials or tools, as well as ejection of solid particles from abrasive or other types of power tools which can result in injury to the head, eyes, and extremities. Techniques for the prevention and control of these hazards include:

- Using a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels
- Conducting sawing, cutting, grinding, sanding, chipping or chiseling with proper guards and anchoring as applicable
- Maintaining clear traffic ways to avoid driving of heavy equipment over loose scrap
- Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as hand rails and toe boards to prevent materials from being dislodged
- Evacuating work areas during blasting operations, and using blast mats or other means of deflection to minimize fly rock or ejection of demolition debris if work is conducted in proximity to people or structures
- Wearing appropriate PPE, such as safety glasses with side shields, face shields, hard hats, and safety shoes

Moving Machinery

Vehicle traffic and use of lifting equipment in the movement of machinery and materials on a construction site may pose temporary hazards, such as physical contact, spills, dust, emissions, and noise. Heavy equipment operators have limited fields of view close to their equipment and may not see pedestrians close to the vehicle. Center-articulated vehicles create a significant impact or crush hazard zone on the outboard side of

a turn while moving. Techniques for the prevention and control of these impacts include:

- Planning and segregating the location of vehicle traffic, machine operation, and walking areas, and controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits, and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic
- Ensuring the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas, and training of workers to verify eye contact with equipment operators before approaching the operating vehicle
- Ensuring moving equipment is outfitted with audible back-up alarms
- Using inspected and well-maintained lifting devices that are appropriate for the load, such as cranes, and securing loads when lifting them to higher job-site elevations.

Dust

- Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements
- PPE, such as dust masks, should be used where dust levels are excessive

Confined Spaces and Excavations

Examples of confined spaces that may be present in construction or demolition sites include: silos, vats, hoppers, utility vaults, tanks, sewers, pipes, and access shafts. Ditches and trenches may also be considered a confined space when access or egress is limited. In addition to the guidance provided in Section 2.8 the occupational hazards associated with confined spaces and excavations in construction and decommissioning sites should be prevented according to the following recommendations:



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- Controlling site-specific factors which may contribute to excavation slope instability including, for example, the use of excavation dewatering, side-walls support, and slope gradient adjustments that eliminate or minimize the risk of collapse, entrapment, or drowning
- Providing safe means of access and egress from excavations, such as graded slopes, graded access route, or stairs and ladders
- Avoiding the operation of combustion equipment for prolonged periods inside excavations areas where other workers are required to enter unless the area is actively ventilated

Other Site Hazards

Construction and decommissioning sites may pose a risk of exposure to dust, chemicals, hazardous or flammable materials, and wastes in a combination of liquid, solid, or gaseous forms, which should be prevented through the implementation of project-specific plans and other applicable management practices, including:

- Use of specially trained personnel to identify and remove waste materials from tanks, vessels, processing equipment or contaminated land as a first step in decommissioning activities to allow for safe excavation, construction, dismantling or demolition
- Use of specially trained personnel to identify and selectively remove potentially hazardous materials in building elements prior to dismantling or demolition including, for example, insulation or structural elements containing asbestos and Polychlorinated Biphenyls (PCBs), electrical components containing mercury⁹⁶
- Use of waste-specific PPE based on the results of an occupational health and safety assessment, including

respirators, clothing/protective suits, gloves and eye protection

4.3 Community Health and Safety

"4.3 Community Health and Safety" \f C \l "2" }

General Site Hazards

Projects should implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction and decommissioning. Risks may arise from inadvertent or intentional trespassing, including potential contact with hazardous materials, contaminated soils and other environmental media, buildings that are vacant or under construction, or excavations and structures which may pose falling and entrapment hazards. Risk management strategies may include:

- Restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community
- Removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials

Disease Prevention

Increased incidence of communicable and vector-borne diseases attributable to construction activities represents a potentially serious health threat to project personnel and residents of local communities. Recommendations for the prevention and control of communicable and vector-borne diseases also applicable to

⁹⁶ Additional information on the management and removal of asbestos containing building materials can be found in ASTM Standard E2356 and E1368

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construction phase activities are provided in Section 3.6 (Disease Prevention).

Traffic Safety

Construction activities may result in a significant increase in movement of heavy vehicles for the transport of construction materials and equipment increasing the risk of traffic-related accidents and injuries to workers and local communities. The incidence of road accidents involving project vehicles during construction should be minimized through a combination of education and awareness-raising, and the adoption of procedures described in Section 3.4 (Traffic Safety).

Annexure C: COVID-19 Pandemic and Health Safety Measures

Given the unprecedented nature of the COVID-19 pandemic, The Contractors are bound to take all necessary precautions to maintain the health and safety related measures at site and to ensure suitable arrangements regarding hygiene requirements for the prevention of pandemic.

Following are the measures that should be implemented at the construction site to avoid the spread of Covid-19:

Activities	Adaptive Measures
Pre- Execution Phase	
A. Profile preparation	- Detail profile of subproject workforce - Enlist the names, addresses and contact # - Breakdown of the workforce (workers from local communities and those who have on site accommodation) - Assigning the task against each person - Schedule the key activities and their duration at site
B. Initial Screening	- All enlisted workforce should go through initial screening process - Ensuring the availability of Thermo gun at site - Record keeping against initial screening - Identifying all workers who are initially at more risk of contracting Covid-19
During Execution Phase	
A. Preliminary Screening	Regular Screening: - Regular screening by using Thermo gun on daily basis before starting civil work at site - Checking and recording temperatures of workers and other people entering the site or requiring self-reporting prior to or on entering the site. - If a worker has symptoms of COVID-19 (e.g., fever, dry cough, fatigue) the worker should be removed immediately from work activities and isolated on designated site. - Co-workers (i.e., workers with whom the sick worker was in close contact) should be required to stop work, and to quarantine themselves for 14 days, even if they have no symptoms. Sequential Screening: Concerned DHQ medical staff is requested for screening at regular intervals. List should also be shared with DHQ for avoiding future inconvenience or hire health safety officer on weekly basis.
B. Special Arrangements regarding PPEs	- Ensuring availability of handwashing facilities (sanitizers/soaps) at site - Presence of closed waste bins at key places throughout site, including at entrances/exits to work areas (toilet, canteen or food distribution, or provision of drinking water; in worker accommodation; at waste stations; at stores; and in common spaces). - Special arrangements regarding PPEs and sanitation at site - Record keeping of stock availability on daily basis

Activities	Adaptive Measures
C. Restricted Movement/ Demobilization of staff	• Encourage employees to wash their hands at least for 20 seconds with soap and stay at least one meter away from people who are coughing or sneezing • Breakdown of workers who reside at home (i.e., workers from the communities), workers who lodge within the local communities and workers in on-site accommodation. Workers accommodated on site should be required to minimize contact with people near the site, and in certain cases be prohibited from leaving the site for the duration of their contract, so that contact with local communities is avoided. • Workers from local communities, who return home daily, weekly or monthly, will be more difficult to manage. They should be subject to health checks at entry to the site (as set out above) and at some point, circumstances may make it necessary to require them to either use accommodation on site or not to come to work. • All workers should be provided separate accommodation.
D. Training sessions	• Health and safety training for The Contractor's Personnel (which include subproject workers and all personnel that the Contractor uses on site, including staff and other employees of the Contractor and Sub-Contractors and any other personnel assisting the Contractor in carrying out subproject activities. • Sessions related to safety procedures, use of construction PPEs, occupational health and safety issues, and code of conduct specially privacy issues including social distancing. • Arranging daily briefings with workforce, reminding workers to self-monitor for possible symptoms (fever, cough) and to report to their supervisor or the COVID-19 focal point if they have symptoms or are feeling unwell. • Placing posters and sign boards around the site in local languages. • Appointing one person on daily basis among the workforce who will serve as trainer for conducting awareness session and encouraging the rest to take preventive measures.
E. Operationalization of Grievance Redress Mechanism	• Effective implementation of GRM at site • Encouraging to report any COVID-19 related health issue and concerns about the health of their co-workers and other staff as well. • In case of unavailability of the PPEs at site, grievance would be lodged directly to PMU.
F. Role of PMU	• PMU is required to arrange regular meetings with The Contractor and workforce to monitor all procedural implementation of COVID-19 prevention related mechanism. • Arrange meeting with concerned DHQs for immediate support and guidance in case of emergency.

Activities	Adaptive Measures
	During inspection visit by PMU Staff, if a worker is found to have symptoms of COVID-19, the worker should be removed immediately from work activities and isolated on designated site.
Post Execution Phase	
A. Post Screening	Screening should be done at the end of the day on daily basis, if a worker is found to have any symptoms of COVID-19, he should be immediately reported to concerned health department.
B. Cleaning and waste disposal	All waste (PPEs and sanitation related) shall be disposed properly at designated sites.

Annexure D: Personal Protective Equipment According to Hazard²⁰

Objective	Workplace Hazards	Suggested PPE
Eye and face protection	Flying particles, molten metal, liquid chemicals, gases or vapors, light radiation.	Safety Glasses with side-shields, protective shades, etc.
Head protection	Falling objects, inadequate height clearance, and overhead power cords.	Plastic Helmets with top and side impact protection.
Hearing protection	Noise, ultra-sound.	Hearing protectors (ear plugs or ear muffs).
Foot protection	Falling or rolling objects, pointed objects. Corrosive or hot liquids.	Safety shoes and boots for protection against moving & falling objects, liquids and chemicals.
Hand protection	Hazardous materials, cuts or lacerations, vibrations, extreme temperatures.	Gloves made of rubber or synthetic materials (Neoprene), leather, steel, insulating materials, etc.
Respiratory protection	Dust, fogs, fumes, mists, gases, smokes, vapors.	Facemasks with appropriate filters for dust removal and air purification (chemicals, mists, vapors and gases). Single or multi-gas personal monitors, if available.
	Oxygen deficiency	Portable or supplied air (fixed lines). On-site rescue equipment.
Body/leg protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration.	Insulating clothing, body suits, aprons etc. of appropriate materials.

²⁰ Source: IFC Environmental, Health, and Safety (EHS) Guidelines.

Annexure E: Checklists

CHECKLIST

Environmental & Social Screening Checklist

Instructions:

Environmental and Social Focal Persons (ESFPs)²¹ nominated by the MCs for PCP environmental and social management, will use this checklist in field for environmental and social screening and categorization of each sub-project proposed to be executed under the Program.

Deputy Program Officers-Environmental and Social Management deputed by PMDFC in regional offices will technically assist and support the ESFPs/MCs use this Checklist for screening.

The Checklist will be attached with the main document²² of sub-projects at planning stage and will be duly signed by the relevant ESFP and endorsed by the respective DPO-ESM

This checklist focuses on environmental issues and social concerns. To ensure that social dimensions are adequately considered, Involuntary Resettlement Screening Checklist will also be used.

(iii) The purpose of this E&S Screening Checklists is to identify potential "Negative" impacts of environmental and social attributes or to enhance the existing environmental & social benefits.

Use the "remarks" section to discuss any anticipated mitigation measures.

Name of ESFP:	Hafiz Talat Mehmood (I&S)	
Name of MC:	Okara	
Sub-Project Sector:	Sewerage	
Sub-Project Title:	Construction of Waste Water Treatment Plant (WWTP)	
Sub- Project Categorization:	E-1 ✓	S-1 ✓
	E-2	S-2
	E-3	S-3
Date of Screening:	11-08-2023	
Estimated Cost of Subprojects	756.46 million	
Estimated cost for implementation of ESIA	7.50 million	
Completion Time/ Duration	11 Months	

²¹ In all MCs, ESFPs are notified by Local government; MO (I&S) are focal persons for environmental sector and MO(P) are focal persons for social sectors.

²² It is meant as PC-I and/or engineering estimates of sub-project

Screening Questions	Yes	No	Remarks
A. Project Siting			
Is the Sub-Project area adjacent to or within any of the following?			
Environmentally sensitive areas?			
Legally protected Area		✓	No legally protected area lies within 100 meters jurisdiction of sub-project.
Any surface water body (river, canal, stream, lake, wetland) within 200 meters of the proposed sub-project		✓	Sukhera drain is flowing through the subproject area
Estuarine		✓	Not observed in sub-project area
Special area for protecting biodiversity		✓	No Wildlife Park or other biodiversity areas observed during site E & S investigations
Buffer zone of protected area		✓	No buffer zone for fauna and flora exists surrounding the sub-project area
Mangroves Forest		✓	No mangrove forest in the sub-project area.
Man-made forest /game reserve, orchid /crops or any other area of environmental importance		✓	Sub-project area is predominantly is a wasteland and is not in use for forestry, game reserve orchid or entitled agriculture.
Socially sensitive /important areas/communities/ people?			
Physical Cultural Resources (PCRs) and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, Gurdwara, Temple, Fort, archeological/historical site) within 100 m of the proposed sub-project	✓		2 mosques are located within 100m of subproject area
Sensitive receptors (Schools, colleges, Shrine, Mosque, Church, hospitals and clinics) within 100 meters of the proposed sub project	✓		2 mosques are located within 100m of subproject area
Any graveyard of local community (Muslims or Christians)	✓		1 Muslim and 1 Christian graveyard located in the subproject area
Any demographic or socio-economic aspects of the sub-project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments ²³ of the society and women or children)?		✓	A settlement comprising of 29 households with population of about 180 persons exists within the project area most of which are vulnerable. This settlement is proposed to be relocated to protect the residents from adverse health impacts such as Respiratory problems (asthma, bronchitis, and pneumonia); Eye, nose, and throat irritation (as burning, itching, and watering), Headaches, nausea, and vomiting, dizziness, fatigue and even

²³ Due to caste, creed, religion or gender e.g., transgender

Screening Questions	Yes	No	Remarks
			cancer
Already existing infrastructure (including public amenities) which may be required to dismantle or may be affected temporarily by any means?	✓		A 220-electricity grid station with residential colony and offices are located within the project area that would severely and permanently affected by the corrosive gases (e.g. Hydrogen Sulphide,) liberated from the wastewater ponds. Moreover, 07 towers of 220kV, 02 towers of 132 kV and 20 towers of 11kV have to be relocated
B. Potential Environmental Impacts			
Will the sub-project cause...			
Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?		✓	No habitats, biodiversity and protected area are observed in the area which may be disturbed
Cutting of trees?		✓	No cutting is involved Massive plantation in the buffer zone of 100m is proposed and made part of ESIA ²⁴
Disruption to habitats/biodiversity of surrounding ecosystem/environment?		✓	No disturbance to habitats/biodiversity of environmentally sensitive or protected areas is envisaged as no such area is found at the proposed project site.
Generation of wastewater during construction or operation?	✓		During construction, wastewater will be generated from contractor's camp etc., The generated wastewater will require proper disposal and mitigation measures will be provided in the ESMMP of ESIA During operational phase, significant adverse impacts on environment and surrounding settlements of the sub-project area will occur i.e., odor and breeding site for the mosquitos. Accordingly, mitigation measures will be proposed in the ESMMP of the ESIA. The municipal wastewater will be drained into the Wastewater Treatment Plant (WWTP) through a sewerage conveyance system. The treated wastewater will essentially comply the PEQSS. WWTP will be exclusively designed for the municipal wastewater and wastewater from all the localities will be discharged into the WWTP. There will be no chance of mixing industrial wastewater and storm water with the municipal wastewater before treatment.

²⁴ Provision of 100m buffer zone in the form of raised walls and plantation is proposed

Screening Questions	Yes	No	Remarks
Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of wastewater?	✓		Wastewater will be generated during construction phase by contractor camp and construction activities. Wastewater from contractor camp will require proper treatment and management before disposal in to nearby drain. At operational phase, due to leakage and clogging of the sewerage system, and overflow at WWTP may result in seepage and pondage. This might result contamination of groundwater. Mitigation measures will be provided in the ESMMP of ESIA and these will be made part of the sewerage system and WTP designs. Emergency Plan will also be developed. 1.5mm thick geomembrane beneath the ponds will be placed to mitigate seepage of wastewater to the groundwater. Wastewater after treatment and PEQS compliance will be released into the nearby drain.
Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion at construction site?	✓		The treated water will be disposed of in nearby Sukhaira Drain. If untreated water carrying sediment is disposed of in the drain, it will choke the drain that would result in spreading wastewater in the surrounding areas.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction.	✓		The water quality in the surface drain would be deteriorated if untreated water disposed of in the Sukhaira Drain. For construction of labor camp, PMDFC SOPs will be followed and mitigation measures will be provided in the ESSMP of ESIA Report Chemical storage facilities will be regularly monitor.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	Ground water of the project area is saline so it will not be pumped out for drinking purposes.
Serious contamination of soil due to construction works?		✓	Construction materials will be stored properly. Mitigation will be provided in the ESMMP of ESIA.
Aggravation of solid waste problems in the area?	✓		No aggravation of solid waste problems in the area during construction phase is anticipated. The waste construction material will be collected and disposed at designated place on daily basis. During operation phase, the sludge generated from the ponds will be disposed of at designated disposal sites. The solid waste management will be described in ESMMP of ESIA
Generation of hazardous waste?	✓		Hazardous waste generated during construction activities in terms of oils, rubber lining, sealants

Screening Questions	Yes	No	Remarks
			will be managed with precautions and mitigation measures will be provided in the ESMMP of ESIA. An Environmental Quality Testing laboratory will be managed by the MC Okara at site to ensure effective monitoring of treated wastewater to ensure that treated wastewater is in compliance with the PEQSS and WHO Guidelines.
Increased air pollution due to sub-project construction and operation?	✓		The sub-project construction and operational phases will result in air pollution. The gases liberated from the wastewater treatment plant may cause health issues to nearby residents such as respiratory problems (asthma, bronchitis, and pneumonia); Eye, nose, and throat irritation (as burning, itching, and watering), Headaches, nausea, and vomiting, dizziness, fatigue and even cancer. The possible air pollution control measures during construction and operational phases will be included in the design and described in ESIA and ESMMP.
Noise and vibration due to sub-project construction or operation?	✓		Noise and vibration will be generated during construction and operational phases. Mitigations will be included in the design of the sub-project. ESIA and ESMMP will cover noise and vibration aspects, impacts and mitigations in detail.
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?	✓		In the proposed wastewater treatment technology, waste stabilization ponds will be used and further bio-remediation (floating wetlands) will be introduced in which minimal chances of mosquito breeding are anticipated. However, during construction and operational phases breeding habitats of mosquitoes and rodents might be created. Accordingly, mitigations will be proposed in ESIA and ESMMP.
Use of chemicals during construction?	✓		Multiple chemicals will be used during construction and operational phases. Chemical management system for the safe use of chemicals will be made part of the ESIA and ESMMP.
C: Potential Social Impacts			
Will the Sub-Project cause...			
Impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to Physical Cultural Resources (PCRs)?	✓		Two mosques, one shrine and two graveyards are located within buffer zone and of the project area of influence. Chance Find Procedure will be applied during the project construction phase.

Screening Questions	Yes	No	Remarks
Displacement or involuntary resettlement of people? (physical displacement and/or economic displacement) (If "Yes", please also fill Involuntary Resettlement Screening Checklist)	✓		36 households with a population of about 180 persons will need to displacement/relocation to save them from the adverse impacts of WWTP. ARAP document will be prepared. The residential colony of Grid station will be adversely affected.
Disproportionate impacts on the poor, women and children and or other vulnerable groups 25(mentioned above)?	✓		There will be a significant adverse impact on the poor women, children and or other vulnerable groups within the sub project.
Temporary impediments in movements of people/transport and animals?	✓		There may be hindrance in the mobility of people during construction phase. However, this will be a temporary impact and would be managed by proper controlling the traffic and providing a temporary access route.
Large population influx during sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Not to be envisaged during construction phase. The Contractor will prefer hiring of local labor.
Social conflicts if workers from other areas are hired.	✓		Contractor will hire local workers for unskilled construction activities. However, if the contractor hires the labor from other areas, then social conflicts would emerge. Training/awareness raising sessions will be conducted for labor to avoid social conflicts
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	✓		Contractor will follow EHS SOPs which will be made part of bid documents to avoid physical hazards and risks related to OHS. During operation phase there would be serious health issues to the nearby residents
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel, and other chemicals during construction and operation?	✓		There would be safety issues due to material transportation and construction activities. The SOPs for health and safety will be included in the bid documents that have to be followed by the contractors
Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation, and decommissioning.	✓		There would be safety issues during construction and operational phases due to storage of fuel and other chemicals and transport. The SOPs for health and safety have been included in the PC-I that have to be followed by the contractors and MC during WWTP operations
Any impact on sensitive receptors (mentioned above)	✓		Negative impacts on sensitive receptors are anticipated as explained above.

²⁵ Women, Children, Women headed households, People in old age, people having disabilities, socially isolated community groups and or people living below the poverty line.

Screening Questions	Yes	No	Remarks
Any impact of negative nature on already existing infrastructure including public amenities	✓		Major adverse impacts on the existing 220-grid station. Shifting of 220kv towers (5 Nos.) Shifting of 132kv towers (2Nos.) Shifting of 11kv Electric Poles (Nos.6) The transmission lines are anticipated to be affected

Prepared By: Name: Dr. Muhammad Ashraf Bodla Designation: Environment Specialist Organization: MM Pakistan Signature: Date:	Endorsed By: Name: Hafiz Talat Mehmood Designation: MOI Organization: MC Okara Signature: Date:
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INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of City/MC/LG: Okara

Sub-Project Sector: Sewerage

Sub-Project Title: Construction of Waste Water Treatment Plant

Sub-Project Categorization: S-1

Date of Screening: 11.08.2023

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No				Land owned by Proventil Government so it will need to transfer to MC
If yes, then describe the type of land being acquired from the categories below:				No Land acquired for this sub project
Has any AED been conducted at the proposed location by the government ²⁶ ?				No AED been conducted at the proposed location by the Government ¹
Land (Quantify and describe types of land being acquired in "remarks column".				No Land acquired for this sub project
Government and LG owned land free of occupation (agriculture or settlement)				Land is owned by Govt.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)				No Land acquired for this sub-project
Private land				No Land acquired for this sub-project
Residential				No Land acquired for this sub-project
Commercial				No Land acquired for this sub-project
Agricultural				No Land acquired for this sub-project
Communal				No Land acquired for this sub-project
Others (specify in "remarks").				land owned by govt so no land acquired for this sub-project
Name of owner/owners and type of ownership document if available.				Already existing sewerage drainage and land is owned by govt.
If land is being acquired, describe any structures constructed on it				No Land acquired for this sub-project
Land-based assets:				No Land acquired for this sub-project
Residential structures				No Land acquired for this sub-project
Commercial structures (specify in "remarks")				No Land acquired for this sub-project
Community structures (specify in "remarks")				No Land acquired for this sub-project

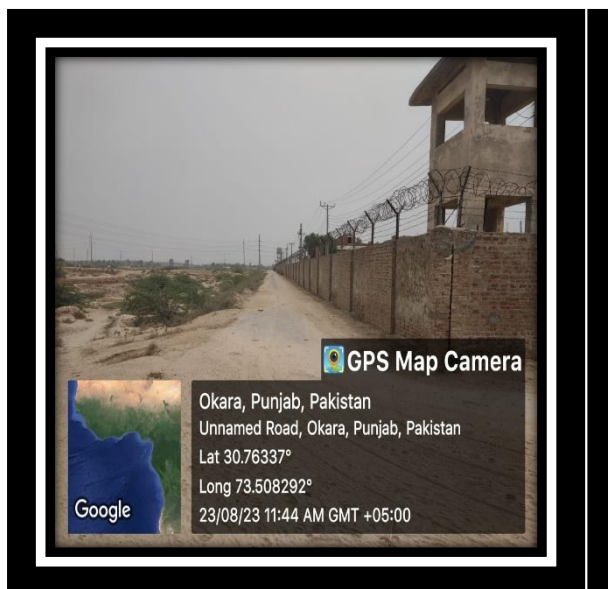
²⁶ The sub-projects have to avoid all such lands where any government led AED has been conducted since 2018 and such land will be considered as ineligible expenditure.

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
Agriculture structures (specify in "remarks")				No
Public utilities (specify in "remarks")				
Others (specify in "remarks")				No Land acquired for this sub-project
If agricultural land is being acquired, specify the following:				No Land acquired for this sub-project
Agriculture related impacts				No Agriculture related impacts foreseen for this sub-project
Crops and vegetables (specify types and cropping area in "remarks").				Not anticipated during this sub-project
Trees (specify number and types in "remarks").				No tree cutting involved during this sub-project
Others (specify in "remarks").				No Land acquired for this sub-project
Affected Persons (APs)				No Persons Affected during this Project
Will any people be displaced from the land when acquired? Yes/No				No Land acquired for this sub-project
Number of APs				No Persons Affected during this Project
Males				No Persons Affected during this Project
Females				No Persons Affected during this Project
Titled land owners				No Land acquired for this sub-project
Tenants and sharecroppers				No Land acquired for this sub-project
Leaseholders				No Land acquired for this sub-project
Agriculture wage laborers				Not involved in this project
Encroachers and squatters (specify in remarks column)				No Land acquired for this sub-project
Vulnerable APs (e.g., women headed households, minors and aged, orphans, disabled persons and those below the poverty line). Specify the number and vulnerability in "remarks".				36 Households will be affected And their residences will be dismantled
Others (specify in "remarks")				Major adverse impacts on the existing 220-grid station. Shifting of 220kv towers (5 Nos.) Shifting of 132kv towers (2Nos.) Shifting of 11kv Electric Poles (Nos.6)
How will people be affected?				There would be Temporary hindrances in movements of people/transport during the desilting phase. However, GRM will be established at site to ensure the best management and silt material will be disposed

Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
				off in 24 hours to the disposal site

Prepared By:**Name:** Muhammad Saqib Sadiq**Designation:** Social Safeguard Specialist**Organization:** MM Pakistan**Signature:****Endorsed By:****Name:** Hafiz Talat Mahmood**Designation:** MOI**Organization:** MC Okara**Signature:**



Name of ESFP: Hafiz Talat Mahmood, MO (I&S)

Name of MC: Okara

Sub-Project Sector: Sewerage

Sub-Project Title: Sewerage System in Okara City

Part 1:

- i). Replacement of Existing Sewer Line 27" i/d from Harnia Wala Chowk to Sabzi Mandi Akbar Road.
- ii). Replacement of Sewer from Islam Building to Depalpur Chowk 12" and 24" i/d.
- iii). Replacement of 42" i/d Sewer and Manhole Chambers (Chungi No.6 to Chungi No.7 along Okara Multan Road)

Part 2:

Laying of New Sewer Lines

Sub-Project Categorization: E-2 & S-2

Anticipated Project Activities: The main activities would include: marking of the alignment; excavation up to required depth and width; timbering or sheet piling when excavation is more than 2m; preparation of sub-grade if required; laying and joining of pipes; testing of straightness of alignment and obstruction; back filling; and repair of roads.

Estimated Cost of Subprojects: 893.92 million.

Tentative Completion Time/Duration: 11 months

Replacement of Existing Sewer Line 27" i/d from Harnia Wala Chowk to Sabzi Mandi Akbar Road.			
Screening Questions	Yes	No	Remarks
A. Project Siting Is the Sub-Project area adjacent to or within any of the following:			
Environmentally sensitive areas?			
Legally protected Area		✓	No legally protected area i.e., wildlife sanctuary, national park or game reserve existed within area of 500 meters jurisdiction of Sub-Project.
Any surface water body (river, canal, stream, lake, wetland) within 250 meters of the proposed sub project		✓	Not observed
Estuarine		✓	Not estuarine observed in Sub-Project area
Special area for protecting biodiversity		✓	No ecological significant habitat exists within or near the project area observed during site E & S investigation.
Buffer zone of protected area		✓	No buffer zone for fauna and flora exists surrounding the project area
Mangroves Forest		✓	There is no existence of any mangrove in the project area.
Man-made forest /game reserve, orchid /crops or any other area of environmental importance		✓	Area of environmental importance such as orchid /crops is not observed within the project interventions.

Replacement of Existing Sewer Line 27" i/d from Harnia Wala Chowk to Sabzi Mandi Akbar Road.			
Screening Questions	Yes	No	Remarks
Socially sensitive /important areas/communities/people?			
PCRs and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, <i>Gordwarah</i> , Temple, Fort, archeological/historical site) within 100 m of the proposed subproject		✓	No PCRs exists within 100 meters of periphery of Sub-Project which will be negatively impacted due to any work activities.
Sensitive receptors (Schools, colleges, hospitals and clinics) within 100 meters of the proposed sub project		✓	No school, colleges, hospitals and clinics exists within the proposed sub-project.
Any graveyard of local community (Muslims or Christians)		✓	No graveyard observed.
Any demographic or socio-economic aspects of the sub-project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments of the society and women or children)?		✓	No vulnerable group exists within the sub-project area.
Already existing infrastructure (including public amenities) which may be required to dismantle or may be affected temporarily by any means?		✓	No public amenities will be affected or dismantled.
B. Potential Environmental Impacts Will the Sub-Project cause...			
Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?		✓	The proposed project site doesn't have any environmentally sensitive or protected areas.
Cutting of trees?		✓	No cutting of trees required as per scope of work under Sub-Project.
Disruption to habitats/biodiversity of surrounding ecosystem/environment?		✓	No disruption to any habitat/ecosystem due to any Sub-Project activities.
Generation of wastewater during construction or operation?	✓		The sub-project itself is disposal of wastewater. No separate establishment of contractor's camp is anticipated so no waste water would be generated during construction
Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of waste water?	✓		The ground water may be polluted if sewer lines are broken/leaked. Proper maintenance of sewerage system is required to avoid ground water contamination
Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion at construction site?		✓	No Sub-Project activities will trigger such negative impact.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?	✓		Local labor will be engaged by the contractor as no skilled labor is the requirement for this activity. Anyhow, Labor Camp Management is provided in the ESMMP of ESIA report which will be strictly followed.

Replacement of Existing Sewer Line 27" i/d from Harnia Wala Chowk to Sabzi Mandi Akbar Road.			
Screening Questions	Yes	No	Remarks
Over pumping of ground water, leading to salinization and ground subsidence?		✓	No over pumping of groundwater will be required for the sub-project
Serious contamination of soil due to construction works?	✓		Due to use of chemicals (asphalt, oil/ fuel) and movement of project machinery there are chances of soil contamination which will be mitigated by avoiding spill of oil/ fuel and safe use of coal tar to avoid soil contamination.
Aggravation of solid waste problems in the area?	✓		The solid waste problem would be aggravated if construction waste is not disposed of properly but dumped at solid waste collection bins. The solid waste generated would be disposed of at designated place approved by the construction supervision engineer
Generation of hazardous waste?	✓		Bitumen mixed solid waste will be generated as a result of dismantling of portion of roads for installation of sewer lines. This material would be harmful if not properly disposed of. The excavated materials would be disposed of as per approval of the supervision engineer
Increased air pollution due to sub-project construction and operation?	✓		Frequent monitoring of air quality particularly odor will support to review the effectiveness of the mitigation measures. Limit the air emissions within PEQS.
Noise and vibration due to sub-project construction or operation?	✓		All noise-making equipment will be installed with acoustic enclosures. Timings of noise construction activities will be regulated near sensitive receptors. Further regular monitoring of noise levels will be adopted and continuous monitoring is proposed during the construction stage as a migratory measure.
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?	✓		The stagnant water and desilted material in desilting areas may create temporary breeding habitat for mosquitoes and resulting in mosquitos borne diseases issue. Handling and dispose off in 24 hours of waste will avoid the creation of breeding habitats. Use of anti-mosquito spray will be ensured by contractor
Use of chemicals during construction?	✓		The adhesives would be used for jointing the pipes that would be harmful for the workers if contacted with skin or eyes. Proper PPE (gloves, goggles) would be used to avoid the harm.
C: Potential Social Impacts Will the Sub-Project cause...			
Impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to Physical Cultural Resources (PCRs)?		✓	Not any PCR is observed within the sub-project area.

Replacement of Existing Sewer Line 27" i/d from Harnia Wala Chowk to Sabzi Mandi Akbar Road.			
Screening Questions	Yes	No	Remarks
Displacement or involuntary resettlement of people? (Physical displacement and/or economic displacement) (If "Yes", please also fill Involuntary Resettlement Screening Checklist)		✓	No displacement/resettlement of people involved in Sub-Project scope.
Disproportionate impacts on the poor, women and children and or other vulnerable groups (mentioned above)?		✓	There will be no direct/indirect negative impact on the poor, women, children and or other vulnerable groups. However, at current accessibility of the local residents is vulnerable due to choked sewer lines and it aggravates during rainy season which will get better.
Temporary impediments in movements of people/transport and animals?	✓		There would be temporary hindrances in movements of business community people/transport during the desilting process. However, movement will be restricted for a few hours only, and the businessmen community/people will be informed before the construction activities in confined areas and streets while alternate route will be provided in the main roads.
Large population influx during sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Local unskilled labor will be preferred by the Contractor due to limited work activities. It's a small-scale project and therefore, there will be no large population influx among the locals. However, during construction activities, separate sanitary facilities and water will be adequately supplied to the labor force by the contractor to avoid any conflict with the local community on the use of their water resources.
Social conflicts if workers from other areas are hired?		✓	No such impact foreseen as work activities are limited up to rehabilitation of existing sewers.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	✓		Workers will be provided requisite PPEs to minimize such exposure and associated harmful occupational health effects. Also, regular monitoring will be conducted by the MCs focal persons and supervision consultants and regional office team of PMDFC. Implementation through PMDFC EHS SOPs will be ensured.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?	✓		The transport of construction material (pipes cement, etc.) would cause accidents and to avoid this risk, the material will be transported during night time. Oil/fuel will be filled in vehicles and equipment safely at a workshop or fuel station to avoid risk.
Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	✓		There would be community safety risks. Entrance to working site will be restricted by installing barricade tape. Safety/caution sign boards will be erected and flag men will be appointed to control traffic and keep irrelevant persons away from project site.

Replacement of Existing Sewer Line 27" i/d from Harnia Wala Chowk to Sabzi Mandi Akbar Road.

Screening Questions	Yes	No	Remarks
Any impact on sensitive receptors (mentioned above)		✓	No significant direct/ indirect impact foreseen
Any impact of negative nature on already existing infrastructure including public amenities		✓	There will be no impact of negative nature on already existing infrastructure including public amenities.

Prepared By:

Name: Dr. Muhammad Ashraf Bodla

Designation: Environment Specialist

Organization: MM Pakistan

Signature:

Date: 26-8-2023

Endorsed By:

Name: Hafiz Talat Mehmood

Designation: MOI

Organization: MC Okara

Signature:

Date:

INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of City/MC/LG: Okara

Sub-Project Sector: Construction of Waste Water Treatment Plant

Sub-Project Title: Replacement of Sewer Line 27" i/d from Harnia Wala Chowk to Sabzi Mandi Akbar Road

Sub-Project Categorization: S-2

Date of Screening: 26.08.2023

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No		✓		Land owned by MC so no land acquired for this sub project
If yes, then describe the type of land being acquired from the categories below:		✓		No Land acquired for this sub project
Has any AED been conducted at the proposed location by the government ²⁷ ?		✓		No AED been conducted at the proposed location by the Government ¹
Land (Quantify and describe types of land being acquired in "remarks column".		✓		No Land acquired for this sub project
Government and LG owned land free of occupation (agriculture or settlement)		✓		Land is owned by Govt.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)		✓		No Land acquired for this sub-project
Private land		✓		No Land acquired for this sub-project
Residential		✓		No Land acquired for this sub-project
Commercial		✓		No Land acquired for this sub-project
Agricultural		✓		No Land acquired for this sub-project
Communal		✓		No Land acquired for this sub-project
Others (specify in "remarks").		✓		land owned by govt so no land acquired for this sub-project
Name of owner/owners and type of ownership document if available.		✓		Already existing sewerage drainage and land is owned by govt.
If land is being acquired, describe any structures constructed on it		✓		No Land acquired for this sub-project
Land-based assets:		✓		No Land acquired for this sub-project
Residential structures		✓		No Land acquired for this sub-project
Commercial structures (specify in "remarks")		✓		No Land acquired for this sub-project
Community structures (specify in "remarks")		✓		No Land acquired for this sub-project

²⁷ The sub-projects have to avoid all such lands where any government led AED has been conducted since 2018 and such land will be considered as ineligible expenditure.

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
Agriculture structures (specify in "remarks")		✓		No
Public utilities (specify in "remarks")		✓		land owned by govt so no land acquired for this sub-project. No Ramps are ROW.
Others (specify in "remarks")		✓		No Land acquired for this sub-project
If agricultural land is being acquired, specify the following:		✓		No Land acquired for this sub-project
Agriculture related impacts		✓		No Agriculture related impacts foreseen for this sub-project
Crops and vegetables (specify types and cropping area in "remarks").		✓		Not anticipated during this sub-project
Trees (specify number and types in "remarks").		✓		No tree cutting involved during this sub-project
Others (specify in "remarks").		✓		No Land acquired for this sub-project
Affected Persons (APs)		✓		No Persons Affected during this Project
Will any people be displaced from the land when acquired? Yes/No		✓		No Land acquired for this sub-project
Number of APs		✓		No Persons Affected during this Project
Males		✓		No Persons Affected during this Project
Females		✓		No Persons Affected during this Project
Titled land owners		✓		No Land acquired for this sub-project
Tenants and sharecroppers		✓		No Land acquired for this sub-project
Leaseholders		✓		No Land acquired for this sub-project
Agriculture wage laborers		✓		Not involved in this project
Encroachers and squatters (specify in remarks column)		✓		No Land acquired for this sub-project
Vulnerable APs (e.g., women headed households, minors and aged, orphans, disabled persons and those below the poverty line). Specify the number and vulnerability in "remarks".		✓		No Land acquired for this sub-project no one effected during this this intervention
Others (specify in "remarks")		✓		Not involved in this project
How will people be affected?		✓		There would be Temporary hindrances in movements of people/transport during the desilting phase. However, GRM will be established at site to ensure the best management and silt material will be disposed off in 24 hours to the disposal site

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
Prepared By: Name: Muhammad Saqib Sadiq Designation: Social Safeguard Specialist Organization: MM Pakistan Signature		Endorsed By: Name: Hafiz Talat Mahmood Designation: MOI Organization: MC Okara Signature:		



Public consultation at Akbar Road



Public consultation at Hernia Wala Chowk



View of road



View of road



View of road



View of road

Replacement of Sewer from Islam Building to Depalpur Chowk 12" and 24" i/d			
Screening Questions	Yes	No	Remarks
A. Project Siting Is the Sub-Project area adjacent to or within any of the following:			
Environmentally sensitive areas?			
Legally protected Area		✓	No legally protected area i.e., wildlife sanctuary, national park or game reserve existed within area of 500 meters jurisdiction of Sub-Project.
Any surface water body (river, canal, stream, lake, wetland) within 250 meters of the proposed sub project		✓	Not observed
Estuarine		✓	Not estuarine observed in Sub-Project area
Special area for protecting biodiversity		✓	No ecological significant habitat exists within or near the project area observed during site E & S investigation.
Buffer zone of protected area		✓	No buffer zone for fauna and flora exists surrounding the project area
Mangroves Forest		✓	There is no existence of any mangrove in the project area.
Man-made forest/game reserve, orchid/crops or any other area of environmental importance		✓	Area of environmental importance such as orchid /crops is not observed within the project interventions.
Socially sensitive/important areas/communities/people?			
PCRs and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, <i>Gordwarah</i> , Temple, Fort, archeological/historical site) within 100 m of the proposed subproject	✓		There are 01 Christian graveyard, 01 health clinic and 01 mosque exist within 100 meters of the proposed sub-project but not within the designed alignment of the sewer.
Sensitive receptors (Schools, colleges, hospitals and clinics) within 100 meters of the proposed sub project	✓		One health clinics and one Railway barrier (<i>phatak</i>) exists within the proposed sub-project.
Any graveyard of local community (Muslims or Christians)	✓		One graveyard observed.
Any demographic or socio-economic aspects of the sub-project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments of the society and women or children)?		✓	No vulnerable group exists within the sub-project area.
Already existing infrastructure (including public amenities) which may be required to dismantle or may be affected temporarily by any means?		✓	No public amenities will be affected or dismantled.
B. Potential Environmental Impacts Will the Sub-Project cause...			
Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?		✓	The proposed project site doesn't have any environmentally sensitive or protected areas.

Replacement of Sewer from Islam Building to Depalpur Chowk 12" and 24" i/d			
Screening Questions	Yes	No	Remarks
Cutting of trees?		✓	No cutting of trees required as per scope of work under Sub-Project.
Disruption to habitats/biodiversity of surrounding ecosystem/environment?		✓	No disruption to any habitat/ecosystem due to any Sub-Project activities.
Generation of wastewater during construction or operation?	✓		The sub-project itself is disposal of wastewater. No separate establishment of contractor's camp is anticipated so no waste water would be generated during construction
Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of waste water?	✓		The ground water may be polluted if sewer lines are broken/leaked. Proper maintenance of sewerage system is required to avoid ground water contamination
Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion at construction site?		✓	No Sub-Project activities will trigger such negative impact.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?	✓		Local labor will be engaged by the contractor as no skilled labor is the requirement for this activity. Anyhow, Labor Camp Management is provided in the ESMMP of ESIA report which will be strictly followed.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	No over pumping of groundwater will be required for the sub-project
Serious contamination of soil due to construction works?	✓		Due to use of chemicals (asphalt, oil/ fuel) and movement of project machinery there are chances of soil contamination which will be mitigated by avoiding spill of oil/ fuel and safe use of coal tar to avoid soil contamination.
Aggravation of solid waste problems in the area?	✓		The solid waste problem would be aggravated if construction waste is not disposed of properly but dumped at solid waste collection bins. The solid waste generated would be disposed of at designated place approved by the construction supervision engineer
Generation of hazardous waste?	✓		Bitumen mixed solid waste will be generated as a result of dismantling of portion of roads for installation of sewer lines. This material would be harmful if not properly disposed of. The excavated materials would be disposed of as per approval of the supervision engineer
Increased air pollution due to sub-project construction and operation?	✓		Frequent monitoring of air quality particularly odor will support to review the effectiveness of the mitigation measures. Limit the air emissions within PEQS.
Noise and vibration due to sub-project construction or operation?	✓		All noise-making equipment will be installed with acoustic enclosures. Timings of noise construction activities will be regulated near sensitive receptors. Further regular monitoring of noise levels will be adopted and continuous monitoring is proposed during the construction stage as a migratory measure.

Replacement of Sewer from Islam Building to Depalpur Chowk 12" and 24" i/d			
Screening Questions	Yes	No	Remarks
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?	✓		The stagnant water and desilted material in desilting areas may create temporary breeding habitat for mosquitoes and resulting in mosquitos borne diseases issue. Handling and dispose off in 24 hours of waste will avoid the creation of breeding habitats. Use of anti-mosquito spray will be ensured by contractor
Use of chemicals during construction?	✓		The adhesives would be used for jointing the pipes that would be harmful for the workers if contacted with skin or eyes. Proper PPE (gloves, goggles) would be used to avoid the harm.
C: Potential Social Impacts Will the Sub-Project cause...			
Impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to Physical Cultural Resources (PCRs)?		✓	No any PCR is observed within the sub-project area.
Displacement or involuntary resettlement of people? (Physical displacement and/or economic displacement) (If "Yes", please also fill Involuntary Resettlement Screening Checklist)		✓	No displacement/resettlement of people involved in Sub-Project scope.
Disproportionate impacts on the poor, women and children and or other vulnerable groups (mentioned above)?		✓	There will be no direct/indirect negative impact on the poor, women, children and or other vulnerable groups. However, at current accessibility of the local residents is vulnerable due to chocked sewer lines and it aggravates during rainy season which will get better.
Temporary impediments in movements of people/transport and animals?	✓		There would be temporary hindrances in movements of business community people/transport during the desilting process. However, movement will be restricted for a few hours only, and the businessmen community/people will be informed before the construction activities in confined areas and streets while alternate route will be provided in the main roads.
Large population influx during sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Local unskilled labor will be preferred by the Contractor due to limited work activities. It's a small-scale project and therefore, there will be no large population influx among the locals. However, during construction activities, separate sanitary facilities and water will be adequately supplied to the labor force by the contractor to avoid any conflict with the local community on the use of their water resources.
Social conflicts if workers from other areas are hired?		✓	No such impact foreseen as work activities are limited up to rehabilitation of existing sewers.

Replacement of Sewer from Islam Building to Depalpur Chowk 12" and 24" i/d			
Screening Questions	Yes	No	Remarks
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	✓		Workers will be provided requisite PPEs to minimize such exposure and associated harmful occupational health effects. Also, regular monitoring will be conducted by the MCs focal persons and supervision consultants and regional office team of PMDFC. Implementation through PMDFC EHS SOPs will be ensured.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?	✓		The transport of construction material (pipes cement, etc.) would cause accidents and to avoid this risk, the material will be transported during night time. Oil/fuel will be filled in vehicles and equipment safely at a workshop or fuel station to avoid risk.
Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	✓		There would be community safety risks. Entrance to working site will be restricted by installing barricade tape. Safety/caution sign boards will be erected and flag men will be appointed to control traffic and keep irrelevant persons away from project site.
Any impact on sensitive receptors (mentioned above)	✓		There are 01 Christian graveyard, 01 mosque and 01 health clinic exist along the entire stretch of proposed sewer lines, where religious and health activities may be affected due to the project interventions. Traffic management plan will be implemented during construction and safety will be ensured by applying SOPs related to construction safety while executing activities near institutions. Further it will be required to monitor noise levels of machinery and equipment to keep them within safe limits
Any impact of negative nature on already existing infrastructure including public amenities		✓	There will be no impact of negative nature on already existing infrastructure including public amenities.

Prepared By:

Name: Dr. Muhammad Ashraf Bodla

Designation: Environment Specialist

Organization: MM Pakistan

Signature:

Date:

Endorsed By:

Name: Hafiz Talat Mehmood

Designation: MOI

Organization: MC Okara

Signature:

Date:

INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of ESFP: Hafiz Talat Mahmood MO (I&S)

Name of MC: Okara

Sub-Project Sector: Sewerage

Sub-Project Title: Replacement of Sewer from Islam Building to Depalpur Chowk 12" and 24" i/d.

Sub-Project Categorization: E-2 & S-2

Date of Screening: 26.08.2023

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No				Land owned by MC so no land acquired for this sub-project
If yes, then describe the type of land being acquired from the categories below:				No Land acquired for this sub-project
Has any AED been conducted at the proposed location by the government ²⁸ ?				No AED been conducted at the proposed location by the Government ¹
Land (Quantify and describe types of land being acquired in "remarks column".				No Land acquired for this sub-project
Government and LG owned land free of occupation (agriculture or settlement)				Land is owned by Govt.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)				No Land acquired for this sub-project
Private land				No Land acquired for this sub-project
Residential				No Land acquired for this sub-project
Commercial				No Land acquired for this sub-project
Agricultural				No Land acquired for this sub-project
Communal				No Land acquired for this sub-project
Others (specify in "remarks").				land owned by govt so no land acquired for this sub-project
Name of owner/owners and type of ownership document if available.				Land owned by Govt.
If land is being acquired, describe any structures constructed on it				No Land acquired for this sub-project
Land-based assets:				No Land acquired for this sub-project
Residential structures				No Land acquired for this sub-project

²⁸ The sub-projects have to avoid all such lands where any government led AED has been conducted since 2018 and such land will be considered as ineligible expenditure.

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
Commercial structures (specify in "remarks")				No Land acquired for this sub-project
Community structures (specify in "remarks")				No Land acquired for this sub-project
Agriculture structures (specify in "remarks")				No
Public utilities (specify in "remarks")				land owned by govt so no land acquired for this sub-project. No Ramps are ROW.
Others (specify in "remarks")				No Land acquired for this sub-project
If agricultural land is being acquired, specify the following:				No Land acquired for this sub-project
Agriculture related impacts				No Agriculture related impacts foreseen for this sub-project
Crops and vegetables (specify types and cropping area in "remarks").				Not anticipated during this sub-project
Trees (specify number and types in "remarks").				No tree cutting involved during this sub-project
Others (specify in "remarks").				No Land acquired for this sub-project
Affected Persons (APs)				No Persons Affected during this Project
Will any people be displaced from the land when acquired? Yes/No				No Land acquired for this sub-project
Number of APs				No Persons Affected during this Project
Males				No Persons Affected during this Project
Females				No Persons Affected during this Project
Titled land owners				No Land acquired for this sub-project
Tenants and sharecroppers				No Land acquired for this sub-project
Leaseholders				No Land acquired for this sub-project
Agriculture wage laborers				Not involved in this project
Encroachers and squatters (specify in remarks column)				No Land acquired for this sub-project
Vulnerable APs (e.g., women headed households, minors and aged, orphans, disabled persons and those below the poverty line). Specify the number and vulnerability in "remarks".				No Land acquired for this sub-project no one effected during this this intervention
Others (specify in "remarks")				Not involved in this project
How will people be affected?				There would be Temporary hindrances in movements of people/transport during the desilting phase. However, GRM will be established at site to

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
				ensure the best management and silt material will be disposed off in 24 hours to the disposal site

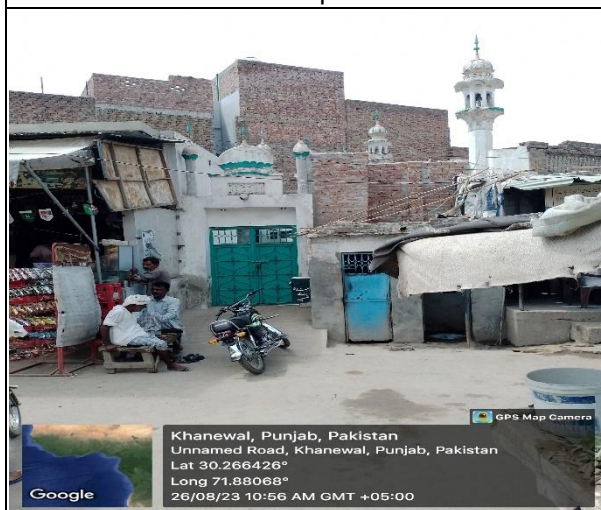
Prepared By: Name: Muhammad Saqib Sadiq Designation: Social Safeguard Specialist Organization: MM Pakistan Signature	Endorsed By: Name: Hafiz Talat Mahmood Designation: MOI Organization: MC Okara Signature:
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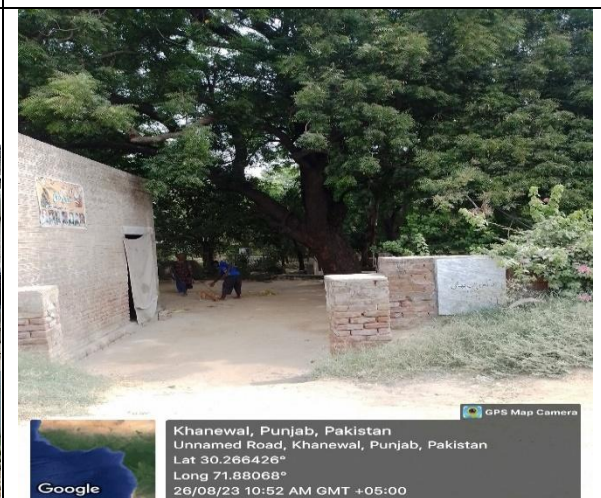
Public Consultation at Depal Pur Chowak



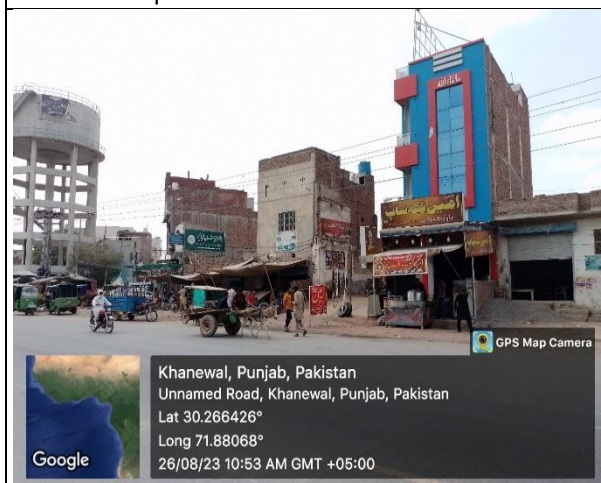
Sewerage crossing railways line



Faridi Mosque



Christian Graveyard



Private Clinic



Start point of Islam building sewerage scheme

Replacement of 42" i/d Sewer and Manhole Chambers (Chungi No.6 to Chungi No.7 along Okara Multan Road)			
Screening Questions	Yes	No	Remarks
A. Project Siting Is the Sub-Project area adjacent to or within any of the following:			
Environmentally sensitive areas?			
Legally protected Area			No legally protected area i.e. Wildlife sanctuary, national park or game reserve exists within or near the project area.
Any surface water body (river, canal, stream, lake, wetland) within 250 meters of the proposed sub-project ²⁹			No surface water body within 250m of proposed sub-project
Estuarine			Not observed in Sub-Project area
Special area for protecting biodiversity			No Wild life park or other biodiversity areas observed during site E & S investigation.
Buffer zone of protected area			No buffer zone for fauna and flora exists surrounding the project area
Mangroves Forest			There is no existence of any mangrove in the project area.
Man-made forest /game reserve, orchid /crops or any other area of environmental importance			There is a green belt (duranta shrubs and grasses but no tree) in the center of the road where sewer line is proposed. The whole belt of 2442 Rft will be dismantled for laying of sewer line. A new green belt will be established after laying of the sewerage system.
Socially sensitive /important areas/communities/ people?			
PCRs and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, <i>Gordwarah</i> , Temple, Fort, archeological/historical site) within 100 m of the proposed subproject ³⁰			No PCRs exists within 100 meters of periphery of Sub-Project which will be negatively impacted due to any work activities. 14 mosques observed.
Sensitive receptors (Schools, colleges, hospitals and clinics) within 100 meters of the proposed sub-project ³¹			There is 01 school exists within the 100 meters of the sub-project. The educational activities may be affected due to project interventions. It will be advised to implement traffic management plan during construction and ensure safety of children by applying SOPs related to construction safety while executing activities near schools. Further, it will be required to monitor noise levels of machinery and equipment to keep them within safe.
Any graveyard of local community (Muslims or Christians)			There is no graveyard.
Any demographic or socio-economic aspects of the sub-project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban			No vulnerable group exists within the sub-project area

²⁹ Ibid.

³⁰ According to Environmental Assessment Guidelines adopted by Punjab EPA

³¹ Ibid.

Replacement of 42" i/d Sewer and Manhole Chambers (Chungi No.6 to Chungi No.7 along Okara Multan Road)			
Screening Questions	Yes	No	Remarks
migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments ³² of the society and women or children)?			
Already existing infrastructure ³³ (including public amenities) which may be required to dismantle or may be affected temporarily by any means?			No public amenities will be affected or dismantled.
B. Potential Environmental Impacts			
Will the Sub-Project cause...			
Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?			The proposed project site doesn't have any environmentally sensitive or protected areas.
Cutting of trees?			No tree cutting is involved. However, there is a green belt (duranta shrubs and grasses but no tree) in the center of the road where sewer line is proposed. The whole belt of 2442 Rft will be dismantled for laying of sewer line. A new green belt will be established after laying of the sewerage system.
Disruption to habitats/biodiversity of surrounding ecosystem/environment?			No disruption to any habitat/ecosystem due to any Sub-Project activities.
Generation of wastewater during construction or operation?			The sub-project itself is disposal of wastewater. No separate establishment of contractor's camp is anticipated so no waste water would be generated during construction.
Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of waste water?			The ground water may be polluted if sewer lines are broken/leaked. Proper maintenance of sewerage system is required to avoid ground water contamination
Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion at construction site?			The disposal of sewage is proposed in to a natural drain. If untreated sewerage is disposed of in to the drain, the surface water hydrology may be altered. No increase in soil erosion at construction site. It is planned to treat sewage prior to disposal in to water ways
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?			No deterioration of surface water quality due to subproject interventions.
Over pumping of ground water, leading to salinization and ground subsidence?			No over pumping of groundwater will be required for the sub-project.

³²due to caste, creed, religion or gender e.g., transgender

³³Sewerage /Drainage system, Water supply lines, tube-wells, WAPDA/Telephone transmission lines/electric poles, Railway tracks, Gas pipelines, Roads, Shops/Plazas, Banks, Industry, Disposal stations etc.

Replacement of 42" i/d Sewer and Manhole Chambers (Chungi No.6 to Chungi No.7 along Okara Multan Road)			
Screening Questions	Yes	No	Remarks
Serious contamination of soil due to construction works?			Due to use of chemicals (asphalt, oil/ fuel) and movement of project machinery there are chances of soil contamination which will be mitigated by avoiding spill of oil/ fuel and safe use of coal tar to avoid soil contamination.
Aggravation of solid waste problems in the area?			The solid waste problem would be aggravated if construction waste is not disposed of properly but dumped at solid waste collection bins. The solid waste generated would be disposed of at designated place approved by the construction supervision engineer
Generation of hazardous waste?			Bitumen mixed solid waste will be generated as a result of dismantling of portion of roads for installation of sewer lines. This material would be harmful if not properly disposed of. The excavated materials would be disposed of as per approval of the supervision engineer
Increased air pollution due to sub-project construction and operation?			Due to project interventions, it is anticipated that ambient air of the project area may be temporarily affected due to dust emissions and smoke generated due earth excavation for laying of sewer lines and from project vehicles and machinery. Water sprinkling will be required to be done periodically on daily basis and contractor will have to keep his machinery and equipment well-tuned to avoid smoke emissions
Noise and vibration due to sub-project construction or operation?			Noise produced from machinery operating at project site may cause disturbance to residents, students of nearby school, and workers. Contractor will be required to use new machinery to avoid noise emissions. Contractor will provide earplugs/ muffs to workers near noise producing machinery and shall monitor noise levels periodically throughout the day during construction works.
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?			The sewage water is being illegally used for irrigation. Breeding habitats would be developed in water courses where water would be stagnated. The waste water would not be used for irrigation but should be drained out into river after proper treatment.
Use of chemicals during construction?			The adhesives would be used for jointing the pipes that would be harmful for the workers if contacted with skin or eyes. Proper PPE (gloves, goggles) would be used to avoid the harm.
C: Potential Social Impacts			
Will the Sub-Project cause...			

Replacement of 42" i/d Sewer and Manhole Chambers (Chungi No.6 to Chungi No.7 along Okara Multan Road)			
Screening Questions	Yes	No	Remarks
Impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to Physical Cultural Resources (PCRs)?			There will be no damages to Physical Cultural Resources (PCRs)
Displacement or involuntary resettlement of people? (Physical displacement and/or economic displacement) (If "Yes", please also fill Involuntary Resettlement Screening Checklist)			No involuntary resettlement of people is involved
Disproportionate impacts on the poor, women and children and or other vulnerable groups ³⁴ (mentioned above)?			There will be no disproportionate impacts on the poor, women and children and or other vulnerable groups due to subproject interventions
Temporary impediments in movements of people/transport and animals?			Due to project interventions, there will be temporary impediment in the movement of traffic, students, and other local peoples (residents, vendors, etc.) which will be managed by working in patches so as to provide alternate passage way on other side and dump construction in a way that does not interfere with the commutation of local community and passersby.
Large population influx during sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?			There will be no population influx during sub-project execution.
Social conflicts if workers from other areas are hired?			Mostly local workers will be hired.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?			Workers will be provided PPEs, and trainings will be imparted to them regarding their use. Site related OHS guidelines shall be displayed at site and will be implemented by the contractor and supervision consultant will monitor its implementation at site
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?			The transport of construction material (pipes cement, etc.) would cause accidents and to avoid this risk, the material will be transported during nighttime. Oil/ fuel will be filled in vehicles and equipment safely at a workshop or fuel station to avoid risk.
Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?			There would be community safety risks. Entrance to working site will be restricted by installing barricade tape. Safety/ caution sign boards will be erected and flag men will be appointed to control traffic and keep irrelevant persons away from project site

³⁴ Women, Children, Women headed households, People in old age, people having disabilities, socially isolated community groups and or people living below the poverty line

Replacement of 42" i/d Sewer and Manhole Chambers (Chungi No.6 to Chungi No.7 along Okara Multan Road)

Screening Questions	Yes	No	Remarks
Any impact on sensitive receptors (mentioned above)			There is 01 school located more than 100m from the proposed sewer lines, where educational activities may be affected due to project interventions. Traffic management plan will be implemented during construction and safety will be ensured by applying SOPs related to construction safety while executing activities near institutions. Further it will be required to monitor noise levels of machinery and equipment to keep them within safe limits
Any impact of negative nature on already existing infrastructure including public amenities			There will be no impact of negative nature on already existing infrastructure including public amenities

Prepared By:

Name: Dr. Muhammad Ashraf Bodla

Designation: Environment Specialist

Organization: MM Pakistan

Signature:

Date:

Endorsed By:

Name: Hafiz Talat Mehmood

Designation: MOI

Organization: MC Okara

Signature:

Date:

INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of City/MC/LG: Okara

Sub-Project Sector: Sewerage System

Sub-Project Title: Replacement of 42" i/d Sewer and Manhole Chambers (Chungi # 6 to Chungi # 7 along Okara Multan Road

Sub- Project Categorization: S-2

Date of Screening: 03-11-2022

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No				Land owned by MC so no land acquired for this sub-project
If yes, then describe the type of land being acquired from the categories below:				No Land acquired for this sub-project
Has any AED been conducted at the proposed location by the government ³⁵ ?				No AED been conducted at the proposed location by the Government ¹
Land (Quantify and describe types of land being acquired in "remarks column".				No Land acquired for this sub-project
Government and LG owned land free of occupation (agriculture or settlement)				Land is owned by Govt.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)				No Land acquired for this sub-project
Private land				No Land acquired for this sub-project
Residential				No Land acquired for this sub-project
Commercial				No Land acquired for this sub-project
Agricultural				No Land acquired for this sub-project
Communal				No Land acquired for this sub-project
Others (specify in "remarks").				land owned by govt so no land acquired for this sub-project
Name of owner/owners and type of ownership document if available.				Land owned by Govt.
If land is being acquired, describe any structures constructed on it				No Land acquired for this sub-project
Land-based assets:				No Land acquired for this sub-project
Residential structures				No Land acquired for this sub-project
Commercial structures (specify in "remarks")				No Land acquired for this sub-project

³⁵ The sub-projects have to avoid all such lands where any government led AED has been conducted since 2018 and such land will be considered as ineligible expenditure.

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
Community structures (specify in "remarks")				No Land acquired for this sub-project
Agriculture structures (specify in "remarks")				No
Public utilities (specify in "remarks")				land owned by govt so no land acquired for this sub-project. No Ramps are ROW.
Others (specify in "remarks")				No Land acquired for this sub-project
If agricultural land is being acquired, specify the following:				No Land acquired for this sub-project
Agriculture related impacts				No Agriculture related impacts foreseen for this sub-project
Crops and vegetables (specify types and cropping area in "remarks").				Not anticipated during this sub-project
Trees (specify number and types in "remarks").				No tree cutting involved during this sub-project
Others (specify in "remarks").				No Land acquired for this sub-project
Affected Persons (APs)				No Persons Affected during this Project
Will any people be displaced from the land when acquired? Yes/No				No Land acquired for this sub-project
Number of APs				No Persons Affected during this Project
Males				No Persons Affected during this Project
Females				No Persons Affected during this Project
Titled land owners				No Land acquired for this sub-project
Tenants and sharecroppers				No Land acquired for this sub-project
Leaseholders				No Land acquired for this sub-project
Agriculture wage laborers				Not involved in this project
Encroachers and squatters (specify in remarks column)				No Land acquired for this sub-project
Vulnerable APs (e.g., women headed households, minors and aged, orphans, disabled persons and those below the poverty line). Specify the number and vulnerability in "remarks".				No Land acquired for this sub-project no one effected during this this intervention
Others (specify in "remarks")				Not involved in this project
How will people be affected?				There would be Temporary hindrances in movements of people/transport during the desilting phase. However, GRM will be established at site to ensure the best management and silt material will be disposed off in 24 hours to the disposal site

Involuntary Resettlement Checklist

SECTION 1	Yes	No	Expected	Remarks
Prepared By: Name: Muhammad Saqib Sadiq Designation: Social Safeguard Specialist Organization: MM Pakistan Signature		Endorsed By: Name: Hafiz Talat Mahmood Designation: MOI Organization: MC Okara Signature:		



Community consultation at Chungi # 6



View of Road Chungi #6



View of Road Chungi # 7

Laying of New Sewer Lines			
Screening Questions	Yes	No	Remarks
A. Project Siting Is the Sub-project area adjacent to or within any of the following:			
Environmentally sensitive areas?			
Legally protected Area			No legally protected area lies within 500 meters jurisdiction of Sub-project.
Any surface water body (river, canal, stream, lake, wetland) within 250 meters of the proposed Sub-project ³⁶	✓		Water seepage drain exists there.
Estuarine			Not observed in Sub-project area.
Special area for protecting biodiversity			No Wild life park or other biodiversity areas observed during site E&S investigation.
Buffer zone of protected area			No buffer zone for fauna and flora exists surrounding the project area.
Mangroves Forest			There is no existence of any mangrove in the project area.
Man-made forest/game reserve, orchard /crops or any other area of environmental importance			Area of environmental importance such as orchard/crops is not observed within the project interventions.
Socially sensitive/important areas/communities/people?			
PCRs and or any site of cultural/religious importance (Graveyard, Shrine, Mosque, Church, Gordwarah, Temple, Fort, archeological/historical site) within 100 m of the proposed Sub-project ³⁷			02 Graveyard (01 Muslim and 01 Christian), 01 Shrine (Pir Jaati Sethi), 05 Mosques PCRs exists within 100 meters of periphery of Sub-project which will be impacted due to any work activities.
Sensitive receptors (Schools, colleges, hospitals and clinics) within 100 meters of the proposed Sub-project ³⁸			05 Schools, 01 Clinics and 01 Hospital. • 6" Sui Gas high pressure pipeline. • 4" Sui Gas high pressure pipeline
Any graveyard of local community (Muslims or Christians)			02 Graveyard (01 Muslim and 01 Christian) observed.
Any demographic or socio-economic aspects of the Sub-project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, squatters, ethnic minorities, people with disabilities, people in old age, socially isolated segments ³⁹ of the society and women or children)?			No demographically or socio-economically vulnerable aspects of the Sub-project were observed.
Already existing infrastructure ⁴⁰ (including public amenities) which may be required to dismantle or may be affected temporarily by any means?			• 6" Sui Gas high pressure pipeline. • 4" Sui Gas high pressure pipeline. • 01 Watercourse may be effected.

³⁶ Ibid.

³⁷ According to Environmental Assessment Guidelines adopted by Punjab EPA.

³⁸ Ibid.

³⁹ due to caste, creed, religion or gender e.g., transgender.

⁴⁰ Sewerage /Drainage system, Water supply lines, tube-wells, WAPDA/Telephone transmission lines/electric poles, Railway tracks, Gas pipelines, Roads, Shops/Plazas, Banks, Industry, Disposal stations etc.

Laying of New Sewer Lines			
Screening Questions	Yes	No	Remarks
			No public infrastructure will be damaged/dismantled due to any Sub-project interventions.
B. Potential Environmental Impacts Will the Sub-project cause...			
Disturbance to habitats/biodiversity of environmentally sensitive or protected areas?			The proposed project site doesn't have any environmentally sensitive or protected areas.
Cutting of trees?			No cutting of trees required as per scope of work under Sub-project.
Disruption to habitats/biodiversity of surrounding ecosystem/environment?			No disruption to any habitat/ecosystem due to any Sub-project activities.
Generation of wastewater during construction or operation?			This is new sewer line, so no wastewater will be generated during the laying of sewer.
Pollution of surface water/ground water due to wastewater discharge from construction site or due to direct/indirect disposal of waste water?			No impact.
Alteration of surface water hydrology of waterways resulting in increased sediment in streams/rivers or due to increased soil erosion at construction site?			No Sub-project activities will trigger such negative impact.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?			No campsite establishment envisaged. Local labor will be engaged by the contractor.
Over pumping of ground water, leading to salinization and ground subsidence?			No over pumping/pumping involved in scope of work.
Serious contamination of soil due to construction works?			Not identified.
Aggravation of solid waste problems in the area?			Not identified.
Generation of hazardous waste?			Not identified.
Increased air pollution due to Sub-project construction and operation?			Not identified.
Noise and vibration due to Sub-project construction or operation?			No such impact is envisaged.
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents due to solid/liquid?			No such impact is envisaged.
Use of chemicals during construction?			No chemicals will be used during machinery replacement activities.
C: Potential Social Impacts Will the Sub-project cause...			

Laying of New Sewer Lines			
Screening Questions	Yes	No	Remarks
Impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to Physical Cultural Resources (PCRs)?			02 Graveyard (01 Muslim and 01 Christian), 01 Shrine (Pir Jaati Sethi), 05 Mosques PCRs exists within 100 meters of periphery of Sub-project which will be impacted due to any work activities.
Displacement or involuntary resettlement of people? (Physical displacement and/or economic displacement) (If "Yes", please also fill Involuntary Resettlement Screening Checklist)			No displacement/resettlement of people involved in Sub-project scope.
Disproportionate impacts on the poor, women and children and or other vulnerable groups ⁴¹ (mentioned above)?			There will be no direct/indirect impact on the poor women, children and or other vulnerable groups.
Temporary impediments in movements of people/transport and animals?			Temporary impediments in movements of people will be affected temporary public consultation will be carried out with all sensitive receptors and work will be scheduled after their consent.
Large population influx during Sub-project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?			Local unskilled labor will be preferred by the Contractor due to limited work activities. It's a small-scale project and therefore, there will be no large population influx among the locals. However, during construction activities, separate sanitary facilities and water will be adequately supplied to the labor by the contractor to avoid and conflict with the local community on the use of their water resources.
Social conflicts if workers from other areas are hired?			No such impact foreseen as work activities are limited up to replacement of machinery. Contractor will hire local workers.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?			To avoid any electricity hazard, it will be ensured that all the connections are switched off before replacement of machinery and valves from waste water are closed during the replacement work. However, this activity will be completed in a short interval of time. Workers will be provided requisite PPEs during work and contractor will ensure the implementation of Occupational Health SOPs developed by the PMDFC.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?			No Such risk is identified.

⁴¹ Women, Children, Women headed households, People in old age, people having disabilities, socially isolated community groups and or people living below the poverty line.

Laying of New Sewer Lines			
Screening Questions	Yes	No	Remarks
Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?			No such risk is envisaged.
Any impact on sensitive receptors (mentioned above)			No significant direct/indirect impact foreseen.
Any impact of negative nature on already existing infrastructure including public amenities			No damages to any public amenity required for the project interventions.

Prepared By: Name: Dr. Muhammad Ashraf Bodla Designation: Environment Specialist Organization: MM Pakistan Signature: Date:	Endorsed By: Name: Hafiz Talat Mehmood Designation: MOI Organization: MC Okara Signature: Date:
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INVOLUNTARY RESETTLEMENT SCREENING CHECKLIST

Name of City/MC/LG: Okara

Sub-project Sector: Sewerage

Sub-project Title: Laying of New Sewer Lines

Sub- Project Categorization: S-2

Date of Screening: 30-3-2023

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
Does the project require land acquisition? Yes/No				Land owned by MC so no land acquired for this Sub-project
If yes, then describe the type of land being acquired from the categories below:				No Land acquired for this Sub-project
Has any AED been conducted at the proposed location by the government ⁴² ?				No AED been conducted at the proposed location by the Government ¹
Land (Quantify and describe types of land being acquired in "remarks column".				No Land acquired for this Sub-project
Government and LG owned land free of occupation (agriculture or settlement)				Land is owned by Govt.
Government or state-owned land (other than LG) free of occupation (agriculture or settlement)				No Land acquired for this Sub-project
Private land				No Land acquired for this Sub-project
Residential				No Land acquired for this Sub-project
Commercial				No Land acquired for this Sub-project
Agricultural				No Land acquired for this Sub-project
Communal				No Land acquired for this Sub-project
Others (specify in "remarks").				land owned by govt so no land acquired for this Sub-project
Name of owner/owners and type of ownership document if available.				Already existing sewerage drainage and land is owned by the Govt.
If land is being acquired, describe any structures constructed on it				No Land acquired for this Sub-project
Land-based assets:				No Land acquired for this Sub-project
Residential structures				No Land acquired for this Sub-project
Commercial structures (specify in "remarks")				No Land acquired for this Sub-project

⁴² The Sub-projects have to avoid all such lands where any government led AED has been conducted since 2018 and such land will be considered as ineligible expenditure.

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
Community structures (specify in "remarks")				No Land acquired for this Sub-project
Agriculture structures (specify in "remarks")				No
Public utilities (specify in "remarks")				land owned by govt so no land acquired for this Sub-project. No Ramps are ROW.
Others (specify in "remarks")				No Land acquired for this Sub-project.
If agricultural land is being acquired, specify the following:				No Land acquired for this Sub-project.
Agriculture related impacts				No Agriculture related impacts foreseen for this Sub-project.
Crops and vegetables (specify types and cropping area in "remarks").				Not anticipated during this Sub-project.
Trees (specify number and types in "remarks").				No tree cutting involved during this Sub-project.
Others (specify in "remarks").				No Land acquired for this Sub-project.
Affected Persons (APs)				No Persons Affected during this Project.
Will any people be displaced from the land when acquired? Yes/No				No Land acquired for this Sub-project.
Number of APs				No Persons Affected during this Project
Males				No Persons Affected during this Project
Females				No Persons Affected during this Project
Titled land owners				No Land acquired for this Sub-project
Tenants and sharecroppers				No Land acquired for this Sub-project
Leaseholders				No Land acquired for this Sub-project
Agriculture wage laborers				Not involved in this project
Encroachers and squatters (specify in remarks column)				No Land acquired for this Sub-project
Vulnerable APs (e.g., women headed households, minors and aged, orphans, disabled persons and those below the poverty line). Specify the number and vulnerability in "remarks".				No Land acquired for this Sub-project no one effected during this this intervention
Others (specify in "remarks")				Not involved in this project
How will people be affected?				There would be Temporary hindrances in movements of people/transport during the desilting phase. However, GRM will be established at site to ensure the best management and silt material will be disposed off in 24 hours to the disposal site

Involuntary Resettlement Checklist				
SECTION 1	Yes	No	Expected	Remarks
Prepared By: Name: Muhammad Saqib Sadiq Designation: Social Safeguard Specialist Organization: MM Pakistan Signature		Endorsed By: Name: Hafiz Talat Mahmood Designation: MOI Organization: MC Okara Signature:		



Annexure F: SGS Waste Water Analysis Reports Okara



ANALYTICAL REPORT

LHR-22-0730/10

CLIENT DETAILS

Client MM Pakistan (PVT)LTD.
Address Okara
Contact Mr. Arsam Ahmed Awan
Telephone +92 (0) 42 36300440
Fax -
Email arsam_ahmed@mmpakistan.com
Project (not specified)
Order Number (not specified)
Samples Waste Water Samples
Sample Collected Mr. Muzammil

LABORATORY DETAILS

SGS Reference C&P-LHR-22-0730/10
(Boss Order No. 5016711)
Sample Collected 12-10-2022
Sample Received In Lab 14-10-2022: 16: 15
Analysis Completion Date 28-10-2022
Date Reported 28-10-2022
Sampling Technique Grab Samples

COMMENTS

This report is not valid for any negotiation.
The lab is accredited in accordance with ISO 17025:2017 with accreditation number LAB 067.
Uncertainty of results will be provided upon request.
The results are reported as absolute value +/- the absolute uncertainty of measurement estimated by the laboratory
The remaining portion of the chemical sample (s) will be disposed off after one week unless otherwise instructed. (Conditions Apply)

SIGNATORIES

Sample Analyzed By
Mr. Mubashir

Laboratory In-Charge (QA/QC)
Ms. Mahpara Alam

Chief Analyst / DH
Mr. Ali Hashim
0321-6461538

SGS Pakistan (Private) Limited

Plot No. 07, Din Muhammad Town, 19-KM Off Multan Road, Lahore UAN: 111-222-747
t +92 -42-37515415-18, f +92-42-37515420, www.sgs.com

Member of SGS Group (Société Générale de Surveillance)



ANALYTICAL REPORT

LHR-22-0730/10

Sample No.				C&P-LHR-22-0730/10-07		
Client ID				Disposal ¼ L (Wastewater Sample SGS)		
Sampled By				Results	Limits as per NEQS	Remarks
Parameters	Units	LOR				

Chemical Oxygen Demand(COD) based on APHA-5220 D 23rd Edition

*COD	mg/L	5.0	357	150	NC
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Biochemical Oxygen Demand (BOD₅) based on APHA 5210 D 23rd Edition

*(BOD ₅) @ 20 °C	mg/L	3.0	248	80	NC
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ANALYTICAL REPORT

LHR-22-0730/10

Sample No.			C&P.LHR-22-0730/10-08	Limits as per NEQS	Remarks
Client ID			Disposal 2/4 L (Wastewater Sample)		
Sampled By			SGS		
Parameters	Units	LOR	Results		

Chemical Oxygen Demand(COD) based on APHA-5220 D 23rd Edition

*COD	mg/L	5.0	404	150	NC
------	------	-----	-----	-----	----

Biochemical Oxygen Demand (BOD₅) based on APHA 5210 D 23rd Edition

* (BOD ₅) @ 20 °C	mg/L	3.0	264	80	NC
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ANALYTICAL REPORT

LHR-22-0730/10

Sample No.				C&P-LHR-22-0730/10-11	Limits as per NEQS	Remarks
Client ID				6/4L Pipili Pahari Road (Waste Water Sample)		
Sampled By				SGS		
Parameters		Units	LOR	Results		

Chemical Oxygen Demand(COD) based on APHA-5220 D 23rd Edition

*COD	mg/L	5.0	639	150	NC
------	------	-----	-----	-----	----

Biochemical Oxygen Demand (BOD₅) based on APHA 5210 D 23rd Edition

* (BOD ₅) @ 20 °C	mg/L	3.0	330	80	NC
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ANALYTICAL REPORT

LHR-22-0730/10

FOOTNOTE

IS	Insufficient sample for analysis.
LOR	Limits of Reporting
TCC	Total Colony Count
P/A	Present / Absent
MPN	Most Probable Number
TPC	Total Plate Count
HPC	Heterotrophic Plate count
APC	Aerobic Plate Count
TVA	Total Viable Count & Total Bacteria
FDA	Food & Drug Administration of USA
BAM	Bacteriological Analytical Manual
LNR	Sample Listed, but not received
*	This analysis is covered by the scope of accreditation.
**	Effluent Temperature should not increase $\leq 3^{\circ}\text{C}$ from receiving body Temperature
***	Residual Chlorine at consumer end.
^	Performed at SGS Karachi Lab.
#	Result will follow soon.
DH	Department Head
Environmental	Temperature $25 \pm 5^{\circ}\text{C}$
Condition	Humidity $55 \pm 15\%$
C	Parameters are in Compliance with PEQS
NC	Parameters are not in Compliance with PEQS
PEQS	Punjab Environmental Quality Standard

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Annexure G: Framework for Emergency Preparedness Response Plan

There would be some dangerous places such as excavated trenches, sumps of pumping stations, machinery movement routes etc. that should have an Emergency Preparedness and Response Plan so that quick and effective action can be taken in the event of a problem to ease the severity of the situation and to limit the consequences. An emergency preparedness and response plan comprise planned, agreed, recorded and rehearsed strategies, enabling those at site to respond effectively and reliably.

Emergencies that may need to be planned for include (but are not limited to):

- Serious injuries.
- Explosion.
- Flood.
- Poisoning.
- Electrocution.
- Fire.
- Chemical spill.
- Structural collapse.

Emergency planning should begin before the commencement of any works on site. The initial emergency plan may be based on a generic plan adapted to the specific project. As the project progresses it will generally be necessary to amend the plan to take account of any changes, in particular, if an emergency or near miss has occurred.

Contents

Some of the basic information that should be included on an emergency plan might include:

- Site address.
- Date on which the emergency plan was prepared.
- Emergency personnel names and contact details.
- Evacuation routes.
- Types of emergencies.

An emergency plan should take into consideration the following:

- Hazard identification/assessment

Due to the complex and fast-changing environment of a construction site, it is important that the assessment of hazards is ongoing. A thorough review of potential hazards may include:

- Proximity to traffic and public ways.
- On-site materials.

- Confined spaces.
- Plant circulation.
- Materials handling and hoisting.
- Environmental issues.
- Working in, or adjacent to, operating facilities.
- Working at height.
- Working at night or in reduced light.

Once the various hazards have been identified, the following needs to be assessed:

- What can go wrong?
- What are the possible consequences?
- What is the strategy for dealing with the consequences in an emergency situation?

Emergency resources

The emergency plan should identify the emergency resources that can be called upon if necessary, and estimated response times, based upon distances from fire stations, hospitals, and so on.

The plan should also identify on-site resources such as fire extinguishers, spills containment equipment, first aid equipment, and so on. On-site first aiders and other medical staff should be identified.

Communication systems

This involves detailing the various communication systems that are in place to enable emergency services to be contacted without delay. This can be especially critical if the site is in an isolated area that is difficult to reach. Inclement weather may render communication systems ineffective, and the plan should make clear the contingency strategy if this is the case. On large sites, emergency phones can be provided.

Emergency response procedure

Any planned procedures must be considered with the expectation that an unfolding situation may change the conditions and circumstances. The basic steps for emergency response are as follows:

- Stay calm.
- Assess the situation.
- Take command of the situation.
- Provide protection.
- Aid and manage.
- Maintain contacts.
- Guide the emergency services.

Communication and review

The emergency plan should consider how it can be communicated effectively and clearly so that all site personnel are aware of it. The following steps should be taken to review the plan:

- With subcontractors so that it covers their activities.
- With suppliers so that it covers their materials/products.
- As new areas of the site are exposed to work activities.
- With the owner/client to ensure any site-specific hazards are accounted for.
- With health and safety inspectors who may visit the site.

Post-emergency

Planning and preparation should also be made for action post-emergency, as simply returning to work may not be straight-forward. Professional counselling may be required for those suffering with post-traumatic stress. In addition, debriefing is necessary to identify how the emergency plan can be improved for the future.

Annexure H: Tree Plantation Plan

Tree Plantation Plan: Trees are an important part of eco-systems across the planet. Trees provide vital resources, clean our air, protect us from weather and provide enjoyment. Tree planting provides “the roots” for building future appreciation and stewardship for nature.

Site Selection: The sites for tree plantation will be selected that are well drained and free of overhead electricity wires and be able to host fully grown trees between 9 ft. to 40 ft. of higher when fully grown. Plantation will be avoided in the private property if to be done so then the written permission from the owner will be sought. Plantation will be avoided on footpaths as tree roots may lift a sidewalk over time if the area is too small. The buried electric wires, cable wires, telephone wires, water pipes, natural gas lines, or septic tanks etc. will be marked if located at planting sites.

Site Preparation: Total planting area required will depend on the number of trees to be planted and how close together the trees are planted. Distance for planting will depend on the type of tree and final height of a grown tree. If trees will be planted 6 to 8 feet apart then no transplanting will be necessary. Seedlings would be planted closer together if future transplanting is possible. The planting spots will be cleared of heavy brush and grass. Brush will be cleared and all roots removed to ensure the plant does not grow back and grass will be removed (roots and all) from the spots where planting the trees. There will be no need to clear-cut the whole area to turn the soil for the entire site, just where the tree will be planted will be cleared. Source of water to the trees for both the planting event and for ongoing care will be determined.

Planting the trees: Holes for planting the tree will be dug using a shovel or hand trowel. The holes will be 2 to 3 times wider than the diameter of the root ball. The tree saplings will be removed from the containers and loosen the roots so they are not encircling the sapling. Sapling will be set in the center of the hole and backfill the hole making sure that the sapling is straight and it is not too deep. Soil will be pressed down gently with hands. More soil will be added to fill up the rest of the hole. The leftover backfill will be used to make a 2–3-inch mound (berm) around the edge of the root ball. The plantation will be watered at required intervals. Weeding will be done as and when required. The dead plants will also be replaced.

Recommended Plant Species: Amaltas (*Cassia fistula*); Amla (*Phyllanthus emblica*); Arjun (*Terminalia arjuna*); Ashoka (*Saraca indica*); Bakain (*Melia azedarach*); Bougainvillea (*Bougainvillea glabra*); Burna (*Crataeva religiosa*); Cassia Tree (*Cassia javanica*); Gulhar (*Benjaminia comosa*); Imli (*Tarminidus indica*); Jasmine (*Jasminum officinale*); Kachnar (*Bauhinia alba*); Kanair (*Nerium oleander*); Kiker (*Acacia nilotica*); Lasura (*Cordia oblique*); Molsari (*Mimusops elengi*); Neem (*Azadirachta indica*); Shareen (*Albizia lebbeck*); Shisham (*Dalbergia sisso*); Simal (*Salmalia malabarica*); Sohanjana (*Moringa oleifera*); Sumbul (*Bombax malabaricum*); Ulta Ashok (*Polyalthia longifolia*)

Annexure I: Tree Plantation Plan

**LOCAL GOVERNMENT & COMMUNITY DEVELOPMENT
DEPARTMENT****PUNJAB CITIES PROGRAM****PC-I FORM****FOR****COMPREHENSIVE SEWAGE SYSTEM IN OKARA CITY****ESTIMATED COST: RS 1952.60 MILLION****SEPTEMBER 2023****Municipal Committee Okara**

Punjab Cities Program
PC-I Form
Comprehensive Sewerage System in Okara City
Table of contents

Sr. No.	Description	Page No. (from-to)
1	PC-I Form	
2	Annexure-A Location map	
3	Annexure-B Existing situation	
5	Annexure-C Project Proposal	
6	Annexure-D Project cost estimates	
7	Annexure-E Annual O&M Cost	
8	Annexure-F Environment Impact Assessment	
9	Annexure-G Project Implementation Period (Gant Chart)	
10	Annexure-H Drawings	

PC-I FORM
for
Comprehensive Sewerage System in Okara City

Project Serial Number

Sector: Local Government & Community Development Department

Sub Sector: Social

1. Name of the project	Punjab Cities Program Comprehensive Sewage system in Okara city														
2. Location	Okara City is situated 38 km from Sahiwal towards Lahore at N-5 Lahore Multan Road. At most distances between these cities are same.. Location Map of the city is attached as Annexure-A														
3. Authorities responsible for															
i- Sponsoring	Government of the Punjab (through World Bank funding)														
ii- Execution	Municipal Committee Okara City														
iii- Operation and Maintenance	Municipal Committee Okara City														
iv- Concerned Provincial Department	Local Government and Community Development Department Punjab (LG & CD Department)														
4a. Plan Provision															
i. If the project is included in medium term/five-year plan, specify actual allocation	Punjab Cities Program (PCP) is a World Bank funded Program with a total cost of 236.00 million USD and comprises of below mentioned components. <table border="1"> <tr> <td>Total loan from World Bank</td><td>200.00</td><td>million USD</td></tr> <tr> <td>Component-1 Infrastructure Development Program for Results (PforR)</td><td>180.00</td><td>million USD</td></tr> <tr> <td>Component-2 Technical Assistance</td><td>20.00</td><td>million USD</td></tr> <tr> <td>MCs share (20% of PforR component) equivalent to:</td><td>36.00</td><td>million USD</td></tr> </table>			Total loan from World Bank	200.00	million USD	Component-1 Infrastructure Development Program for Results (PforR)	180.00	million USD	Component-2 Technical Assistance	20.00	million USD	MCs share (20% of PforR component) equivalent to:	36.00	million USD
Total loan from World Bank	200.00	million USD													
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MCs share (20% of PforR component) equivalent to:	36.00	million USD													

	<table border="1"> <tr> <td>Total Program cost</td><td>236.00 million USD</td></tr> </table> The Project is funded in ADP 2023-24 at Serial No 1673 (TA component only) with current year allocation as Rs 537.66 million. MC Okara City will get its due share from P4R funding depending upon the formula fixed by World Bank	Total Program cost	236.00 million USD
Total Program cost	236.00 million USD		
ii- If not included in the current plan, what warrants its inclusion and how it is now proposed to be accommodated	Not applicable		
iii If the project is proposed to be financed out of block provision indicate.	The Project is funded in ADP 2023-24 at Serial No 1673 (TA component only) with current year allocation as Rs 537.66 million. MC Okara City will get its due share from P4R funding depending upon the formula fixed by World Bank. The Project is being financed by World Bank as Donor along with 20% co-financing from the Program Municipal Committees and is not proposed to be financed out of Block Allocation.		
4b- Provision in the current year PSDP/ADP	The Project is funded in ADP 2023-24 at Serial No 1673 (TA component only) with current year allocation as Rs 537.66 million.		
5. Project objectives and its relationship with sector objectives	<u>Sector Objectives</u> The sector objectives include: 1. Provision of efficient and effective municipality services to the masses. 2. Improvement of existing sewerage system in Okara City. 3. To improve existing environmental conditions by provision of wastewater treatment facilities in Okara City. 4. To improve (O&M) efficiency through provision of liquid waste machinery. <u>Objectives of the Project</u> The Program aims for improvement of Infrastructure of Municipal Services including Sewerage System to improve municipal service delivery.		

The Project comprises of the Replacement of old, outlived, damaged or worn-out components in existing infrastructure for; -

- To improve the service delivery by laying of trunk sewer according to topographic conditions. It will provide Improvement of service delivery level of the municipal services in the served areas of the city for provision of better basic urban services for improved livability of the citizen.
- The new system is proposed to reduce in annual O&M cost of the infrastructure due to reduced repairs in the forthcoming years because of repair or replacement of infrastructure components.
- The major areas like General bus stand, rehmanabad, grain market and other areas un-served partially reserved is planned in this project. Sanitation conditions are very poor, wastewater stagnating in the streets, open plates converted into ponds. Road network are detorial due to non existence if proper sewerage. Overflow on the road are occurring resultantly, road network are damaging. MC Okara spending huge funds for maintenance as well as reconstruction of road network. Municipal Committee has construct open drain for dewatering of wastewater and this wastewater is going to the agriculture form without any treatment. Some industries also fall on the route which will be fitted from proposed system.
- On completion of scheme about one hundred thousand peoples will benefited with sewerage facility as well as improve the existing areas. It will cause in reduction and prompt addressal of the public complaints regarding municipal service delivery.
- The major areas are without sewer along the planned route of trunk sewer which will be benefited with sewerage facility and environmental condition will be improve.
- The provide the wastewater treatment facility for reduction of BOD to bring the effluent within permissible limits of the NEQs and the treated water can used for irrigation.
- With the improvement of environmental standards, the growth potential and the local economy of the city will be improved.

Hence, the objectives of the project are in line with the sector objectives mentioned above and the project forms integral part of the concerned sector.

6. Description, justification, technical parameters and technology transfer aspects

i. Present Condition	Details are given at Annexure-B		
ii. Description of the subproject-	Details given in Annexure-C ➤ Municipal Committee shall insure the use of treated water for irrigation purpose. ➤ Revenue Department approach to transfer the state land in favour of MC Okara. The area of state land having 60 Acres for treatment of wastewater is in process.		
iii Detail of civil works, equipment & machinery and other physical facilities	The PC-I provides the below given components. 1. Rehabilitation of Existing Sewerage system The rehabilitation of the system will comprise of below given components		
	SN	Components	Quantity
	1	RPC Manhole covers	690 Nos
	2-Comprehensive sewerage system in Okara City The newly proposed system in Okara City will comprise of the below given components:		
	SN	Components	Quantity
	1	RCC sewers	
		a) 9” I/d	2500 Rft
		b) 12” I/d	4159 Rft
		c) 15” I/d	2750 Rft
		d) 18” I/d	2597 Rft
		e) 24” I/d	3164 Rft
		f) 30” I/d	3994 Rft
		g) 42” I/d	3131 Rft
	h) 60” I/d	4332 Rft	
	i) 66 I/d	7775 Rft	
	3-Waste water Treatment Plant comprising of: a) Sewage Collecting pit / Chamber = 1 No b) Course & fine Screening Chamber = 1 No c) Grit Chamber d) Sullage Drains e) Anaerobic ponds = 4 Nos f) Facultative ponds = 4 Nos g) Sludge drying beds = 4 No h) Administration block = 1 No i) Floating plants = 5% of Facultative ponds area j) Effluent water course = 1		

iv Indicate governess issues of the sector relevant to the project and strategy to resolve them	• Municipal Committee Okara City is facing acute shortage of local field staff. The operation & maintenance of the project after completion can only be assured when the required staff is available with MC. • The operation and maintenance of the municipal services in not up to the mark in the MCs. Capacity building under the Program, through trainings and seminars will be imparted by PMDFC to the officers as well as the field staff.		
7- Capital Cost of Project	The summary of the works included in the project is given below; (All costs in million rupees)		
	Ser #	Description	Cost (RS.) In Millions
	1	Package-1 Sewerage system	907.44
	2	Package-2 Construction of Wastewater Treatment Plant (WWTP)	726.47
	3	Package-3 Supply of Liquid Waste Machinery	43.32
	4	Package-4 Providing and Fixing of RPC manhole Cover	10.36
		Total Cost (Rs.)	1687.59
		E & S cost	7.50
		Add ARAP cost	55.00
		Add 2% contingencies	33.75
		Add 5% PST	84.38
		Add 5% escalation	84.38
		Grand Total Cost (Rs. In millions)	1952.60
	Note: Keeping in view volume and nature of work it is proposed that estimate will get technical sanction on package basis. Accordingly, procurement will be carried out.		
	The detail of costs has been given in Annexure-D		
i- Indicate date of estimation of the project cost	The project estimates have been framed during the month of September, 2023.		

ii- Basis of determining the estimates be provided.	The cost estimates have been framed on the basis of bill of quantities actually measured at site and unit rates from the Market Rate System (MRS) issued by the Government of Punjab (Okara 2nd biannual of year 2023). For items not available in the MRS, the same have been analyzed as per prevailing market rates.																																												
Provide year wise estimation of physical activities	The physical and financial requirements, year wise are included in the following table: <table><tr><th>Ser #</th><th>Detail of subheads</th><th>Year 23-24</th><th>Year 24-25</th></tr><tr><td>1</td><td>Package-1 Sewerage system</td><td>80%</td><td>20%</td></tr><tr><td>2</td><td>Package-3 Providing and Fixing of RPC manhole Cover</td><td>100%</td><td>0</td></tr><tr><td>3</td><td>Package-4 Construction of Wastewater Treatment Plant (WWTP)</td><td>60%</td><td>40%</td></tr><tr><td>4</td><td>Package-5 Supply of Liquid Waste Machinery</td><td>100%</td><td>0</td></tr><tr><td>5</td><td>E & S cost</td><td>80%</td><td>20%</td></tr><tr><td></td><td>Total Cost (Rs.)</td><td></td><td></td></tr><tr><td></td><td>ARAP cost</td><td>100%</td><td></td></tr><tr><td></td><td>Add 2% contingencies</td><td>80%</td><td>20%</td></tr><tr><td></td><td>Add 5% PST</td><td>80%</td><td>20%</td></tr><tr><td></td><td>Add 5% escalation</td><td>80%</td><td>20%</td></tr></table>	Ser #	Detail of subheads	Year 23-24	Year 24-25	1	Package-1 Sewerage system	80%	20%	2	Package-3 Providing and Fixing of RPC manhole Cover	100%	0	3	Package-4 Construction of Wastewater Treatment Plant (WWTP)	60%	40%	4	Package-5 Supply of Liquid Waste Machinery	100%	0	5	E & S cost	80%	20%		Total Cost (Rs.)				ARAP cost	100%			Add 2% contingencies	80%	20%		Add 5% PST	80%	20%		Add 5% escalation	80%	20%
Ser #	Detail of subheads	Year 23-24	Year 24-25																																										
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	Add 5% PST	80%	20%																																										
	Add 5% escalation	80%	20%																																										
	The PC-I has been framed in 4 package as given in the above-mentioned table because of below mentioned issues: 1. The cost of this mega project is very high and one contractor will not be able to execute all items of work in parallel. 2. The time line available for the execution of the project is very narrow as the Punjab Cities Program has been extended up to June, 2025. For completion of the project within this timeline more than one contractor will have to be engaged. 3. The residents of Okara City are suffering from waste water flooding since long and they should be relieved from this panic as soon as possible. Engaging 4 contractors will get the project completed rapidly thus accruing early benefits to the public of Okara City. 4. Hence 4 package of the projects will be let out separately and the work will be completed in parallel on all parts																																												

8-Annual recurrent cost after completion of the project and source of financing	The annual O&M cost will be around Rs. 10.00 million to run the system on sustainable basis. The source of financing O&M cost will be borne by MC Okara City. O & M details have been attached in Annexure-E.
9- Demand & Supply Analysis i- Existing Capacity of services	B. Existing supply level ● Municipal Committee Okara City is unable to render satisfactory service to the entire area of the city because of degraded infrastructure wherein major replacements are direly needed but MC could not be able to accomplish them because of low revenue recovery and funding constraints. As a result, major areas are deprived of the required level of the service. This is resulting in low credibility of the municipal services and citizen dissatisfaction. Further, the municipal infrastructure has not been extended keeping in pace with the growth of population which has impacted the service delivery level of MC.
ii- Projected Demand for 10 years	● For meeting the needs of population up to year 2050, the proposed sewerage system including Rehabilitation of the existing system, laying of 14.32 km sewer lines, construction of 1 new disposal stations, construction of wastewater treatment plant (WWTP) will address the required municipal infrastructure coping with demand of population up to planning horizon.
iii- Capacity of other similar projects being implemented in public/private sector	No other project of this nature is being implemented in public as well as private sector. However, MC is trying to keep the services in operation with bare minimum repairs/replacements because of funding constraints.
iv- Supply and Demand gaps	The nature of supply and demand gap has been explained in the preceding paras which concludes; ● The existing infrastructure has poor efficiency resulting in unsatisfactory service delivery level. ● The O&M cost of the municipal services is very high because of low efficiency of the services infrastructure and high market rates while there in a large gap between the O&M expenditure and the revenue recovery. ● Large subsidies are being injected by MC to the keep the services in operation ● Numerous public complaints are also registered on daily basis.

	Hence, there is a large gap between the supply and demand which is to be bridged by improvement in the municipal infrastructure and its management.										
v- Designed capacity and output of the project	Investments have been proposed for improvement of the existing infrastructure which will result in the under mentioned outputs; • The new disposal station, drain and wastewater treatment plants will be constructed. This will address the issue of waste water flooding and disposing of untreated sewage into agricultural field and it will help to meet the requirements of NEQS. • By implementation of proposed project, improved sanitation conditions will be developed leading to improved service delivery by MC.										
10. Financial Plan Sources of financing <u>Debt</u> a) Indicate the local and foreign debt Loan	The below given loan for the Punjab Cities Program has been funded by World Bank for 16 PCP cities in Punjab. <table border="1"> <tr> <td>Total loan to Government of Pakistan/Punjab</td><td>200 million USD</td></tr> <tr> <td>Component-1 for Infrastructure Development</td><td>180 million USD</td></tr> <tr> <td>Component-2 for Investment Project Financing For capacity building of MCs & three Govt. organization and program management.</td><td>20 million USD</td></tr> <tr> <td>20% share of Municipalities is equivalent to</td><td>36 million USD</td></tr> <tr> <td>Total funds available for Infrastructure Development</td><td>216 million USD</td></tr> </table> Municipal Committee Gojra city is getting its share from this funding and depositing its 20% share of the total funding allocated to the MC. The project will be funded out of this allocation.	Total loan to Government of Pakistan/Punjab	200 million USD	Component-1 for Infrastructure Development	180 million USD	Component-2 for Investment Project Financing For capacity building of MCs & three Govt. organization and program management.	20 million USD	20% share of Municipalities is equivalent to	36 million USD	Total funds available for Infrastructure Development	216 million USD
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b-Equity	A. Loan /Grant to MC The amount of loan converted to grant to Okara City will be Rs 1952.60 million. The financing of the project will be as given below: <table border="1"> <tr> <td>Grant to MC (Loan from WB)</td><td>PKR 1562.08 million</td></tr> <tr> <td>20% Co-finance by MC</td><td>PKR 390.52 million</td></tr> <tr> <td>Total available funds (Total cost of PC-I)</td><td>PKR 1952.60 million</td></tr> </table> B. Project Cost: PKR 1952.60 million *The loan is from World Bank to Government of Pakistan/Punjab, which will trickle down to Okara MC as grant.	Grant to MC (Loan from WB)	PKR 1562.08 million	20% Co-finance by MC	PKR 390.52 million	Total available funds (Total cost of PC-I)	PKR 1952.60 million				
Grant to MC (Loan from WB)	PKR 1562.08 million										
20% Co-finance by MC	PKR 390.52 million										
Total available funds (Total cost of PC-I)	PKR 1952.60 million										

c) Grants	No grant is being given by Government of Punjab out of ADP funds. The World Bank loan to Government of Pakistan/Punjab will trickle down as grant to MC from Government of Punjab.
d) Weighted cost of capital	Nil
11-Project Benefits and Analysis	
Financial: Income to the project with assumption	• The project comprises construction of new components the existing Municipal Infrastructure to improve the service delivery of MC and construction of new sewerage system in the unserved areas Presently, no user charges have been levied because of unsatisfactory service delivery but with improvement of service delivery, the consumers will be ready to pay user charges. • It is proposed to levy user charges on the service which will increase the income of the MC. • However, it is a social sector project and the capital cost of the project is not intended to be recovered. The user charges will be recovered from the consumers for meeting the operation and maintenance charges of the services and to lower down the heavy subsidies being injected by MC to keep the services in operation.
i. Social benefits to the target group	The completion of the project will result in: • Up gradation of the municipal services infrastructure. • Increase in efficiency of all infrastructure components • Improved service delivery level • Enhanced design life of the components. This in turn will result the following social benefits: • Improved hygienic conditions in the city • Reduction in vector breeding and generated diseases • Elimination of obnoxious smell • Reduction in medical expenditures by Public
Environmental Impact negative/positive	There will be moderate to significant level negative environment impacts including temporary deterioration in air quality, water pollution, wastewater pollution, change of land use etc. during and after implementation of the project. The Environment and Social Screening Checklists have been developed and attached as Annexure-F . According to World Bank E&S screening and safeguards procedures and Punjab EPA Regulations, this project falls in the projects category where it requires to develop a detailed Environmental and Social Impact Assessment (ESIA) Report and obtain its NOC/Approval from PEPA.
Quantifiable project outputs	The social benefits to the citizen have been described at Sr. No-11(ii).

ii. Unit cost analysis	The unit Capital cost analysis is produced below; <table border="1"> <tr> <td>Project capital cost of the Project</td><td>PKR 1952.60 million</td></tr> <tr> <td>Population in year 2023</td><td>416,289 persons</td></tr> <tr> <td>Unit capital cost per capita</td><td>Rs. 4,690.49</td></tr> </table> The Unit O&M cost per annum is given below <table border="1"> <tr> <td>Project O&M cost per annum</td><td>PKR 45.78 million</td></tr> <tr> <td>Population in year 2023</td><td>416,289 persons</td></tr> <tr> <td>Unit O&M cost per capita per annum</td><td>Rs. 109.97</td></tr> </table>	Project capital cost of the Project	PKR 1952.60 million	Population in year 2023	416,289 persons	Unit capital cost per capita	Rs. 4,690.49	Project O&M cost per annum	PKR 45.78 million	Population in year 2023	416,289 persons	Unit O&M cost per capita per annum	Rs. 109.97
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Population in year 2023	416,289 persons												
Unit O&M cost per capita per annum	Rs. 109.97												
Employment generation direct and indirect)	<u>Employment Analysis</u> Direct Employment a) Planning and Design of Projects The Planning and Design of the project will be entrusted to local consultants who will be appointing staff and experts in different disciplines along with support staff. The Consultants will also appoint their staff for resident supervision of the Project to verify and certify the items of works to be executed under this PC-I. b) Execution of the Project a) PMDFC PMDFC has the project monitoring and supervisory role and the company has enough experts and staff to complete this assignment. PMDFC has already deployed under mentioned staff for these projects: ● Civil Engineers ● Accounts, administration and audit personnel ● Urban planners ● GIS experts ● Support staff like computer operators, vehicle drivers, office boys and guards. ● Procurement experts ● Communication experts ● Environmental and social experts ● Contract management experts b) Consultants PMDFC has employed (M/s MM PAKISTAN) as consultants for detailed design and resident supervision of the projects who will deploy their staff for execution of the project. c) Municipality												

	Municipal committee has regular staff like engineers, sub engineers and other administrative & accounts keeping staff which will be responsible for execution of the project and contract management. No additional staff will be needed for execution of this project d) Contractor The contractor responsible for execution of the sub project will employ skilled and un-skilled labor on this work. Indirect Employment Indirect employment for production of material such as cement, steel, stone metal, bitumen, bricks etc. will be generated.
iii. Impacts of delays on project cost and viability	The impact of delay in project implementation will; ● Result in increased project cost due to escalation in cost of material and labor. ● Delay the benefits to the target group ● Result in further deterioration of the infrastructure and the service delivery level.
12-Implementation Schedule	
a) Indicate starting and completion date of the project	The project is anticipated to commence by November 2023 and to be completed by December 2024 with project implementation period of 14 months.
b) Item wise/year wise schedule in line chart	See Gant Chart attached as Annex-G
13- Management Structure and manpower requirements	
i. Administrative arrangements for the implementation of the project	i. Planning & design of the project The project has been designed by the consultants employed by PMDFC and will also carry out the resident supervision of the project. ii. Preparation of cost estimation The cost estimates have been prepared by the Design Consultants by actual measurements at site. The execution of the items of works included in these estimates /PC-I will be certified by these consultants. iii. Execution of the project

	• The project will be executed by MC Gojra and supervised by the Consultants appointed by PMDFC in resident supervision mode. The technical staff & experts in PMDFC will oversee, co-ordinate and collaborate in the project planning, design and implementation through their experts in head office located in Lahore and regional offices. The reporting of progress to LG & CDD & World bank and troubleshooting will also be responsibility of PMDFC. • MO (I&S) of the Unit has been designated as Project Manager /Engineer in Charge of the project. The supervision of the works will also be carried out by these municipal officers along with their support engineering staff. All supervisory staff is available with MC Gojra. • The Procurement Committee of MC Gojra will do the procurement of works and goods as per PPRA Rules.																
ii- The manpower requirements by skills during execution and operation of the project and; The job description, qualification, experience, age and salary of each post	a) PMDFC experts and staff For rendering assistance in implementation of infrastructure projects in 16 MCs, PMDFC has the experts and staff in the required fields. In order to facilitate the Program Units, three regional offices have been established by PMDFC at Gujranwala, Faisalabad and Khanewal. b) Resident Supervision Consultants The project will be supervised by consultants. The tentative staff to be employed/deployed by the consultants for the certification of quantities of works and resident supervision of the project is given below. <table><tr><th>Sr. No.</th><th>Personnel</th><th>No.</th><th>Qualification</th></tr><tr><td>1</td><td>Chief Resident Engineer/Team Leader</td><td>01</td><td>BSc;/BE in Civil engineering with minimum 20 years’ professional experience or MSC; Civil Engineering/Public Health Engineering/Environmental Engineering with Bachelor in Civil Engineering and minimum 15 years, experience, with 5 years on similar assignments in both cases</td></tr><tr><td>2</td><td>Senior Engineer</td><td>01</td><td>BSc/BE Civil engineering with minimum 08 years’ relevant design experience or MSc engineering, with 5 years on similar assignments in both cases</td></tr><tr><td>3</td><td>Resident Engineer</td><td>01</td><td>BSc;/BE Civil engineering with minimum 10 years’ experience in site supervision and execution for projects of similar nature.</td></tr></table>	Sr. No.	Personnel	No.	Qualification	1	Chief Resident Engineer/Team Leader	01	BSc;/BE in Civil engineering with minimum 20 years’ professional experience or MSC; Civil Engineering/Public Health Engineering/Environmental Engineering with Bachelor in Civil Engineering and minimum 15 years, experience, with 5 years on similar assignments in both cases	2	Senior Engineer	01	BSc/BE Civil engineering with minimum 08 years’ relevant design experience or MSc engineering, with 5 years on similar assignments in both cases	3	Resident Engineer	01	BSc;/BE Civil engineering with minimum 10 years’ experience in site supervision and execution for projects of similar nature.
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3	Resident Engineer	01	BSc;/BE Civil engineering with minimum 10 years’ experience in site supervision and execution for projects of similar nature.														

	4	Assistant Resident Engineer	01	Bachelor Degree in Civil engineering with minimum 8 years' experience in site supervision and execution for projects of similar nature	
	5	Site Inspectors	01	DAE in Civil with minimum 10 years' experience in site supervision for projects of similar nature	
	6	Quantity Surveyor	01	DAE in Civil Technology with minimum 10 years' experience in estimation & costing of projects of similar nature. The person having public sector projects will be preferred.	
	7	AutoCAD Operator	01	DAE in Civil Technology with minimum 5 years' experience in preparation of drawings for projects of similar nature. (Situated at Lahore office)	
	8	Environment Specialist	01	16 years of education in Environmental Sciences/Engineering with minimum 05 years of experience in environmental management and site-specific supervision of ESMMPs and EHS SOPs	
	9	Social Safeguards /Resettlement Specialist	01	16 years of education in Sociology/Social Work or Anthropology with minimum 05 years of experience in social management and handling site specific social management plans and grievance management	
c) Contractor's Technical Staff, Skilled & Non-Skilled Labor The contractors will employ the supervisory technical staff and skilled & non skilled labor for execution of works. The works will be supervised by experienced Engineers and sub engineers and the number of slots for engineers and skilled and non-skilled will depend upon the type and quantity of work and its period of completion. d) Repair & Maintenance of the Project MC has its own regular staff which has been deployed for Repair and maintenance of the municipal services infrastructure. However, it has been observed that the existing staff is not adequate to repair and maintain the services in a manner which can give good service delivery. Hence it is proposed to; • Fill up the presently vacant slots • Recruit additional staff as per need of the infrastructure after obtaining the sanctions from the competent authorities.					

14-Additional projects /decisions required to optimize the investment being undertaken	Shortage & frequent transfers of Provincially appointed staff MC is facing shortage in provincially appointed and locally appointed cadres. This will seriously affect the pace of progress of the program and the implementation of the infrastructure projects may be delayed. Provincial Government should fill-up the vacant staff immediately for optimizing the investments and capacity building in MC.
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15-Certificate	Certified that the project proposal has been prepared on the basis of guidelines provided by the Planning Commission for the preparation of PC-I for social sectors projects.
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Prepared by	M/s MM PAKISTAN (Consultants)	Signatures	
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Checked by	Municipal Officer (Infrastructure) Municipal Committee, Okara	Signatures	
	Chief Officer Municipal Committee, Okara	Signatures	
Vetted by	Senior Program Officer PMDFC	Signatures	
Submitted By	Administrator Municipal Committee Okara	Signatures	
Forwarded By	Secretary LG & CD Department	Signatures	