

# Initial Environmental Examination

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Project Number: 51036-002  
August 2021

## Pakistan: Khyber Pakhtunkhwa Cities Improvement Project

### Improvement of Water Supply System in Peshawar

Prepared by Project Management Unit, Local Government, Elections and Rural Development Department, Government of Khyber Pakhtunkhwa for the Asian Development Bank.

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**GOVERNMENT OF KHYBER PAKHTUNKHWA  
PROJECT MANAGEMENT UNIT**

**KHYBER PAKHTUNKHWA CITIES IMPROVEMENT PROJECT  
LOCAL GOVERNMENT, ELECTIONS &  
RURAL DEVELOPMENT DEPARTMENT, PESHAWAR**



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**Dated: 24 August 2021**

**To:**

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**Subject: 51036-002-PAK: KHYBER PAKHTUNKHWA CITIES IMPROVEMENT  
PROJECT**  
**- ENDORSEMENT OF ENVIRONMENT AND SOCIAL SAFEGUARDS  
DOCUMENTS**

Dear Mr. Kiyoshi,

This is to confirm our endorsement of the following documents and their disclosure:

- Environmental Impact Assessment: Abbottabad Solid Waste Management Facility Development
- Environmental Impact Assessment: Mardan Solid Waste Management Facility Development
- Environmental Impact Assessment: Mingora Solid Waste Management Facility Development
- Environmental Impact Assessment: Peshawar Solid Waste Management Facility Development
- Initial Environmental Examination: Extension of JICA Water Treatment Plant and Gravity Water Supply Scheme (Abbottabad)
- Initial Environmental Examination: Construction and Improvement of Sewage Treatment System at Kohat Development Authority Township, Kohat
- Initial Environmental Examination: Construction of Rorya Sewage Treatment Plant and Revamping of Sewerage System in Mardan
- Initial Environmental Examination: Kohat Solid Waste Management Facility
- Initial Environmental Examination: Improvement of Water Supply System Kohat
- Initial Environmental Examination: Salhad Park Abbottabad
- Initial Environmental Examination: Water Supply Scheme, Mingora
- Initial Environmental Examination: Improvement of Water Supply System Peshawar
- Social Due Diligence Report
- Land Acquisition and Resettlement Framework
- Land Acquisition and Resettlement Plan: Landfill Site in Abbottabad
- Land Acquisition and Resettlement Plan: Landfill Site in Kohat
- Land Acquisition and Resettlement Plan: Access Route to Landfill Site in Mingora
- Land Acquisition and Resettlement Plan: Greater Water Supply Scheme Mingora
- Land Acquisition and Resettlement Plan and Environmental Safeguard Documents: Pedestrianization of Abbottabad Old City
- Corrective Action Plan: Chuna Water Supply, Abbottabad
- Corrective Action Plan: Integrated Solid Waste Management System & Landfill Site Mingora
- Corrective Action Plan: Integrated Solid Waste Management System & Landfill Site Peshawar
- Environmental Management Plan
- Resettlement Plan
- Due Diligence Report for Use of ADB Funds for Land Acquisition and Resettlement

We are committed to their full implementation in compliance with the requirements of ADB SPS (2009) Policy, please

**(VASIF SHINWARI)**

**PROJECT DIRECTOR**

**PMU, KPCIP, LGE&RDD, Peshawar**

Copy to:

- PS to Secretary LGE&RDD – for information

## CURRENCY EQUIVALENTS

As of 18 August 2021  
 Pak Rs 1.00 = \$ 0.00625

Currency Unit – Pak Rupees (Pak Rs.)  
 US\$1.00 = Pak Rs. 160

## CONVERSIONS

1 meter = 3.28 feet  
 1 hectare = 2.47 acre

## ACRONYMS

ADA	Peshawar Development Authority
ADB	Asian Development Bank
AIP	Access to Information Policy
AMSL	Above Mean Sea Level
BC	Before Construction
BOQ	Bill of Quantities
CIU	City Implementation Unit
CORDEX	Coordinated Regional Downscaling Experiment
COVID-19	Corona Virus Infectious Disease-2019
CSC	Construction Supervision Consultant
DC	During Construction
DO	During Operation
EA	Executing Agency
EDCM	Engineering Design Construction Management
EGL	Existing Ground Level
EHS	Environmental, Health, and Safety
EIA	Environment Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
GoP	Government of Pakistan
GRM	Grievance Redress Mechanism
HDPE	High Density Polyethylene
IA	Implementing Agency
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IPCC	Intergovernmental Panel on Climate Change
KP	Khyber Pakhtunkhwa
KPCIP	Khyber Pakhtunkhwa Cities Improvement Project
KP-EPA	Khyber Pakhtunkhwa Environmental Protection Agency
KPI	Key Performance Indicator
LAA	Land Acquisition Act (of 1984)
LARP	Land Acquisition and Resettlement Plan
Lea	Equivalent sound pressure level
LGERDD	Local Government, Elections and Rural Development Department
LHW	Lady Health Worker
LULC	Land use/Land cover
MGD	Million Gallons per Day
NCS	National Conservation Strategy
NEP	National Environmental Policy
NEQS	National Environmental Quality Standards

NER	Net Enrollment Rate
OHS	Occupational Health and Safety
O&M	Operation & Maintenance
PAP	Project Affected Persons
PC	Public consultation
PCC	Plain Cement Concrete
PCOs	Public Call Offices
PDD	Planning & Development Department
PEP Act	Pakistan Environment Protection Act 1997
PEPC	Pakistan Environmental Protection Council
PGA	Peak Ground Acceleration
PMU	Project Management Unit
PPE	Personal Protective Equipment
RCC	Reinforced Cement Concrete
REA	Rapid Environmental Assessment
RFP	Request for Proposal
RP	Resettlement Plan
SOPs	Standard Operating Procedures
SS	Suspended Solids
SPS	Safeguard Policy Statement
SSEMP	Site Specific Environmental Management Plan
TMA	Tehsil Municipal Administration
TMP	Traffic Management Plan
USEPA	United States Environmental Protection Agency
WHO	World Health Organization
WSSC	Water and Sanitation Services Company
WSSP	Water and Sanitation Services Company Peshawar

### NOTE

In this report, "\$" refers to US dollars.



## DEFINITION OF TERMS

**“Ground Water”:** The supply of fresh water found beneath the Earth's surface, usually in aquifers, which supply wells and springs.

**“Laws”:** means state and local laws and all regulations, rules, orders, decrees, decisions, instructions, requirements, policies and guidance which are issued or made by any Relevant Authority and which are legally binding, as any of them may be amended from time to time.

**“Nodal Demand”** It's a demand for each node in a water distribution network calculated by multiplying as representative length and demand per meter length. Demand per meter length is calculated by  $q = Q/\text{total network length}$ , where Q is total demand of concerned area

**“Peaking Factor”** Peak water use is typically expressed as a ratio, or peaking factor, dividing the peak water use by the average daily water use. Water supply networks design on peaking factor

**“Per Capita Demand”** It is the annual average amount of daily water required by one person and includes the domestic use, industrial and commercial use, public use, wastes, thefts, etc.

**“Personal Protective Equipment”** (also PPE): Clothing and equipment worn by pesticide mixers, loaders, applicators, and re-entry workers, hazmat emergency responders, which is worn to reduce their exposure to potentially hazardous chemicals and other pollutants.

**“Peak Ground Acceleration”** (PGA) is a measure of earthquake acceleration on the ground and an important input parameter for earthquake engineering.

**“PRVs”** A relief valve or pressure relief valve (PRV) is a type of safety valve used to control or limit the pressure in a system

**“Risk Assessment”:** Qualitative and quantitative evaluation of the risk posed to human health and/or the environment by the actual or potential presence and/or use of specific pollutants.

**“Transmission Main”** Transmission main are larger pipes (12” & 24” in diameter and larger) which are designed to move large quantities of water from the source to treatment plant

**CONTENT DETAILS**

<b>S/No.</b>	<b>Version</b>	<b>Date</b>	<b>Summary of Revisions made</b>
1	1	11-08-21	First Draft of IEE report
2	2	18-8-21	Second Draft of IEE report

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## EXECUTIVE SUMMARY

### Project Overview

1. The Khyber Pakhtunkhwa Cities Improvement Projects (KPCIP) will improve the quality of life of the residents of five KP cities, including Abbottabad, Kohat, Mardan, Mingora, and Peshawar, directly benefitting about 6 million of urban population. KPCIP will help selected cities improve their access to quality urban services through three interlinked outputs: (i) Climate resilient and gender friendly urban infrastructure improve, (ii) Institutional capacities of urban service providers and governments strengthened, and (iii) Increased women's participation in urban governance and access to economic opportunities.
2. KPCIP will support the Government of Pakistan's development priorities, established in (i) the National Water Policy (2018), (ii) the Local Government Act (2019), and (iii) Pakistan Vision 2025. The project is also aligned with ADB's operational priorities of (i) addressing remaining poverty and reducing inequalities; (ii) accelerating progress in gender equality; (iii) tracking climate change, building climate and disaster readiness; (iv) making cities more liveable; and (v) strengthening governance and institutional capacity, outlined in ADB's Strategy 2030, and is included in ADB's country operations business plan for Pakistan, 2021–2023.
3. The project readiness financing (approved in March 2019) has financed the preparation and engineering design of the KPCIP. The Department of Local Government, Elections and Rural Development Department (LGE&RDD), the Government of Khyber Pakhtunkhwa, will be the executing agency for the project and the city governments of the five target cities, including the respective Water and Sanitation Services Companies, will be the implementing agencies.
4. This report has been prepared based on detailed engineering designs, due diligence assessments, and studies conducted by the government and project readiness financing consultants. The Government of Pakistan (GoP), Asian Development Bank (ADB), and Asia Infrastructure Investment Bank (AIIB) are expected to approve KPCIP in Q3 2021.
5. The Project has the following four major components:
  - Improvement of water supply systems in five cities.
  - Development of sewage treatment plants (STPs) in two cities.
  - Provision of Integrated Solid Waste management (ISWM) system in four cities.
  - Development of Urban/Green Spaces in five cities.
6. There are forty-two (42) no. of urban Union Councils (UCs) under the jurisdiction of Water and Sanitation Services Peshawar (WSSP) currently. None of these UCs has a continuous water supply (CWS) mode of service. Currently, the only water supply source in Peshawar city are tube wells-based ground water sources with approximately 550 existing tube wells. The mode of service in the jurisdiction of WSSP is intermittent water supply (IWS). Water is pumped into the water distribution networks either directly or from elevated overhead reservoirs for a limited number of hours on daily basis. IWS leads to frequent problems in operation, deteriorated condition of the water supply pipes, widespread ingress of contamination into the pipes risking public health and lack of reliable supply to residents.
7. The proposed improvement of water supply system in Peshawar city consists of the following components:

- Operationalization of existing 34 Overhead Reservoirs (OHRs) i.e. reconstruction of 23 OHRs and rehabilitation of 10 OHRs based on condition assessment. One OHR is already under construction i.e. Bahadur Kalay Tank;
  - Installation of 155 km of associated water distribution network;
  - Rehabilitation of 41 existing tube wells that are feeding the thirty-four OHRs;
  - Installation of 22,000 water meters at consumer level in the project area;
  - Installation of solar system for 23 OHRs i.e. OHRs having equal or greater than 100,000 gallons' storage capacity;
  - Provision of SCADA system.
8. A map showing the project area locations are provided as **Figures ES-1** and **ES-2**. Summary of project components is provided as **Tables ES-1, ES-2** and **ES-3** below.

### **Project Need**

9. The proposed project intervention will put all the existing OHRs into operation and will ensure 24/7 sustainable and continuous water supply to residents with water meters installed at the consumer end.

### **Environment Category of the Project**

10. According to ADB's Safeguard Policy Statement (SPS) 2009, a Rapid Environmental Assessment (REA) Checklist was prepared for the proposed project. Based on the initial findings, it was ascertained that generally the potential environmental impacts are not expected to be irreversible and long term and thus this IEE has been conducted for the proposed Water Supply improvement project, which has been assessed to be Category "B" as per ADB SPS, 2009.
11. Furthermore, regulatory requirements of the Khyber Pakhtunkhwa Environment Protection Agency (KPEPA) shall be complied by KP LGERDD as per IEE/EIA Regulation 2000 as notified by the Pakistan Environment Protection Agency (PEPA) vide S.R.O. 339 (1)/2001 during the project approval and execution stage.

### **Scope and Objectives of the IEE**

12. The scope of IEE will include environmental impact assessment of project activities including design, construction and operation of all infrastructure to be rehabilitated or developed. Following are the objectives of the IEE study:
- Assess the existing environmental conditions of project area, including the identification of environmental sensitive receptors and develop a baseline of its prevalent environmental and socioeconomic conditions;
  - Identify and investigate all impacts due to the proposed project's pre-construction/design, construction and operation stages, on the physical, biological and socioeconomic environment of the project area;
  - To propose mitigation measures that would help KP LGERDD and WSSP in conducting the proposed project activities in an environmentally sustainable manner;
  - To uncover the planning and operational phase impacts up to microenvironment levels in which project is proposed to be sited; and

- To develop an Environmental Management Plan (EMP) that would assist KP LGERDD and WSSP in the effective implementation of the recommendations of the IEE study.

### **Study Methodology**

13. This involves collecting information from the ADB, PMU KPCIP and Engineering Design and Construction Management (EDCM) technical team on the proposed project activities and understanding the activities to identify potential impacts of implementing these.
14. Both secondary and primary data on ambient noise levels and air quality, water resources, flora, fauna and information from the detailed design conducted for this and other projects of similar nature was collected, reviewed, and analyzed. Field visits to the project area were undertaken and key receptors and stakeholders within the project area has been identified and consulted.
15. The significance of impacts from the proposed project were then assessed and for those impacts requiring mitigation, suitable measures in project design, construction and operation phase were proposed to avoid/reduce impacts to within acceptable limits as per local and international applicable regulations. A detailed environmental management and monitoring plan has been developed to ensure compliance to the proposed measures during the project development.

### **Baseline Condition of Project location**

#### **Physical Environment**

16. The project area (Peshawar) falls in Seismic Zone 3 with peak ground acceleration of 0.24 to 0.32g, according to the Seismic Zoning Map of Pakistan. It is therefore, recommended that the project structures will be designed to cater for the requirements of Zone 3 of Building Code of Pakistan (2007).
17. The monitoring results indicate the ambient noise levels being within the most stringent guidelines during the daytime. However, exceedances were observed at the night time at all locations in the project area. This is not surprising since the project area consists completely of urban area that is a highly built environment with many congested areas and continuous movement of traffic and people during both the day and night times, making noise dissipation difficult.
18. In general, the air shed seems to be of good quality with the ambient air quality within the acceptable NEQS standards with SO<sub>2</sub> only being exceeded at one location and PM<sub>10</sub> being the only pollutant that is exceeding the guidelines at all monitored locations while PM<sub>2.5</sub> only exceeded the standard at one monitored location. The high particulate matter levels are generally aligned with historical data for this area.
19. All parameters of the ground water samples taken within the project area are within the applicable NEQS/WHO guidelines with no exceedances observed.

#### **Ecological Environment**

20. Site is falling outside of any restricted zones/wildlife/forest protected areas.

#### **Socio-economic Environment**

21. The project is located in Peshawar city, situated in the south east of Khyber Pakhtunkhwa Province. All project works will be conducted on government owned land and thus no land acquisition and/or resettlement will be required.

## Public Consultation Process

22. As part of environmental and social assessment, detailed consultations were carried with primary and secondary stakeholders and also with institutional stakeholders. Meetings with village notables and focus group discussions (FGDs) with the communities, including women in the project area were carried out. The public consultation process was carried out by the KPCIP-EDCM team in May, 2020. Mainly key informants were consulted for these meetings which were carried out in an open and frank atmosphere conducive to appreciation of the basic elements of the project and dissemination of information on beneficial and adverse impacts and mitigation for adverse impacts.
23. Findings of consultation shows that existing water supply is not sufficient to cater the needs of nearby localities in terms of water demand. Treated water had tapeworm or biological contamination, broken lids of existing water storage reservoirs and mixing of flooded rainwater with water supply network. Project will provide permanent solution of these issues.
24. Consultation plan for construction and operation phase of the proposed water supply improvement project will be prepared in order to receive responses of project stakeholders and general public about the project. Periodic consultations and community feedback surveys will be carried out to develop positive perception about the project. Intended stakeholders for such consultations will be all stakeholders that are consulted at the time of IEE preparation and KPCIP PRF processing. Record of such consultations will be maintained at PMU/WSSC offices and necessary changes in operational modalities will be introduced in the system in light of the response provided by the consultants.

## Analysis of Alternatives

25. If 'no project' option is triggered, it will result in loss of all positive impacts that project will pose on Peshawar city; such as improved and sustainable potable water availability to citizens of Peshawar for next thirty years. At most, clean potable water will reduce water borne diseases and ultimately reduce pressure on the health care system of Peshawar.
26. Furthermore, project implementation will also create job opportunities during construction, thereby improving the socioeconomic condition of the local people and help in improving their quality of life. Thus, the 'no project' option is not a viable option

## Potential Major Impacts

27. The impact screening matrices for the pre-construction/design, construction and operation phases of the proposed project are provided as **Tables ES.1, ES.2 and ES.3** below.
28. **Pre-construction/design phase:** The key potential impacts have been assessed and necessary mitigation measures have been proposed, as shown in **Table ES.1** below for potential impacts such as damage and disturbance to utilities services etc.
29. **Construction phase:** The key potential impacts that have been assessed and for which necessary mitigation measures have also been proposed, as required, are as follows:
  - Impacts associated with construction of water distribution network and supply mains
  - Traffic congestion and community health and safety issues
  - Occupational health and safety issues
  - Communicable diseases including COVID-19

- Improper handling and/or disposal of hazardous and non-hazardous waste
30. **Operation phase:** The key potential impacts that have been assessed and for which necessary mitigation measures have also been proposed, as required are as follows:
- Water system leaks
  - Contaminated water provided to customers due to lack of or improper treatment
  - Intermittent water supply due to excessive groundwater abstraction

### **Key Mitigation Measures**

31. Mitigation measures associated with design, construction and operation phases are detailed in the IEE report. Mitigations associated with construction phase are detailed in the IEE report to avoid construction related impacts.
32. Major impacts associated with construction activity are clearance of vegetation, traffic hindrance and social grievances during laying of pipeline networks within city. Transmission main shall be laid to avoid tree cutting with minimum vegetation clearance. Contractor camp shall be located on vacant land to avoid unnecessary clearance. Traffic management plan shall be developed to avoid hindrance to locals during laying of distribution networks.

### **Environmental Management Plan**

33. For the effective implementation and management of mitigation measures, an Environmental Management Plan (EMP) has been prepared and given in section 7 of the IEE report. The EMP provides a delivery mechanism to address potential impacts of project activities, to enhance project benefits and to introduce standards of good practice in all project activities. The EMP has been prepared with the objective of:
- Defining legislative requirements, guidelines and best industry practices that apply to the project.
  - Defining mitigation measures required for avoiding or minimizing potential impacts assessed by the IEE.
  - Defining roles and responsibilities of the project proponent and the contractor/s; and
  - Defining requirements for environmental monitoring and reporting.
34. The EMP has been prepared keeping in view the anticipated environmental impacts during design, construction and operational stages of the project on the existing environmental conditions including air, soil, water, land, biodiversity and socio economic condition of the project area, and suggests appropriate measures to mitigate the potential adverse impacts and enhance the positive impacts. The compliance monitoring of mitigation measure implementation would be ensured through the implementation of the Environmental Monitoring Plan included in the EMP. The EMP will be included in the contract under specific conditions, making it obligatory for the contractor to carry out the works assigned in the EMP.

### **EMP Cost, Monitoring and Reporting**

35. Total estimated indicative cost for EMP implementation is about PKR 5.1 million. Environmental monitoring cost for pre-construction phase (once) will be PKR 252,000 and construction phase (annually) will be about PKR 756,000.

36. During the construction phase, the overall responsibility for the implementation and monitoring of the EMP rests with the Project Director (PD), Project Management Unit (PMU), and KPCIP. The PD at the PMU, using the Construction Supervision Consultant (CSC), will supervise the implementation of the proposed mitigation measures and monitor the implementation progress in the field.
37. During the operation phase, the overall responsibility for the implementation and monitoring of the EMP rests with CEO WSSP. Project will be administered and monitored through City Implementation Unit (CIU) that will be developed within WSSP, which will deliver services based on indicators sets out in Services and Assets Management Agreement (SAMA).
38. EMP implementation would be responsibility of all project stakeholders including PMU, WSSP, Project Construction contractors, O&M contractor and other suppliers involved in the project. Requirement of environmental staffing will be part of bidding documents and necessary cost will be allocated as BOQ item by the bidder. PMU will maintain environmental safeguard staffing (Environmentalist/Environment Associate) for construction and operation phase of the project to monitor and supervise EMP implementation and performance.
39. The Environment expert will also be part of CSC technical team and will produce bi-weekly and monthly environmental compliance reports during construction phase. Environment expert of CSC will be responsible to monitor the implementation of EMP during construction phase by project contractors. Project contractors will also hire sufficient environmental officers to implement the EMP requirements and prepare necessary EMP documentation. Project contractor EMP staff will prepare daily environmental reports and submit to CSC for approval and record. Within city implementation unit (CIU), WSSP will hire qualified environmental specialist during operation phase of the project who will be responsible for EMP implementation and reporting by WSSP and its O&M contractors during operation. Monthly environmental compliance report will be prepared by WSSP and circulated to concerned authorities.

### **Cumulative Impacts**

40. No other infrastructure works are planned to be conducted along the proposed project alignments and project sites while these project works shall be conducted. Thus, no cumulative impacts are expected.

### **Indirect and Induced Impacts**

41. Potential impacts arising from the proposed project have been identified and assessed on the basis of field data, secondary data, expert opinion and examining previous similar projects in Pakistan. These include effects on physical, biological and socio-economic environment. Impacts on the environment from air emissions, traffic and community noise have also been assessed and have found to be acceptable and within the carrying capacities of the environmental media.
42. Thus, negative indirect and induced impacts from the proposed project activities are not expected.

### **Institutional Arrangements**

43. During the construction phase, the overall responsibility for the implementation and monitoring of the EMP rests with the Project Director (PD), Project Management Unit



(PMU) KPCIP, KP Local Government Election and Rural Development Department (LGERDD). The PD through assistance from the Supervision Consultant's Environmental staff and the Environment team of PMU, will supervise the implementation of the proposed mitigation measures and monitor the implementation progress in the field. During operation phase responsibility of EMP implementation lies with WSSP with limited support from PMU. Monthly environmental monitoring data/reports will be incorporated in the progress reports to be shared with ADB and such monthly reports will be consolidated into bi-annual monitoring reports and submitted to ADB for review and clearance. Upon clearance, all such reports will be uploaded on the PMU and ADB websites.

## **Conclusion & Recommendations**

44. The water supply improvement project for Peshawar is of high significance, considering the urgent need for improving sustainable water supply system for Peshawar city.
45. An action plan with clear roles and responsibilities of stakeholders is provided in the IEE report. The PMU, Contractors, WSSP and the CSC are the major stakeholders responsible for the action plan. The action plan must be implemented prior to commencement of construction work. In order to execute successful operation of the infrastructure, institutional review and capacity building (IRCB) component is included in the project design to enhance services delivery of WSSP.
46. The majority of the environmental impacts are associated with the design and operation phase of the project as they are envisaged to be long-term. These include improper designing of distribution networks, including transmission main. Major impacts during construction phase would be related to traffic congestion and community health and safety issues during laying of water supply system in populated urban areas.
47. Mitigation measures will be assured by a program of environmental monitoring conducted during construction and operation to ensure that all measures in the EMP are implemented and to determine whether the environment is protected as intended. This will include observations on and off-site, document checks, and interviews with workers and beneficiaries, and any requirements for remedial action will be reported.
48. The implementation of mitigation measures during construction period will be the responsibility of the Contractor. Therefore, the required environmental mitigation measures will have to be clearly defined in the bidding and contract documents, and appropriately qualified environmental staff need to be retained by the Consultant to supervise the implementation process. The EMP includes measures to minimize project impacts due to traffic, noise, air pollution and waste generation etc.
49. The EMP contained within this IEE document is considered sufficient for issuance as part of the Contracts to the successful bidder(s) and for subsequent use during the project works. It should be mentioned that prior to the commencement of works, this EMP must be further updated by the Contractor into site specific EMPs (SSEMPs) for review and approval of ADB. In these SSEMPs, aspects such as a detailed traffic management plan, identification of locations for disposal of debris and spoil and any other details which shall become available later must be included for efficient implementation of all proposed mitigation measures and the subsequent monitoring of these measures.
50. Based on the findings of the IEE study, the sub-project is unlikely to cause any significant, irreversible or unprecedented environmental impacts. The potential impacts localized, temporary in nature and can be addressed through proven mitigation measures. Hence,

the classification of the subproject as Category 'B' per ADB SPS, 2009 is confirmed. No further study or assessment is required at this stage.

**Recommendations:**

- Obtain statutory clearances prior to award of contract and ensure conditions/requirements are incorporated in the subproject design and documents;
- Upon mobilization of the contractors, PMU to provide a safeguards orientation per IEE and project administration manual;
- Contractor to appoint environmental safeguards nodal person responsible for environmental safeguards compliance, occupational health and safety and core labour standards;

**Information Disclosure**

51. After completion/revision and approval from the ADB and the KP-EPA, the IEE will be disclosed to all the stakeholders as part of public consultation process. The summary of the IEE report will be made available to the stakeholders at ADB website and official website of PMU KPCIP LGERDD.

**Table ES-1: 'Activity Wise' Screening of possible Impacts during Design/Pre-Construction phase**

Key Aspect	Proposed Activity				
	Tube well installation as part of rehabilitation	Overhead tank installation	Laying of water supply pipelines	Installation of Water Meters	Rehabilitation of TW, OHR & Pumping Machinery
<b>Pre-Construction Phase</b>					
Damage/disturbance to Utilities services	Low	Low	Significant	Low	Low
Traffic Management	Low	Low	Significant	Low	Low
Lack of integration of IEE/EMP requirements into Construction bid documents	Medium	Medium	Significant	Low	Medium
Planning of Material Haul Routes	Low	Low	Significant	Low	Low
Contractor's Environmental Safeguards Capacity	Medium	Medium	Medium	Low	Medium
Identification of locations of Labor Camps and ancillary facilities	Low	Low	Medium	Low	Low
Cultural Heritage & Religious Sites	Low	Low	Low	Low	Low
Land Acquisition and Resettlement Impacts	Low	Low	Low	Low	Low

- Critical Risk Level
- Significant Risk Level
- Medium Risk Level
- Low Risk Level
- Positive impacts

**Table ES-2: Screening of Possible Impacts during Construction Phase**

Key Aspect	Activity				
	Tube well installation as part of rehabilitation	Overhead tank installation	Laying of water supply pipelines	Installation of Water Meters	Rehabilitation of TW, OHR & Pumping Machinery
<b>Construction Phase</b>					
Traffic Management	Low	Low	Significant	Low	Low
Community Health and Safety	Low	Low	Medium	Low	Low
Air Quality	Low	Low	Medium	Low	Low
Noise	Low	Low	Medium	Low	Low
Occupational Health and Safety	Medium	Low	Medium	Low	Low
Disposal of Spoil and Solid Waste	Low	Low	Medium	Low	Low

Hazardous and Non-hazardous Waste Management	Low	Low	Medium	Low	Low
Loss of Access in project areas	Low	Low	Medium	Low	Low
Vegetation and Wildlife Loss	Low	Low	Low	Low	Low
Natural and Manmade hazards	Low	Low	Low	Low	Low
Historical/Archaeological Sites	Low	Low	Low	Low	Low
Employment Conflicts	Low	Low	Low	Low	Low

- Critical Risk Level
- Significant Risk Level
- Medium Risk Level
- Low Risk Level
- Positive impacts

**Table ES-3: Screening of Possible Impacts during Operation Phase**

S/ No	Potential Issues	Likelihood (Certain, Likely, Unlikely, Rare)	Consequence (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)	Residual Impact (Short term, Long term)
1	Water system leaks	Likely	Major	Medium	Long term
2	Contaminated water provided to customers due to lack of or improper treatment	Likely	Major	Medium	Long term
3	Intermittent water supply due to excessive groundwater abstraction	Likely	Major	Medium	Long term
4	Improved water availability	Positive impacts expected			Long term positive residual impact
5	Improvement in Public Health	Positive impacts expected			Long term positive residual impact






-  Critical Risk Level
-  Significant Risk Level
-  Medium Risk Level
-  Low Risk Level
-  Positive Impacts

Figure ES-1: Project area map for water supply improvements in Peshawar

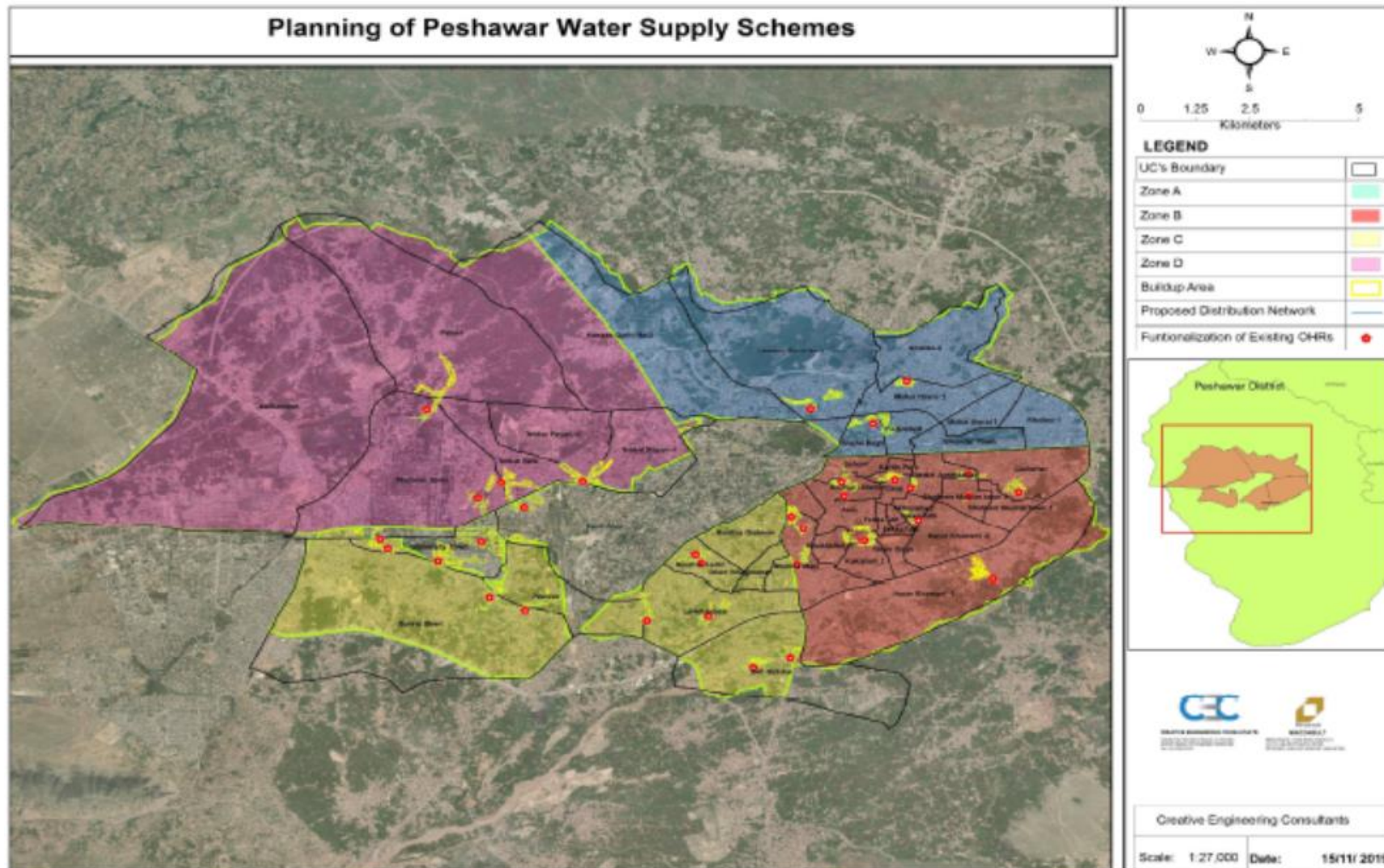
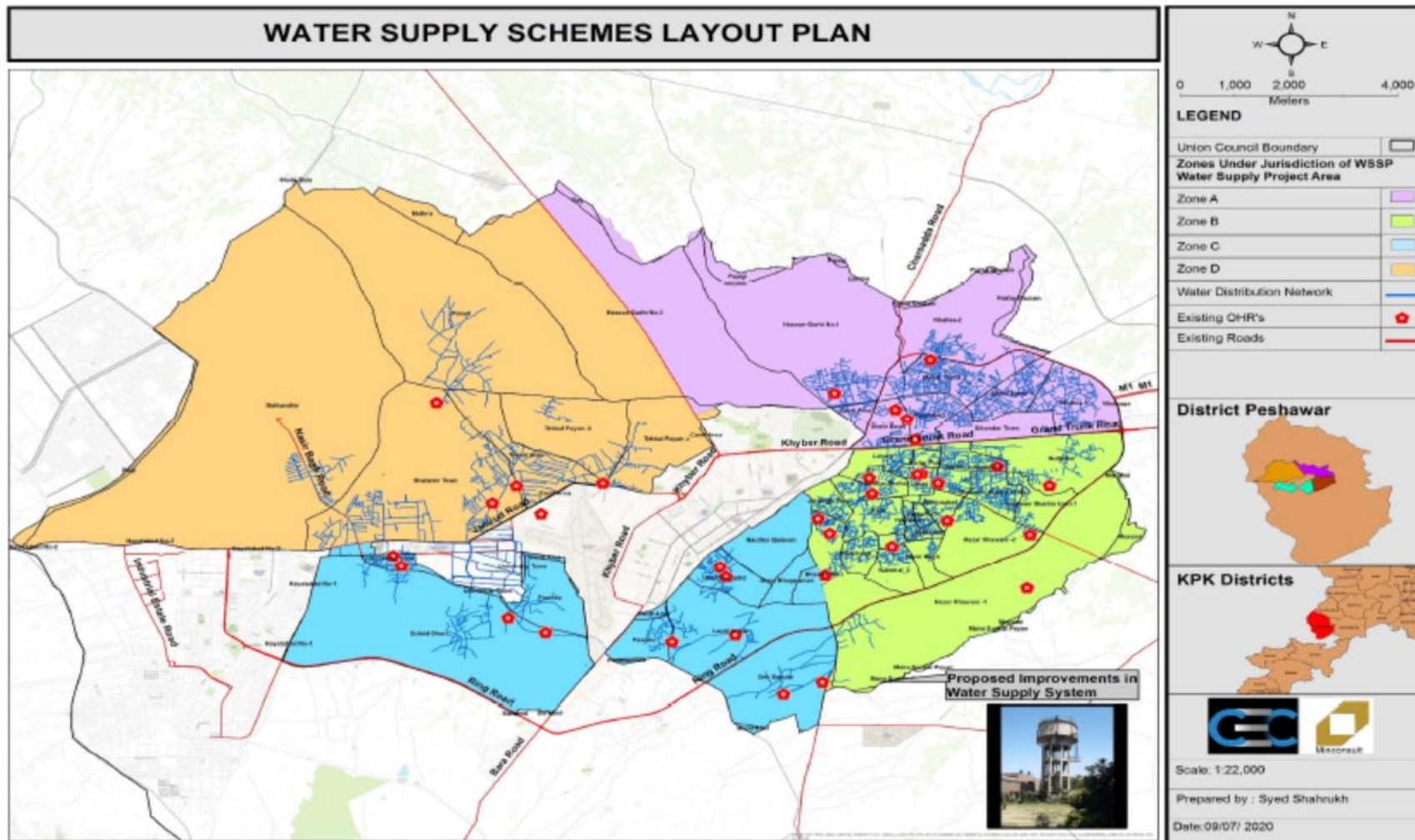


Figure ES-2: Proposed Schematic layout plan for water supply improvements in Peshawar







# 1 Introduction

## 1.1 Overview

52. The Khyber Pakhtunkhwa Cities Improvement Projects (KPCIP) will improve the quality of life of the residents of five KP cities, including Abbottabad, Kohat, Mardan, Mingora, and Peshawar, directly benefitting about 6 million of urban population. KPCIP will help selected cities improve their access to quality urban services through three interlinked outputs: (i) Climate resilient and gender friendly urban infrastructure improve, (ii) Institutional capacities of urban service providers and governments strengthened, and (iii) Increased women's participation in urban governance and access to economic opportunities.
53. KPCIP will support the Government of Pakistan's development priorities, established in (i) the National Water Policy (2018), (ii) the Local Government Act (2019), and (iii) Pakistan Vision 2025. The project is also aligned with ADB's operational priorities of (i) addressing remaining poverty and reducing inequalities; (ii) accelerating progress in gender equality; (iii) tracking climate change, building climate and disaster readiness; (iv) making cities more liveable; and (v) strengthening governance and institutional capacity, outlined in ADB's Strategy 2030, and is included in ADB's country operations business plan for Pakistan, 2021–2023.
54. The project readiness financing (approved in March 2019) has financed the preparation and engineering design of the KPCIP. The Department of Local Government, Elections and Rural Development Department (LGE&RDD), the Government of Khyber Pakhtunkhwa, will be the executing agency for the project and the city governments of the five target cities, including the respective Water and Sanitation Services Companies, will be the implementing agencies.
55. The Project has the following four major components:
  - Improvement of water supply systems in five cities.
  - Development of sewage treatment plants (STPs) in two cities.
  - Provision of Integrated Solid Waste management (ISWM) system in four cities.
  - Development of Urban/Green Spaces in five cities.
56. There are forty-two (42) urban Union Councils (UCs) under the jurisdiction of Water and Sanitation Services Peshawar (WSSP) currently. None of these UCs has a continuous water supply (CWS) mode of service. Currently, the only water supply source in Peshawar city are tube wells-based ground water sources with approximately 550 existing tube wells. The mode of service in the jurisdiction of WSSP is intermittent water supply (IWS). Water is pumped into the water distribution networks either directly or from elevated overhead reservoirs for a limited number of hours on daily basis. IWS leads to frequent problems in operation, deteriorated condition of the water supply pipes, widespread ingress of contamination into the pipes risking public health and lack of reliable supply to residents.
57. The proposed improvement of water supply system in Peshawar city consists of the following components:
  - Operationalization of existing 34 Overhead Reservoirs (OHRs) i.e. reconstruction of 23

OHRs and rehabilitation of 10 OHRs based on condition assessment. One OHR is already under construction i.e. Bahadur Kalay Tank;

- Installation of 155 km of associated water distribution network;
  - Rehabilitation of 41 existing tube wells that are feeding the thirty-four OHRs;
  - Installation of 22,000 water meters at consumer level in the project area;
  - Installation of solar system for 23 OHRs i.e. OHRs having equal or greater than 100,000 gallons' storage capacity;
  - Provision of SCADA system.
58. The project will pose positive impacts on Peshawar city; such as improved and sustainable potable water availability to citizens of Peshawar for next thirty years. Cleanest potable water will reduce water borne disease and ultimately reduced pressure on health care system.
59. The project will provide an end-to-end solution from source to end customers, including transmission main, storage reservoirs, distribution network inside the city, and water metering system.
60. This Initial Environmental Examination (IEE) document focuses solely on the scope of works of the Peshawar Water Supply Scheme and assesses any potentially significant impacts and proposes required mitigation measures, which shall be implemented by the Contractor and monitored by the Project Management Unit (PMU), KPCIP, KP Local Government, Elections and Rural Development Department (LGERDD) and ADB using the Environmental Management Plan (EMP).

## 1.2 Project Location

61. The project is located in the jurisdiction WSSP which is operational in 42 union councils of Peshawar city. The jurisdiction of WSSP has been distributed into four Zones i.e. Zone A, Zone B, Zone C and Zone D as follows:
- Zone A covers Peshawar union councils from UC1 to UC9;
  - Zone B covers Peshawar union councils from UC10 TO UC 21;
  - Zone C covers Peshawar union councils from UC 22 TO UC 35;
  - Zone D covers Peshawar union councils from UC 36 TO UC42.
62. A map showing the project area and proposed works are shown in **Figures 1-1** and **1-2**.

## 1.3 Objective of IEE

63. The objective of the IEE study are as follows:
- Assess the existing environmental conditions of project area, including the identification of environmental sensitive receptors and develop a baseline of its prevalent environmental and socioeconomic conditions;
  - Identify and investigate all impacts of the proposed Water Supply Scheme pre-construction/design, construction, operation, on the physical, biological and socioeconomic environment of the project area;

- To propose mitigation measures that would help KP LGERDD and WSSP in conducting the proposed project activities in an environmentally sustainable manner;
- To uncover the planning and operational phase impacts up to microenvironment levels in which project is proposed to be sited; and
- To develop an Environmental Management Plan (EMP) that would assist KP LGERDD and WSSP in the effective implementation of the recommendations of the IEE

## 1.4 Environmental Category of Project

64. According to ADB's Safeguard Policy Statement (SPS) 2009, a Rapid Environmental Assessment (REA) Checklist was prepared for the proposed water supply scheme (**Annexure A**). Based on the initial findings, it was ascertained that based on the scope of work and resulting limited impacts, the project was assessed to be Category 'B' for Environment and thus an IEE study has been prepared in accordance with ADB SPS,2009.
65. Furthermore, this IEE study will also meet the regulatory requirements of Khyber Pakhtunkhwa Environment Protection Agency (KPEPA), as per IEE/EIA Regulation 2000 as notified by the Pakistan Environment Protection Agency vide<sup>1</sup> S.R.O. 339 (1)/2001 during the project approval and execution stage.

## 1.5 Methodology of IEE Study

66. The various steps undertaken in the preparation of the IEE are summarized below:

### 1.5.1 Understanding of Proposed Operation

67. This involves collecting information from the ADB, PMU KPCIP and Engineering Design and Construction Management (EDCM) technical team on the proposed project activities and understanding the activities to identify potential impacts of implementing these.

### 1.5.2 Review of Legislation and Guidelines

68. National legislation, international agreements, environmental guidelines both of KP Environment Protection Authority (KP-EPA), and ADB, and best industry practices has been reviewed to set environmental standards that KP LGREDD as the executing Agency will adhere during implementation of the project.

### 1.5.3 Secondary Data Collection

- Available published and unpublished information pertaining to the background environment has been obtained and reviewed. All data sources have been carefully reviewed to collect the following information.
- Physical environment – topography, geology, seismology, geomorphology, soils, surface and groundwater resources and climate;
- Biological environment – habitat types, flora and fauna (particularly rare or endangered species), critical habitats, vegetation and communities within the area;

<sup>1</sup> <https://www.informea.org/en/legislation/pakistan-environmental-protection-agency-review-ieee-and-eia-regulations-2000>

- Physical cultural resources – sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance; and,
- Socio-economic environment–settlements, socio-economic conditions, infrastructure and land use.

#### **1.5.4 Field Data Collection (Baseline Survey)**

69. Field visits were undertaken consisting of preliminary scoping through survey and assessment activities to establish the potential impacts and categorization of activities and the REA was completed. The key receptors and stakeholders within the project area were identified.
70. Baseline surveys required to identify and establish physical and biological conditions and ecosystems in the project area has been carried out by IEE team and results has been incorporated in this report. The socio-economic environment in the project areas has been obtained through the socio-economic profiles and social impact assessment carried out by social safeguard team. Climate risk and vulnerability assessment findings are discussed.
71. Primary data collection in two kilometer area of influence such as ambient noise levels, ambient air quality and ground water quality at the key receptor locations in the project area and particularly in close proximity to the project site was conducted.
72. Review of secondary information on the physical, biological and ecological aspects, physical cultural resources and infrastructure utilities in the project area has been conducted.

#### **1.5.5 Public Consultation**

73. Public consultations (PC) were carried out with all key stakeholders, particularly local communities residing in the project area, local businesses and government and local government bodies in line with ADB's "Safeguard Policy Statement (SPS) – June 2009"/ Environmental Assessment Guidelines. Under ADB requirements, the environmental assessment process must also include meaningful public consultations during the completion of the study. In this IEE, the public consultation process was carried out including verbal disclosure regarding the project development with stakeholders to brief them about project and to seek their response/recommendation.

#### **1.5.6 Impact Identification and Assessment**

74. Potential impacts arising from each phase of the proposed project has been identified and assessed on the basis of field data, secondary data, expert opinion and examining previous similar projects in Pakistan. These include effects on physical, biological and socio-economic environment.

#### **1.5.7 Recommendations for Mitigation Measures**

75. Mitigation measures to minimize, eliminate or compensate the potential environmental impacts has been recommended. The mitigation measures have been recommended on the basis of past experiences, best industry practices, legislative requirements and professional judgment.

#### **1.5.8 Development of Environmental Management Plan (EMP)**

76. An EMP has been developed for effective implementation of the recommended mitigation measures. The EMP has included controls to minimize the identified impacts and monitoring program to monitor effect of mitigation measures implemented and residual impacts, if any, during implementation. The EMP has identified roles and responsibilities of all concerned parties during the implementation of the project.

## 1.6 Proponent of Project

77. The LGERDD, GoKP is the Executing Agency (EA) for the proposed Water Supply project in Peshawar, which will be implemented through the Water and Sanitation Services Company (WSSC), Peshawar with the support of Project Management Unit (PMU). Contact details of the EA are provided as **Table 1.1** below.

**Table 1.1: Executing Agency Contact Details**

Executing Agency Details	Information
Name of EA	Project Management Unit (PMU) KPCIP, Local Government, Elections and Rural Development Department (LGE&RDD), GoKP
Address	Ground Floor, Afzal Apartments, Jamrud Road, Phase-3 Chowk, Hyatabad Peshawar
Telephone	0092-91-5854555
E-mail	<a href="mailto:pdkpcip@gmail.com">pdkpcip@gmail.com</a> , <a href="mailto:info@kpcip.gov.pk">info@kpcip.gov.pk</a>
Web	<a href="http://kpcip.gov.pk">kpcip.gov.pk</a>

## 1.7 Structure of the Report

78. The IEE report contains eleven chapters as follows:
- Introduction
  - Policy and Legal Framework
  - Description of the Project
  - Description of Environment
  - Analysis of Alternatives
  - Assessment of Environmental Impacts and Mitigation Measures
  - Institutional Requirements Environmental Management Plan
  - Public Consultation
  - Grievance Redressal Mechanism
  - Findings, Recommendations and Conclusions
  - References

## **1.8 IEE Team**

79. The IEE team comprised of the following members:
- Environment Specialists by ADB, PMU KP LGREDD and Engineering Design Construction Management (EDCM)
  - Environmental associate
  - Design experts
  - Integrated Environmental Laboratory
  - Climate change expert
  - Social Safeguard Expert
  - Social safeguard team of EDCM
  - Gender Expert
  - ADB and PMU technical team

## **1.9 Further Additions & Updating of IEE Study**

80. This version of the report will be further updated once any other project details become available over the coming weeks and months. These revisions shall be incorporated into any subsequent updated versions of this IEE report. Furthermore, the draft IEE/EMP will be disclosed locally at least two weeks prior to the next consultation to allow the public time to read, look for information or consult experts, and form opinions. This will help ensure a meaningful process. (per SPS's environmental principle 6).

Figure 1-1: Project area map for water supply improvements in Peshawar

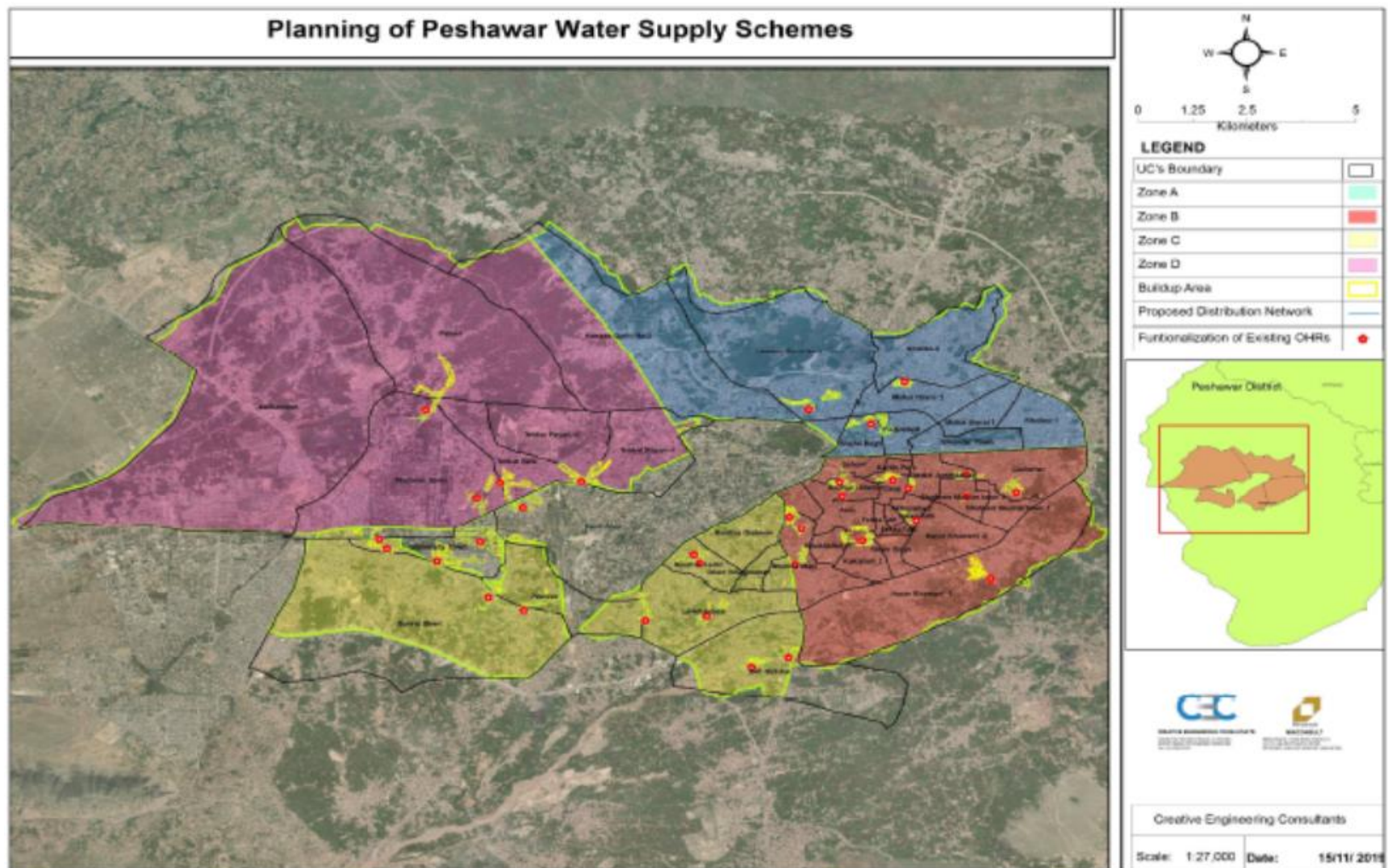
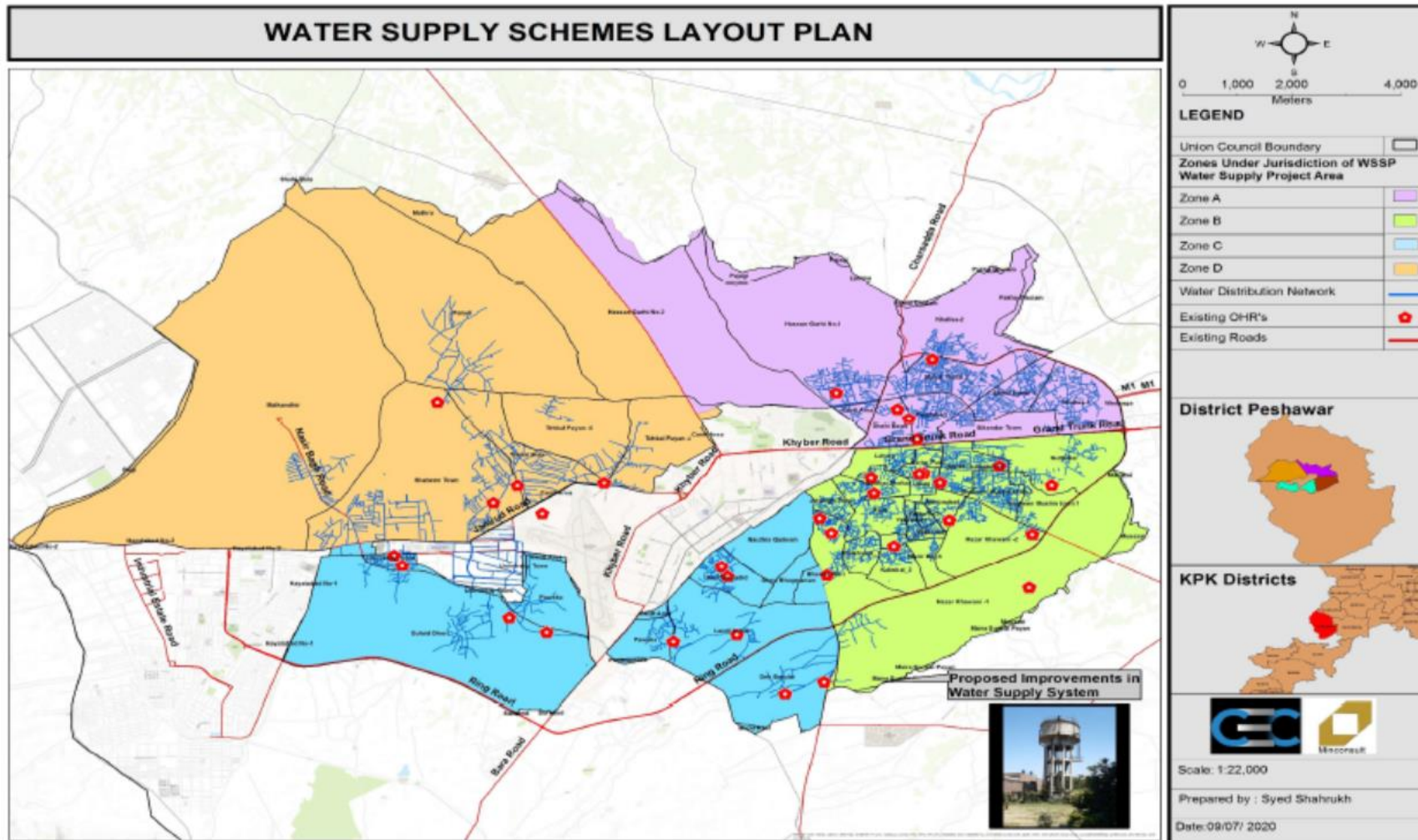




Figure 1-2: Proposed Schematic layout plan for water supply improvements in Peshawar





## 2 Policy and Legal Framework

### 2.1 General

81. This section provides an overview of the policy framework and national legislation that applies to the proposed Water Supply improvement project for Peshawar city, Pakistan. The project will comply with all national legislation relating to the environment in Pakistan and will obtain all the regulatory clearances required from the financing agency, ADB. The project will be consistent with the environmental safeguards requirements as specified in the ADB SPS 2009.

### 2.2 National Policy and Legal Framework

82. 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 project development are ground water depletion, provision of sustainable potable water to citizens while conserving biodiversity.
83. Prior to the adoption of the 18th Constitutional Amendment, 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 in 2011, the subject of environment was devolved, and the provinces have been empowered for environmental protection and conservation.

### 2.3 Regulations for Environmental Assessment, Pakistan EPA

84. Under Section 12 (and subsequent amendment) of the PEPA (1997), a project falling under any category specified in Schedule I of the IEE/EIA Regulations (SRO 339 (10/2000), requires the proponent of the project to file an IEE with the concerned 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 accordance of approval or request any additional information deemed necessary.

### 2.4 Regulatory Clearances, KP EPA

85. In accordance with provincial regulatory requirements, an IEE/EIA satisfying the requirements of the KP Environmental Protection Act (2014) is to be submitted to KP environmental protection agency (KP-EPA) for review and approval, and subsequent issuance of NOC before the commencement of construction.

### 2.5 Guidelines for Environmental Assessment, Pakistan EPA

86. 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 sub-project are listed below:

- Guidelines for the Preparation and Review of Environmental Reports, Pakistan, EPA1997;
- Guidelines for Public Consultations; Pakistan EPA May 1997;

## 2.6 National Environmental Quality Standards (NEQS) 2000 & 2010

87. The National Environmental Quality Standards (NEQS), 2000 & 2010, specify the following standards:
- 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);
  - Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources;
  - Maximum allowable concentration of pollutants (two parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles;
  - Maximum allowable noise levels from vehicles;
  - Maximum allowable concentration of parameters in drinking water.

88. The NEQS are attached as **Annexure L**.

## 2.7 Other Environment Related Legislations

89. The national laws and regulations are provided in **Table 2.1** below.

**Table 2.1: Environmental Guidelines and Regulations**

Legislation/Guideline	Description
<b>National Environmental Policy (2005) (NEP)</b>	NEP is the primary policy of Government of Pakistan addressing environmental issues. The broad Goal of NEP is, “to protect, conserve and restore Pakistan’s environment in order to improve the quality of life of the citizens through sustainable development”. The NEP identifies a set of sectoral and cross-sectoral guidelines to achieve its goal of sustainable development. It also suggests various policy instruments to overcome the environmental problems throughout the country.
<b>The Forest Act (1927)</b>	The Act empowers the provincial forest departments to declare any forest area as reserved or protected. It empowers the provincial forest departments to prohibit the clearing of forest for cultivation, grazing, hunting, removing forest produce, quarrying and felling, lopping and topping of trees, branches in reserved and protected forests. No protected forest is situated within the area of influence of project activities i.e. water supply scheme.

Legislation/Guideline	Description
<b>Khyber Pakhtunkhwa Wildlife and Biodiversity Act, 2015</b>	It empowers the government to declare certain areas reserved for the protection of wildlife and control activities within these areas. It also provides protection to endangered species of wildlife. As no activities are planned in these areas, no provision of this law is applicable to the proposed project.
<b>The KP Antiquities Act (2016)</b>	It ensures the protection, preservation, development and maintenance of antiquities in the province of KP. The Act defines “antiquities” as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc. The Act is designed to protect these antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the GoKP to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the subproject proponents are obligated to ensure that no activity is undertaken in the proximity of a protected antiquity, report to the Department of Archaeology, GoKP, any archaeological discovery made during the course of the project. However, if any archaeological antiquity discovered Archeological Chance Find procedure shall be adopted. Archeological Chance Find procedure has been attached as <b>Annexure G</b> .
<b>Pakistan Penal Code (1860)</b>	It authorizes fines, imprisonment or both for voluntary corruption or fouling of public springs or reservoirs so as to make them less fit for ordinary use.
<b>NATIONAL ENVIRONMENTAL AND CONSERVATION STRATEGIES</b>	
<b>National Conservation Strategy</b>	Before the approval of NEP, the National Conservation Strategy (NCS) was considered as the Government’s primary policy document on national environmental issues. At the moment, this strategy just exists as a national conservation program. The NCS identifies 14 core areas including conservation of biodiversity, pollution prevention and abatement, soil and water conservation and preservation of cultural heritage and recommends immediate attention to these core areas.
<b>Biodiversity Action Plan</b>	The plan recognizes IEE/EIA as an effective tool for identifying and assessing the effects of a proposed operation on biodiversity.
<b>INTERNATIONAL CONVENTIONS</b>	
<b>The Convention on Conservation of Migratory Species of Wild Animals (1981.21)</b>	The Convention requires countries to take action to avoid endangering migratory species. The term "migratory species" refers to the species of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries. The parties are also required to promote or cooperate with other countries in matters of research on migratory species. There are no critical habitat of endangered species of plant life or animal life in the vicinity of the proposed water supply project.

<b>Legislation/Guideline</b>	<b>Description</b>
<b>Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)</b>	The convention requires Pakistan to impose strict regulation (including penalization, confiscation of the specimen) regarding trade of all species threatened with extinction or that may become so, in order not to endanger their survival further.
<b>International Union for Conservation of Nature and Natural Resources Red List (2000)</b>	Lists wildlife species experiencing various levels of threats internationally. Some of the species indicated in the IUCN red list are also present in the wetlands of Pakistan.
<b>Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention) (1971)</b>	The Ramsar Convention deals with the protection of water bodies of international importance and their associated biodiversity, as well as promoting wise use of allied resources. The Convention was adopted in 1971 at Ramsar, Iran and entered into force in 1975. Pakistan signed the Ramsar Convention in 1971, and ratified it in July 1976. There are 19 Ramsar sites in Pakistan.
<b>Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal (1992)</b>	The Basel Convention deals with the controlled trans-boundary movement of hazardous wastes and their disposal. The Convention was adopted on March 22, 1989, and entered into force on May 5, 1992; Pakistan signed the Convention in May 1992 and ratified it in October 1994.
<b>United Nations Framework Convention on Climate Change (UNFCCC) (1994)</b>	This convention highlights broad guidelines for protecting the climate of the planet. It was adopted in 1992 and came into force in 1994. Pakistan signed the UNFCCC in 1992 and ratified it in June 1994.
<b>Kyoto Protocol to UNFCCC (2005)</b>	The Kyoto Protocol seeks to mitigate climate change and to reverse the pace of climate change through the use of carbon sequestration and carbon credits known as Certified Emission Reduction trading. The Protocol was adopted in 1997 and came into force in 2005; Pakistan signed the Protocol in December 1997 and ratified it in January 2005.

## 2.8 Implications of national policies and regulations on proposed project

90. The Pak-EPA formulated regulations in 2000 for 'Review of IEE and EIA' which categorizes development projects under three Schedules-Schedules I, II and III. Projects are classified on the basis of expected degree and magnitude of environmental impacts and the level of environmental assessment required is determined from the schedule under which the project is categorized.

91. The projects listed in Schedule-I include those where the range of environmental issues is comparatively narrow and the issues can be understood and managed through less extensive analysis. Schedule-I projects require an IEE to be conducted, rather than a full-fledged EIA, provided that the project is not located in an environmentally sensitive area.
92. The projects listed in Schedule-II are generally major projects and have the potential to affect a large number of people in addition to significant adverse environmental impacts. The impacts of projects included in Schedule-II may be irreversible and could lead to significant changes in land use and the social, physical and biological environments.
93. The proposed project has been categorized as Schedule II (G) and requires an EIA.
94. The LGERDD, GoKP, being the Executing Agency for the Project, is responsible for management of project impacts, and have to undertake the commitments and mitigation measures proposed in this environmental report and in the subsequent review and approval conditions.
95. According to the regulations, no construction, preliminary or otherwise, relating to the project, shall be undertaken, until and unless approval of the IEE/EIA report has been issued by the KP EPA.
96. The LGERDD will submit the IEE/EIA Report on a prescribed application along with the processing fee to KP EPA. After submission of the environmental assessment report, a forty-five (45) day period for review will be provided. The assessment will be completed within a period of one hundred and twenty (120) days from receipt of the complete documents, and earlier than this wherever practicable.

## 2.9 ADB's Safeguard Policy Statement (SPS), 2009

97. The ADB's SPS 2009 requires that environmental considerations be incorporated into ADB funded projects to ensure that the project will have minimal environmental impacts and be environmentally sound. Occupational health & safety of the local population will also be addressed as well as the project workers as stated in SPS. A Grievance Redress Mechanism (GRM) to receive application and facilitate resolution of affected peoples' concerns, complaints, and grievances about the project's environmental performance is also established.
98. All loans and investments are subject to categorization to determine environmental assessment requirements. Categorization is to be undertaken using Rapid Environmental Assessment (REA) checklists, consisting of questions relating to (i) the sensitivity and vulnerability of environmental resources in project area, and (ii) the potential for the project to cause significant adverse environmental impacts. Projects are classified into one of the following environmental categories:
99. **Category A:** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA) is required.
100. **Category B:** A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE) is required. The proposed project falls in **Category B**.

101. The ADB requirements as stated in ADB SPS (2009) are that the IEE should at least include:
- A screening process for project should be conducted as early as possible, to determine the appropriate extent and type of environmental assessment and/or audit required so that appropriate studies are undertaken commensurate with the significance of the Projects' potential environmental and social impacts and risks;
  - Studying baseline information, which includes biodiversity, air quality, and noise and water quality. Required baseline surveys for each parameter that is present in the environmental conditions;
  - An assessment of all the environment impacts in the project area;
  - Mitigation measures, an environmental management plan including the use of appropriate mitigation technologies, an environmental monitoring plan with monitoring indicators, and institutional arrangements and responsibilities (including cost estimates and training);
  - Examination of EA's implementation capacity in relation to Environmental safeguards needs and an institution review. A capacity development program to cover all of the marked capacity gaps.
102. ADB SPS 2009 also guides that the borrower/client will assess the significance of project impacts and risks on biodiversity and natural resources as an integral part of the environmental assessment process.
103. **Category C:** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.
104. **Category FI:** A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary (FI).

## 2.10 ADB's Access to Information Policy (AIP) 2018

105. ADB's new Access to Information Policy (AIP), reflects the ADB's ongoing commitment to transparency, accountability, and participation by stakeholders. The policy contains principles and exceptions to information sharing with external stakeholders, led by a new overarching principle of "clear, timely, and appropriate disclosure."

## 2.11 ADB's Accountability Mechanism Policy 2012

106. The objectives of the Accountability Mechanism are providing an independent and effective forum for people adversely affected by ADB-assisted projects to voice their concerns and seek solutions to their problems, and to request compliance review of the alleged noncompliance by ADB with its operational policies and procedures that may have caused, or is likely to cause, them direct and material harm. The Accountability Mechanism is a "last resort" mechanism.

## 2.12 Implications of ADB's safeguard policies on proposed project

107. The objectives of ADB's safeguards are to:

- avoid adverse impacts of projects on the environment and affected people, where possible;
  - minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and
  - Help borrowers/clients to strengthen their safeguard systems.
108. ADB's SPS sets out the policy objectives, scope and triggers, and principles for three key safeguard areas:
- environmental safeguards,
  - involuntary resettlement safeguards, and
  - Indigenous Peoples safeguards.
109. The objective of the environmental safeguards is to ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process. ADB's policy principles are summarized in **Table 2.2** below.

**Table 2.2: ADB Policy Principles**

No.	Policy principle	Summary
1	Screening and categorization	Screening process initiated early to determine the appropriate extent and type of environmental assessment.
2	Environmental assessment	Conduct an environmental assessment to identify potential impacts and risks in the context of the project's area of influence.
3	Alternatives	Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts, including no project alternative.
4	Impact mitigation	Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts. Prepare an environmental management plan (EMP).
5	Public consultations	Carry out meaningful consultation with affected people and facilitate their informed participation. Involve stakeholders early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation. Establish a grievance redress mechanism.
6	Disclosure of environmental assessment	Disclose a draft environmental assessment in a timely manner, in an accessible place and in a form and language(s) understandable to stakeholders. Disclose the final environmental assessment to stakeholders.

No.	Policy principle	Summary
7	Environmental management plan	Implement the EMP and monitor its effectiveness. Document monitoring results and disclose monitoring reports.
8	Biodiversity	Do not implement project activities in areas of critical habitats.
9	Pollution prevention	Apply pollution prevention and control technologies and practices consistent with international good practices. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges. Avoid the use of hazardous materials subject to international bans or phase outs.
10	Occupational health and safety/Community safety.	Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.
11	Physical cultural resources	Conserve physical cultural resources and avoid destroying or damaging them. Provide for the use of “chance find” procedures.

## 2.13 IFC Environmental, Health, and Safety Guidelines for Water and Sanitation<sup>2</sup>

110. The IFC EHS Guidelines for Water and Sanitation include information relevant to the operation and maintenance of potable water treatment and distribution systems.
111. Environmental issues associated with water and sanitation projects may principally occur during the construction and operational phases, depending on project-specific characteristics and components.
112. Guidelines are related to following impacts associated with drinking water supply and treatment are as follows:
  - Water Withdrawal
  - Water Distribution
    - Water system leaks and loss of pressure
    - Water discharges

## 2.14 Comparison of International and Local Environmental Legislations

113. The ADB SPS, 2009 requires application of pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally

<sup>2</sup> <https://www.ifc.org/wps/wcm/connect/83217cd8-b9a5-4383-97b5-5af26182b3b8/2007+Water+and+Sanitation.pdf?MOD=AJPERES&CVID=m3CdtQr>



- recognized standards. The SPS states that when host country regulations differ from these standards, the EA will achieve whichever is more stringent.
114. In order to select the most stringent standards applicable, a mix of local (NEQS) and international (IFC) regulations have been selected. The IFC Environmental, Health, and Safety (EHS) Guidelines, General EHS Guidelines and Environmental standards are also applicable. It shall be ensured that all necessary noise mitigation measures are implemented to minimize the noise levels in the project area.
  115. The **Table 2.3** presents IFC workplace noise standards that are applicable to the construction workers. It should also be noted that IFC EHS guidelines advise that where existing ambient noise levels already exceed thresholds, the project will not result in an increase of more than 3 dB over existing ambient noise levels at the nearest receptor location off-site.
  116. A comparison of applicable local and international guidelines for ambient air quality has been provided in **Table 2.4** below. In the case of most pollutants, the Pak NEQS standards for ambient air quality are more stringent in comparison to USEPA and WHO/IFC standards. The applicable and most stringent parameters for each respective pollutant are highlighted in green.
  117. Similar to the standards for air quality, the comparison of noise standards provided in **Table 2.5** clearly shows that the Pakistan NEQS standards for noise are more stringent in comparison to the IFC standards. The only exception is the daytime noise level standard for Industrial areas where the IFC standard is more stringent (70 dB (A)) in comparison to NEQS (75 dB (A)) and so for this particular parameter, the IFC standard will be used. Apart from this one exception, the NEQS standards have been used for water quality of development project.
  118. Comparison of International and Local Water Quality Standards has been provided in **Table 2.6**. Standard for Bacterial contamination are same for both NEQS and IFC/WHO standard while physical parameters are different. NEQS for odor, turbidity, hardness and pH are more stringent while IFC/WHO standards are stringent in metallic contaminations i.e. Arsenic, Barium, Boron, Cadmium and Zinc.
  119. As far as regulations regarding other environmental parameters are concerned such as acceptable effluent disposal parameters, the local regulations i.e. NEQS take precedence over any other international regulations such as IFC.

**Table 2.3: IFC Work Environment Noise limits**

Type of Work, workplace	IFC General EHS Guidelines
Heavy Industry (no demand for oral communication)	85 Equivalent level $L_{eq,8h}$
Light industry (decreasing demand for oral communication)	50-65 Equivalent level $L_{eq,8h}$

**Table 2.4: Comparison of International and local Air Quality Standards\***

Pollutants	USEPA		WHO/IFC		Pak. NEQS	
	Avg. Time	Standard	Avg. Time	Standard	Avg. Time	Standard
SO <sub>2</sub>	3 hrs.	0.5 ppm	24 hr.	20 up/m <sup>3</sup>	Annual Mean	80 up/m <sup>3</sup>
	1 hr.	75 ppb	10 min	500 up/m <sup>3</sup>	24 hrs.	120 up/m <sup>3</sup>
CO	8 hrs.	9 ppm (11 mg/m <sup>3</sup> )	-	-	8 hrs.	5 mg/m <sup>3</sup>
	1 hr.	35 ppm (43 mg/m <sup>3</sup> )			1 hr.	10 mg/m <sup>3</sup>
NO <sub>2</sub>	Annual Mean	100 up/m <sup>3</sup> (53 ppb)	1 yr.	40 up/m <sup>3</sup>	Annual Mean	40 up/m <sup>3</sup>
	1 hr.	100 ppb	1 hr.	200 up/m <sup>3</sup>	24 hrs.	80 up/m <sup>3</sup>
O <sub>3</sub>	8 hrs.	0.07ppm (148 up/m <sup>3</sup> )	8 hrs.	100 up/m <sup>3</sup>	1 hr.	130 up/m <sup>3</sup>
TSP	-	-	-	-	Annual Mean 24 hrs.	360 up/m <sup>3</sup> 500 up/m <sup>3</sup>
PM <sub>10</sub>	24 hrs.	150 up/m <sup>3</sup>	1 yr. 24 hr.	20 up/m <sup>3</sup> 50 up/m <sup>3</sup>	Annual Mean 24 hrs.	120 up/m <sup>3</sup> 150 up/m <sup>3</sup>
PM <sub>2.5</sub>	Annual Mean 24 hrs.	15 up/m <sup>3</sup> 35 up/m <sup>3</sup>	1 yr. 24 hr.	10 up/m <sup>3</sup> 25 up/m <sup>3</sup>	Annual Average 24 hrs. 1 hr.	15 up/m <sup>3</sup> 35 up/m <sup>3</sup> 15 up/m <sup>3</sup>

\*: The standards highlighted in green for each respective pollutant are the most stringent based on a comparison between local and international regulations and thus shall be applicable for the proposed project.

\* In instances where the air shed is significantly degraded and the pollutant levels are already exceeding the ambient pollutant concentrations provided in the table above, it shall be ensured that the project activities cause as small an increase in pollution levels as feasible, and amounts to a fraction of the applicable short term and annual average air quality guidelines or standards as established in the project specific environmental assessment.

**Table 2.5: Comparison of International and Local Noise Standards**

Category of Area/Zone	Limit in dB(A) Lea			
	NEQS		WHO/IFC	
	Day Time 06:00 – 22:00	Night Time 22:00-06:00	Day Time 07:00 – 22:00	Night Time 22:00-07:00
Residential area (A)	55	45	55	45
Commercial area (B)	65	55	70	70
Industrial area (C)	75	65	70	70
Silence zone (D)	50	45	55	45

\*: The standards highlighted in green for each respective Area/Zone are the most stringent based on a comparison between local and international regulations and thus shall be applicable for the proposed project.

\* In instances where baseline noise levels are already exceeding the standards above, it will need to be ensured that the project activities do not cause an increment of more than 3 dB (A) from the baseline noise levels.

**Table 2.6: Comparison of International and Local Water Quality Standards**

Parameter	Unit	NEQS	WHO/IFC
<b>Bacterial</b>			
E-Coli	numbers/ml	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample
Total Coliform	numbers/ml	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample
<b>Physical</b>			
Color	TCU	≤ 15 TCU	-
Taste	No objectionable/Acceptable	-	-
Odor	No objectionable/Acceptable	-	-
Turbidity	NTU	< 5 NTU	
Total Hardness	mg/l	< 500 mg/l	
TDS	mg/l	< 1000	
pH		6.5-8.5	
<b>Chemical</b>			
Aluminum	mg/l	≤0.005 (P)	0.2
Antimony	mg/l	≤0.005 (P)	<0.005 (P)
Arsenic	mg/l	≤0.005 (P)	0.01
Barium	mg/l	0.7	0.3

Parameter	Unit	NEQS	WHO/IFC
Boron	mg/l	0.3	0.3
Cadmium	mg/l	0.01	0.0003
Chloride	mg/l	<250	250
Chromium	mg/l	≤0.05	0.05
Copper	mg/l	2	2
Cyanide	mg/l	≤0.05	0.07
Fluoride	mg/l	<1.5	1.5
Lead	mg/l	≤0.05	0.01
Manganese	mg/l	≤0.5	0.5
Mercury	mg/l	≤0.0001	0.0001
Nickel	mg/l	≤0.02	0.02
Nitrate	mg/l	≤50	50
Nitrite	mg/l	≤3	-
Selenium	mg/l	0.01	0.01
Residual Chlorine	mg/l	0.2-0.5 at consumer end	-
Zinc	mg/l	5	3

\*: The standards highlighted in green for each respective Area/Zone are the most stringent based on a comparison between local and international regulations and thus shall be applicable for the proposed project.

## 3 Project Description

### 3.1 Project Introduction

120. The specific information on the proposed water supply works in Peshawar is provided below.

### 3.2 Scope of Project Works

121. The general step wise sequence of activities to be conducted are described below. It shall be ensured that staging of activities takes place to manage any potential impacts, including traffic management issues.

▪ **Tubewell re-installation as part of rehabilitation process**

122. The general steps involved in re-installation of each tubewell will be as follows:

**i. Step 1: Well drilling:** The Contractor shall drill a bore hole for the tube well, if required as a part of the rehabilitation process at the designated location established by the Engineer-in-charge. The Contractor shall prepare the site for the construction of the tube-well and shall provide for water for construction requirements, the disposal of water, cuttings and refuse from the operations away from the tube-well. General overall conditions related to the ground water at the site of the tube-well, if available, will be made known to the Contractor. The Contractor is expected to make his own assessment of the character, quality and the conditions that may be encountered and shall take full responsibility for performance of work as specified.

123. The Contractor shall be responsible for protecting the tube-wells from contamination with foreign materials until the completion of the tube-well. The Contractor shall bear any expense that may result from any damage to tube-well, tools, or equipment that may be caused by caving, washing, or other disturbances within the tube-wells. To prevent sloughing and caving of surface material and/or the hole, the Contractor shall furnish and install a boring casing pipe with a minimum diameter 2 inches greater than the bit diameter from not less than 6 inches above the ground surface to bottom of the hole. The casing pipe shall be new or used pipe of adequate strength for the purpose. After the drilling is completed, the casing pipe shall be removed by the Contractor and shall remain his property.

**i. Step 2: Installation of components:** Installation shall consist of all work required in connection with the erection of pumping housing pipe, blind pipe, reducer, screen and bail plug/ sand trap required. for each tube-well as specified herein or on the drawings or as directed by the Engineer-in-Charge and shall include, but not be limited to storing, fabricating and installing all the tube-well components including concentric reducers.

**ii. Step 3: Fabrication:** The depth of pump housing pipe will be established by the Engineer-in-Charge depending on the future water levels and draw down anticipated. Length of the specified diameter of steel pipe shall be provided to extend the pump housing/casing from the elevation of the top of the pump housing pipe to the depth established by the Engineer-

in-Charge. Adjoining sections of Mild steel pump housing pipe shall be assembled by field welding. The ends of the casing sections shall be lathe turned or otherwise prepared for joining.

**iii.Step 4: Installation:** The Contractor shall install the entire pump housing and tube-well casing assembly straight, plumb, and concentric in the drilled hole to permit the installation of the pump in such a manner that it will operate satisfactorily and without damage. The methods employed by the Contractor in the installation of the casing and in obtaining or correcting the verticality & straightness of the pump housing/ casing shall be subject to the approval of the Engineer-in-Charge. Centralizers, spacers or other suitable devices shall be attached to the tube-well casing so that it will be cantered in the drill hole throughout its entire length and held in such position while gravel shrouding is being placed. Centralizers shall be attached to the pipe in a manner that ensures that the pipe is accurately cantered in the drill hole. The detailed design of centralizers and the method of attachment to the pipe shall be subject to the approval of the Engineer-in-Charge. Unless otherwise directed centralizers shall be spaced not more than 60 ft. along the overall length of screen and casing assembly.

**iv.Step 5: Gravel Shrouding:** Gravel shrouding shall consist of all work required in connection with supply and placing of gravel shrouding in annular space between the walls of the drilled hole and the outside of the pump casing. The work shall include, but not limited to development of source, excavation, stock piling, grading, washing, storing, transporting and placing of gravel shrouding as specified herein or as directed by the Engineer-in-Charge.

124. The Contractor may obtain gravel from any source or location subject to the approval of the Engineer-in-Charge provided that the gravel meets the requirements of the specifications. The Department will not be responsible for the amount of work involved or the amount of materials wastage in order to obtain the required amount of gravel of proper gradation.

**i.Step 6: Grouting of Pump Housing Casing:** Grouting of pump housing casing shall cover providing all equipment, labour and doing all work required to seal the annular space between the pump housing casing and the bore hole face by the introduction of grout as specified herein and on the drawings according to procedures approved by the Engineer-in-Charge.

**ii.Step 7: Development and testing:** Development and testing shall consist of all work including power supply required in connection with the development of the tube-well to produce the design capacity of sand free water with a minimum drawdown, and the testing of the tube-well to determine the effectiveness of the development operations as specified herein. Development and testing shall include, but not be limited to surging, back washing and pumping the tube-well at higher than rated capacity, testing the tube-well for specific capacity, sand content and degree of development, and disinfection and sealing of the tube-well.

**iii.Step 8: Testing of installed equipment:** The contractor shall test each tube-well under the direction of the Engineer-in-Charge as described herein. Upon completion of the development operations the tube-well shall be permitted to recover for a minimum period of one hour. During this recovery period, the tube-well shall be sounded. If the comparison of the depth by sounding and the length of the casing string indicates that there is more than 6.00 feet of material in the tube-well, it shall be cleaned to within 2.0 feet of the bottom of the casing by bailing.

**iv.Step 9: Disinfection:** After development and testing of the tube-well has been satisfactorily completed, and when approved by the Engineer-in-Charge, the Contractor shall disinfect the tube-well by dispersing chlorine solution throughout the entire depth of the well to obtain a minimum chlorine content of 50 mg/l. The procedure and equipment used to introduce and disperse the chlorine in the tube-well shall be subject to approval by the Engineer-in-Charge.

**v.Step 10: Sealing:** Upon completion of the tube-well, the Contractor shall seal the tube-well with a ¼ inch thick steel plate cap welded to the pump housing at few points using Arc welding, or by some other method approved by the Engineer-in-Charge. Compliance with this requirement will not relieve the Contractor of his responsibility for the safeguarding of any part of the tube-well completed until the Certificate of Acceptance is issued for the entire tube-well installation.

▪ **Tank installation (Overhead Tank)**

**i.Step 1:** Prepare a reinforced concrete pad that is level and 300 mm wider than the diameter of tank OR prepare an earth ring 300mm wider than the diameter of the tank so that no part of the tank is bearing on the wall. Fill is to be consolidated fill with 50-75mm (2-3") of sand or crusher dust on surface.

**ii.Step 2:** Tank is rolled to position

**iii.Step 3:** Tank must be secured or water filled to 25mm to prevent blow-away.

▪ **Piping installation**

The step wise process for installation of pipelines shall be as follows:

**i.Step 1: Clearing and Grubbing:** Clearing shall include the felling and cutting up of all trees, and the satisfactory removal and disposal of trees, downed timber, brush and debris and obstructions of any nature. Individual trees directed to be left standing shall be protected in a satisfactory manner to prevent damage incident to construction operations.

125. Grubbing shall include the satisfactory removal and disposal of all stumps, roots larger than one (1) inch in diameter, matted roots, debris and other obstructions to a depth not less than eighteen (18) inches below finish ground grades, except that in areas to be occupied

by structures they shall be removed in their entirety. All depressions resulting from grubbing shall be refilled with selected materials from earth excavation, graded and compacted so as to conform to adjacent ground surfaces.

126. All timber, stumps, roots, brush, and other debris, obstructions and objectionable material resulting from clearing and grubbing and site preparation operations shall be removed and disposed of by the contractor off the site. Disposal by burning or burying on the site is not permitted.

**ii.Step 2: Stripping, Stockpiling and Replacing Topsoil:** Topsoil shall be carefully removed to the depths and within the limits indicated or directed for removal and replacing of topsoil. Topsoil shall be transported and deposited in storage piles in approved locations convenient to the areas from which it is removed. The topsoil shall be stockpiled, separate from other excavated materials and free of roots, stones, and other undesirable material. The Contractor shall take all necessary precautions to prevent other excavated materials or objectionable materials from becoming intermixed with topsoil during any operations. Stripping operations shall be completed prior to excavation, compacting, or grading operations.

127. Stockpiles shall be neatly trimmed and graded to provide drainage from surfaces and to prevent depressions where water may become impounded. After being trimmed and graded, stockpiles shall be protected and shall not be disturbed except for subsequent reuse of topsoil. Any deficiencies in the quantities of topsoil obtained from the stripping operations and caused by the Contractor's operations shall be replaced by the Contractor with approved topsoil.
128. The subgrade of all areas to be topsoiled shall be cleared of all vegetation, stones and roots larger than one (1) inch in diameter, brush, stakes or any other material which might hinder proper grading or tillage operations or which might interfere with or be harmful to plant growth. The subgrade of all such areas shall be brought to the elevations required by filling, excavation or grading, free of depressions or irregularities, so that topsoil may be placed to the depth as directed.
129. After subgrades of areas to be topsoiled have been brought to the proper condition, the subgrade shall be loosened immediately prior to placing topsoil by disking, scarifying or other approved method to a depth of approximately three (3) inches, to permit bonding of the topsoil to the subgrade.
130. Before the stockpiled topsoil is reused, it shall be cleaned of all debris, roots and stones larger than one (1) inch in diameter and other objectionable material. Topsoil shall not be placed when the topsoil or subgrade is frozen, excessively wet, extremely dry or in a condition which would be detrimental to the topsoiling operations.

**iii.Step 3: Dewatering, Control and Diversion of Water:** The excavations for work required under this contract are to some extent below existing ground water levels. The Contractor shall provide, operate, and maintain all pumps, drains, well points or any facility necessary for the control collection and disposal of all surface and subsurface water encountered in the performance of the contract work. All excavations shall be kept dry at all times, and all construction work shall be performed in the dry.



131. Upon completion of the contract work, the Contractor shall remove all temporary construction and shall do all necessary earthwork and grading to restore the areas disturbed to their original condition.
132. Water shall not be permitted to flow into or through excavations in which work is under way or has been partially completed. The Contractor shall not restrict or close of the natural flow of water in such a way that ponding or flooding will occur, and shall at all times prevent flooding of public and private property. All damages resulting from flooding or restriction of flows shall be the sole responsibility of the Contractor.

**iv.Step 4: Earth Excavation and Backfill:** The work under this Section includes the furnishing of all labor, equipment and materials, and performing all operations in connection with excavating, backfilling, compacting, grading and all other incidental work necessary for the construction of pipelines, structures, pavement and appurtenant work in accordance with the drawings and specifications and as directed. The work also includes installing, shoring and bracing as the excavation proceeds; providing approved earth borrow and bank-run gravel from off-site sources when directed for backfills or excavations and refills of below-grade excavations; excavation and disposal at approved locations of pavements, surplus and unsuitable materials, protection of existing pipelines; utilities and structures and of new work; compaction of trench bottom, backfills and subgrades; excavation and backfilling of test pits, and all other appurtenant work as required or as directed.

**v.Step 5: Rock Excavation:** The work covered under this Section includes the furnishing of all labor, equipment and materials, and performing all operations in connection with rock excavation and subsequent earth refill within the property as indicated on the drawings, and all incidental work in accordance with the drawings and specifications, and as directed. The work shall also include providing and compacting gravel for refilling depressions resulting from removal of boulders, the satisfactory removal and disposal of the excavated rock materials; and the protection of existing pipelines, structures and appurtenant facilities.

**vi.Step 6: Sand Bedding:** The work covered under this Section includes the furnishing of all labor, equipment and materials, and performing all operations in connection with providing and compacting sand for pipe bedding and under structure base slabs in accordance with the drawings and specifications, at the locations indicated and as directed. The work shall also include compaction and shaping of bedding just prior to laying pipe, to provide proper bedding of pipe.

**vii.Step 7: Steel Sheet piling and Bracing:** The work covered under this Section includes the furnishing of all labor, equipment and materials, and performing all operations in connection with the furnishing, installation, maintenance and removal of all temporary and permanent steel sheet piling and bracing necessary to permit the proper and satisfactory installation and construction of the work; to prevent injurious caving or erosion, or loss of ground to maintain at all times pedestrian, vehicular and railroad traffic on public and private streets, property and rights-of-way; or where shown on drawings, necessary for unforeseen reasons.

**viii.Step 8: Ductile Iron Water Pipe:** The work covered under these items includes the furnishing of all plant, labor, equipment, appliances and materials, and in performing all operations in connection with providing the construction of ductile iron pipe water distribution mains at the locations and to the lines and grades indicated and/or as directed, including all pipe, pipe fittings and accessories, connections to other piping and structures, testing of pipelines and material tests, jointing and jointing materials, services of manufacturer's representatives, and all other related and appurtenant work, complete in place and accepted, in accordance with the drawings and specifications, and as directed.

**ix.Step 9: Water Main Gate Valves:** The work covered under these items includes the furnishing of all plant, labor, equipment, appliances and materials, and in performing all operations in connection with providing the construction of water main gate valves, at the locations and to the lines and grades indicated and/or as directed, including all valves, valve fittings and accessories, connections to other piping and structures, testing of pipelines and associated isolation gate valves and material tests, jointing and jointing materials, services of manufacturer's representative, and all other related and appurtenant work, complete in place and accepted, in accordance with the drawings and specifications, and as directed.

**x.Step 10: Service Laterals:** The work covered under this item includes the furnishing of all plant, labor, equipment, appliances and materials, and in performing all operations in connection with furnishing and setting in place all service laterals in accordance with the drawings and specifications, and as directed.

**xi.Step 11: Miscellaneous Concrete Work:** The work covered under this item includes the furnishing of all plant, labor, equipment, appliances and materials, and in performing all operations in connection with providing the construction of all plain cement-concrete work for pipe cradles, encasements, thrust blocks, and appurtenant work, as shown on the drawings and as directed, complete in place and accepted, in accordance with the drawings and specifications. Prior to placing the concrete, the Contractor shall be responsible for checking and maintaining the proper locations of all parts to be embedded in concrete work.

### 3.3 Design Criteria

133. The design criteria are presented in the section below.

#### 3.3.1 Applicable Standards and Specifications

134. The design criteria are mainly based on the standards and specifications of WASA Lahore. Where required, international best practices were also considered in establishing the design criteria for the proposed water supply system.

#### 3.3.2 Design Life

135. For OHRs, 40 years design life is considered. For distribution networks, a design life of 25 years is considered. For tube wells, a design life of 15 years is considered. The catchment area of all the existing OHRs is mostly fully developed. Therefore, the water distribution network is proposed for the full-built out scenario.

### **3.3.3 House Connections**

136. The following standards for service connection to be adopted for providing house connection;

- Domestic Service House Connection 18.75mm (3/4 inch);
- Commercial Connection 25.4mm (1 inch);
- A dedicated water meter is proposed with each house connection.

### **3.3.4 Pipe Material**

137. Two different types of pipe materials are considered for the proposed water supply pipes.

- For distribution network i.e. DN 75 mm to 300 mm (3 to 12 inches), the (HDPE) pipes are proposed;
- For the proposed pipes above surface, GI pipes are recommended.

### **3.3.5 Minimum Pipe Size**

138. As per design criteria, the minimum acceptable pipe diameter for all newly proposed water distribution lines shall be 75mm (3-inches).

### **3.3.6 Utility Corridor**

139. As we are replacing the existing distribution network which is already located in a mostly developed area, the criteria for the utility corridor for the proposed water distribution pipe is as follows:

- For a street/road having an existing drain on one side, the proposed water supply pipe shall be laid on the opposite side of the drain;
- For a street/road having an existing drain on both sides, the proposed water supply pipe shall adjusted in the mid of the road/street in a way to have minimum damage to the existing carriageway;
- For streets/ road with no drain, the proposed water supply pipe shall be laid at one end of the carriageway to avoid maximum damage to the carriageway.

140. Design criteria established for the proposed water supply distribution system and transmission main is summarized below in

142. Table 3.1 below.

**Table 3.1: Design criteria of proposed water supply system**

Sr No	Parameter	Criteria
<b>Water Distribution network</b>		
1	Per capita water consumption including unaccounted for water	30 Gallons per capita per day
2	Peak demand for design of distribution network	Peak factor of 1.5 for maximum day demand and peak factor of 2 for maximum hourly demand
3	Permissible velocity in distribution lines	0.3 m/s min to 1.5 m/s max
4	Minimum Pipe Size for Distribution Network	75 mm
5	Pipe size for Domestic connection	18.75 mm
6	Pipe size for Commercial Connection	25.4 mm
7	Pipe material	HDPE PE-100, PN-12/PN-16 for underground pipe and GI for at grade
8	Minimum terminal pressure for the farthest point in system	1 bar
9	Desirable maximum pressure	6.5 bars
10	Maximum test pressure	1.5 times the designed pressure
11	Minimum cover to pipe from the finished level / ground level	0.9 m (3 ft)
12	Hydraulic modelling software	Bentley's WaterCAD
13	Laying of distribution network	Loop/grid system
14	Isolation valves	Every zone defining junction
15	Pipe crossing existing roads	Concrete encasement
16	Pipe roughness coefficient	130 (Hazen William's Co-efficient)
17	Pipe bedding	Sand bedding for plain/hilly areas

### 3.3.7 Existing Water Distribution System

143. The current water supply system in Peshawar, in the area under the jurisdiction of WSSP, is a ground water/tube well-based system. There are more than 500 number of tube wells in Peshawar which are serving the areas under WSSC Peshawar Jurisdiction. The average discharge from the tube wells is approximately 11,500 gallons per hour. While most the existing tube wells are supplying water through direct pumping to the end users, there are few OHRs in the city. These OHRs receive water from the connecting tube wells from where the water is supplied to the end users by gravity.
144. There are 34 Nos of existing OHRs under jurisdiction of WSSP, out of which only twelve (12) OHRs are functional. The current mode of service in Peshawar is intermittent water

supply (IWS) – water is pumped into the distribution networks either directly (from tube wells) or from elevated OHRs – for a limited number of hours daily. Supply hours in the 45 urban UCs under WSSP range from 10 hours to 14 hours with an average of 12.6 hours for all the UCs. None of the UC in the project area has a continuous water supply (CWS) mode of service.

### **3.3.8 Population estimate and Water Demand computations**

145. Catchment area of each of the OHRs was marked based on the existing water distribution network and after site walk through with the operational and maintenance supervisors of WSSP. Following are the two types of approaches followed to estimate the population of the catchment area of the existing OHRs:
  - a. Actual house counting
  - b. Based on digitizing of planning data
146. In the first approach, detailed house connection data including the land use data for each catchment was collected from WSSP. For estimation of actual house counting, the EDCM field staff along with WSSP water supply supervisors visited the catchment area for each OHR. The field staff marked the total number of houses and other land use including schools, shops, hospitals, wedding halls, service stations markets and plaza etc. for each catchment. Accordingly, the population for each OHR or catchment was calculated keeping in view the criteria of 8.5 persons per house. The details of the OHRs, catchments marking, and future growth projection are provided in below sections. This data has also been verified from concerned zonal managers of WSSP.

## **3.4 Design of Proposed Water Supply System Components**

147. Improvement of existing water supply system in Peshawar under jurisdiction of WSSP is comprised of the following system components:
  - Operationalization of existing 34 Overhead Reservoirs (OHRs) i.e. reconstruction of 23 OHRs and rehabilitation of 10 OHRs based on condition assessment. One OHR is already under construction i.e. Bahadur Kalay Tank;
  - Installation of 155 km of associated water distribution network;
  - Rehabilitation of 41 existing tube wells that are feeding the thirty-four OHRs;
  - Installation of 22,000 water meters at consumer level in the project area;
  - Installation of solar system for 23 OHRs i.e. OHRs having equal or greater than 100,000 gallons' storage capacity;
  - Provision of SCADA system.
148. Further details of the detailed design of the proposed improvements for the water supply system in Peshawar are provided below.

### **3.4.1 Tubewells**

149. There are 67 existing tube wells which are connected to the existing 34 number of OHRs. The underground water from the tube wells will pump to the existing OHRs and these reservoirs will further supply water to the end users/customers through proposed water distribution system pipelines and house connections.

150. Detailed condition assessment of all the existing tube wells was carried out to check the current condition of these tube wells including the condition of boring as well as the pumping machinery. Based on the condition assessment, certain modifications were recommended by the EDCM team that are summarized below in **Table 3-2**.

151. The recommended modifications for the tube wells mainly include:

- Replacement of the old pumping machinery at some of the tube wells;
- New borings for some tube wells as part of the rehabilitation process;

**Table 3.2: Recommended Modifications for tube wells**

OHRs Names	OHRs connected to T/W	Construction year of boring	Recommended modification for boring	New pumping machinery (Year)	Recommended modification for pumping machinery
<b>Zone A</b>					
Kaki Jan Tank	Kaki Jan T/W	1960	Reboring required	Nil	New machinery required
Shahi Bagh Tank	Shahi Bagh Tanki T/W	1980	Reboring required	2020	In good condition
	Malaria Office T/W	1985	Reboring required	Nil	New machinery required
	NIC Office T/W	1990	Reboring required	Nil	New machinery required
Lateefabad Tank	Lateefabad Tanki T/W 1	2019	In good condition	2019	In good condition
Bashirabad Tank	Bashirabad Tanki T/W	1995	Reboring required	2008	New machinery required
	Bashir Abad T/w No.45	1995	Reboring required	2008	New machinery required
<b>Zone B</b>					
Ijaz Abad Tank	T/W No. 104	2000	In good condition	2019	In good condition
	T/W No. 105	2019	In good condition	2019	In good condition
Gul Bahar Tank	T/W No.92	2017	In good condition	2017	In good condition
	Proposed T/W	N/A	N/A	N/A	N/A
Muhtaseeban Tank	Proposed T/W	N/A	N/A	N/A	N/A
	Muhtaseeban T/W No. 155	2010	In good condition	2019	In good condition

<b>OHRs Names</b>	<b>OHRs connected to T/W</b>	<b>Construction year of boring</b>	<b>Recommended modification for boring</b>	<b>New pumping machinery (Year)</b>	<b>Recommended modification for pumping machinery</b>
	T/W No. 146	1990	Reboring required	2005	New machinery required
	Shah Masoom T/W No. 147	2017	In good condition	2017	In good condition
Wazir Bagh Tank	Janazgah T/w No. 203	2005	In good condition	2005	New machinery required
	Sufi Colony T/W No. 220	2000	In good condition	2019	In good condition
	Wazir Bagh Ground T/W	1980	Reboring required	2005	New machinery required
	Inter College T/W	2005	In good condition	2005	New machinery required
Quaid Abad Tank	Quaid Abad Tanki	1980	Reboring required	2000	New machinery required
	T/w T/W No.274	2005	In good condition	2005	New machinery required
	T/W No. 273	1980	Reboring required	2000	New machinery required
Aasia Park Tank	T/W No.164	1980	Reboring required	2000	New machinery required
	T/W No.165	1995	Reboring required	2005	New machinery required
	T/W No.166	1995	Reboring required	2005	New machinery required
	T/W No.167	1980	Reboring required	2000	New machinery required
Beri Bagh Tank	Proposed T/W	N/A	N/A	N/A	N/A
	Beri Bagh Tanki T/W	2005	In good condition	2005	New machinery required
Murshid Abad Tank	T/W No.1	2005	In good condition	2005	New machinery required
	T/W No.262	1980	Reboring required	2000	New machinery required
Sheikh Abad Bano Tank	T/W No.1	1975	Reboring required	2000	New machinery required



OHRs Names	OHRs connected to T/W	Construction year of boring	Recommended modification for boring	New pumping machinery (Year)	Recommended modification for pumping machinery
	T/W No.2	2000	In good condition	2005	New machinery required
	T/W No.3	2016	In good condition	2016	In good condition
Khanam Market Tank	T/W No.158	1975	Reboring required	2000	New machinery required
Dhaki Munawar Shah Tank	T/W No.159	1985	Reboring required	2000	New machinery required
	T/W No. 160	1984	Reboring required	2000	New machinery required
Bostan Abad Tank	Bostan Abad Tanki T/W	1971	Reboring required	2005	New machinery required
Hazarkhawani Tank	Proposed T/W No.1	N/A	N/A	N/A	N/A
	Proposed T/W No.2	N/A	N/A	N/A	N/A
	Hazarkhawani Tanki T/W	N/A	N/A	N/A	N/A
<b>Zone C</b>					
Danish Abad Tank	Danish Abad Tanki T/W	1980	Reboring required	2020	In good condition
Charkhana Road Tank	Charkhana Road Tanki T/W	1992	Reboring required	N/A	-
Landi Arbab Tank	Landi Arbab Tanki T/W	2018	In good condition	2018	In good condition
Abdara Tank	Abdara Tanki T/W	1985	Reboring required	Nil	New machinery required
Pawaki Tank	T/W No.1	2015	In good condition	Nil	-
	T/W No.2	1995	Reboring required	Nil	New machinery required
Swati Tank	Swati Tanki T/W	1978	Reboring required	Nil	New machinery required
	T/W No.1	1985	Reboring required	2020	In good condition

OHRs Names	OHRs connected to T/W	Construction year of boring	Recommended modification for boring	New pumping machinery (Year)	Recommended modification for pumping machinery
Nothia Janazgah Tank	T/W No.2	1998	Reboring required	Nil	New machinery required
Kohat Bus Stand Tank	Kohat Bus Stand Tanki T/W	1983	Reboring required	Nil	New machinery required
Bahadar Kaly Tank	Bahadar Kaly tanki T/W	1983	Reboring required	Nil	New machinery required
	Proposed T/W	N/A	N/A	N/A	N/A
Gulshan Iqbal Tank	T/W No.1	1982	Reboring required	Nil	New machinery required
	T/W No.2	1995	Reboring required	Nil	New machinery required
Canal Road Tank	Canal Road Tanki T/W	1976	Reboring required	Nil	New machinery required
University Office Tank	T/W No.1	2007	In good condition	Nil	-
	T/W No.2	1998	Reboring required	Nil	New machinery required
University Town Tank	T/W No.1	2002	In good condition	Nil	In good condition
	T/W No.2	2005	In good condition	Nil	In good condition
<b>Zone D</b>					
Tahkal payan Tank	T/W No.1	1980	Reboring required	Nil	New machinery
	T/W No.2	1980		Nil	New machinery
Palosai Tank	Palosai Tanki T/W	1980		2020	In good condition
	Abdur Rehman Hujra T/W	1980		Nil	New machinery
Arbab Arif Tank	Arbab Arif Tanki T/W	1985		2020	In good condition
Jahangir Abad Tank	T/W No.1	1980		Nil	New machinery
	T/W No.2	1980		Nil	New machinery
	T/W No.3	1980		Nil	New machinery

### 3.4.2 Overhead Water Reservoirs (OHRs)

152. Only Twelve (12) out of the total 34 OHRs are functional currently. Based on the condition assessment of the existing overhead reservoirs, 23 Nos of reservoirs are proposed for demolition and reconstruction due to their old age and bad structural condition. The rest of the OHRs are proposed for minor, medium or major repairs.
153. A summary of the proposed recommendations for the OHRs is provided in **Table 3.3** below.

**Table 3.3: Recommendations for OHRs**

Sr. No.	Name of OHR and location	Proposed Recommendation	Final Storage Capacity US Gallons
Zone A			
1	Lateef Abad Tank	Minor repair work is required	30,000
2	Bashir Abad Tank		30,000
3	Shahi Bagh Tank		200,000
4	Kaki Jan Mosque Tank	Reconstruction	30,000
Zone B			
1	Gul Bahar Tank	Medium repair work is required	50,000
2	Ijaz Abad Tank		50,000
3	Bostan Abad Tank	Reconstruction	50,000
4	Murshid Abad Tank		30,000
5	Wazir Bagh Tank	Major repair work is required	100,000
6	Beri Bagh Tank	Medium repair work is required	30,000
7	Quaid Abad Tank	Reconstruction	30,000
8	Aasia Park Tank	Major repair work is required	100,000
9	Khanum Market Tank	Reconstruction	30,000
10	Dhaki Ander Sher (Manwar Shah)	Major repair work is required	20,000
11	Muhtasiban Tank	Reconstruction	200,000
12	Sheikh Abad Bano Tank		30,000
13	Hazar Khawani		50,000
Zone C			
1	Danish Abad Tank	Reconstruction	50,000
2	Canal Road danish Abad	Reconstruction	20,000

Sr. No.	Name of OHR and location	Proposed Recommendation	Final Storage Capacity US Gallons
3	Pawakai Tank	Reconstruction	50,000
4	Abdara Tank canal road	Reconstruction	50,000
5	Gulshan Iqbal Tank	Reconstruction	50,000
6	Swati Tank	Reconstruction	30,000
7	Landi Arbab 1	Reconstruction	30,000
8	Bahadar Kalay Tank	Reconstruction	50,000
9	Kohat Bus Stand	Reconstruction	50,000
10	Nothia Janaz Gah Tank	Reconstruction	30,000
11	University Office Tank	Reconstruction	30,000
12	University Town Tank	Reconstruction	50,000
13	Charkhana Road Tank	Reconstruction	30,000
<b>Zone D</b>			
1	Palosi Tank	Reconstruction	50,000
2	Jahangir Abad Tank	Reconstruction	100,000
3	Arbab Arif Tank	Minor repair work is required	30,000
4	Tahkal Payan Tank	Reconstruction	50,000

### 3.4.3 Installation of Solarization

154. The EDCM team visited all 34 OHRs to identify the spaces for the provision of solar system at the tube wells connected to these OHRs. Peshawar urban area is almost fully congested and no free land i.e. on ground surface, for solar compound at the surrounding of existing OHRs were identified. The only option for the installation of solar system is to utilize the top roof of the OHRs.
155. EDCM visited different vendors associated with solar system and they showed their consent for the provision of solar panels of the roof top of the OHRs. For the purpose, twenty six (26) Nos. of OHRs are proposed to be converted in to solar system and each system will generate tentatively, 20 kilo watt power which will be sufficient for the power requirement of one connected tube well at each of the 26 OHRs. EDCM proposed only those OHRs for solarization which have equal or greater than 100,000 gallon storage capacity.
156. Solar panels on tube-wells are proposed for the purpose of getting clean renewable solar energy. The electricity produced from Solar panels / Sheets will be used to operate the tube-wells. PV cells are panels that can be attached to a roof or wall. Each cell is made from one or two layers of semiconducting material, usually silicon. When light shines on the cell, it creates an electric field across the layers. The stronger the sunshine, the more electricity is produced. However, PV cells do not need direct sunlight to work - they can still generate some electricity even on a cloudy day. Cells come in a variety of shapes and colours, from grey "solar tiles" that look like roof tiles to panels and transparent cells that can be used on conservatories.

157. The solar system installation will be done by reputable national level solar system supplier firms. These companies have all the technical expertise and knowhow to ensure all the safety measures put in place at time of procurement, installation and later at the operation stage.

#### **3.4.4 Provision of SCADA**

158. EDCM team visited different vendors related to SCADA interventions for the proposed water supply system. The team discussed the possibility of the type of SCADA system that can be introduced for this project. Accordingly, quotation was collected for the SCADA system and part of the revised Bill of Quantity (BOQ).

### **3.5 Project Construction Schedule**

159. The project construction phase is expected to last for a total of 3 years with the activity expected to commence in the second quarter of 2021 and completed by mid of 2023.

### **3.6 Construction Camps and Work Force**

160. The construction activity has to span over approximately thirty-six months. There shall be a number of contracts for a variety of works. The selected Contractor shall have the option to select suitable site(s) located near the project sites to establish his labor camps. If private land is selected, the contractor shall enter into contract with the private owner.
161. Since the work is quite scattered in nature with a large number of sites in the project area, the work bases shall be setup by the contractor in consultation with the engineering teams. Essential for the work bases is easy approach, availability of a suitable place for temporary storage of material and availability of water for construction in the vicinity. Presence of shade from trees close to the work bases can add to the comfort of the labor while taking rest during the hot season.
162. The location of storage materials and camps will be critical. Since the project contractor(s) will be responsible for identifying the suitable locations for storage and labor camps from the private sector, thus there will need to be clear guidelines for this process, which will need to be closely monitored by the implementing agency. As far as possible, the project design team shall be assigned the task to identify the suitable location(s) for storage of materials since inappropriate storage of materials may result disruption of the traffic movement.

### **3.7 Machinery Requirement**

163. For storing materials, stocking equipment and parking machinery and vehicles, the Contractor shall require open and accessible sites close to the labor camps. The Contractor, at his own expense, but keeping in view his contractual obligations to honor the applicable national and international guidelines regarding level of pollution, shall make the arrangements.

### **3.8 Climate Risks of Project**

#### **3.8.1 Climate Change Trends and Extremes in Peshawar**

164. Increases in precipitation, urban flooding and possibly high winds are considered as the key potential climate change impacts for Peshawar city which can negatively affect urban

infrastructure and services (transport infrastructure, clogging of drainage system, energy and water supply, health services) as well as private businesses and domestic assets (ADB 2017a).

165. Dominated by the monsoon seasonal patterns, Peshawar's climate can be categorised as comprising winter (November to March) and summer (June to September) seasons including western disturbances entering from Afghanistan and Iran<sup>3</sup>. Based on Peshawar climate station data (1950-2015), monthly average temperature during winter ranges from 17.7°C to 11.1°C where the highest monthly average temperature was 35.3°C observed in 1973. During the last 66 years, the maximum temperature has increased by 0.57°C while the minimum temperature has increased by 0.49°C.
166. Although heatwaves<sup>4</sup> do not have a statistically significant trend in Peshawar, longer periods of rate of increase of maximum and minimum temperature together with heat waves and increased precipitation can cause increases in humidity and water consumption. Important city infrastructure such as roads, energy distribution networks, and transport related infrastructure (waiting areas, bus stops), natural resources including reservoirs, and groundwater can directly be affected due to increased temperature. During the last 50 years, summer days (temperature > 25°C) have increased by 22 days including increased number of warm days and nights which can affect infrastructure, increased energy consumption, decreased work efficiency, and human health.
167. The city's average annual rainfall during 1961-2015 period was 474.4 mm with the highest annual rainfall of 904.5 mm recorded in 2003 while the highest daily precipitation (274 mm) was recorded on 29th July 2010. The lowest rainfall (190 mm) was recorded in 1974 based on Pakistan Meteorological Department, (PMD) Peshawar climate station data. The annual precipitation together with an increase in extreme precipitation events in Peshawar have increased according to the historic precipitation data. During the last 50 years, overall 212 mm increase in annual precipitation during last five decades have been observed according to the precipitation extreme indices. Likewise, heavy precipitation events (rainfall > 10mm) increased by 8.2 days, while heavy precipitation events (> 20mm and > 25 mm) increased by 5 and 4 days respectively.
168. Sudden rise and fall in terrestrial temperatures causes low air pressures, bringing whirling winds since during April and May days are relatively warmer and the nights are cooler in Peshawar where frequency of wind storms is higher in these months as compared to other seasons. In Peshawar district, a windstorm of 110 km/hr was recorded on 26 April 2015, which claimed around 31 human lives and damaged infrastructure and private property in Peshawar district. Due to limited data, future projections of strong wind patterns is challenging however the best possible maximum wind speed projections from the CORDEX<sup>5</sup> data are not showing any increase in intense wind storm events.
169. These climate change patterns and socio-economic changes including rapid urbanization can cause urban flooding events. Intense precipitation as well as infrastructure developments that have reduced urban surface interception, flash floods are increasing,

<sup>3</sup> The weather data and information in this section is sourced from ADB (2017): UCCRTF TA-8913 PAK: Mainstreaming Climate Risk Management into Urban Infrastructure Investments through Urban Resilience Assessments (URAs), Peshawar City, Khyber Pakhtunkhwa, Pakistan.

<sup>4</sup> Heatwaves period can be defined as when consecutive 3-days temperature remains >45°C/day.

<sup>5</sup> The Coordinated Regional Downscaling Experiment (CORDEX) is a program sponsored by World Climate Research Program (WCRP) to develop an improved framework for generating regional-scale climate projections for impact assessment and adaptation studies worldwide within the IPCC AR5 timeline and beyond (quoted from ADB 2017).

which are likely to continue to become more severe in the future. Urban flooding is largely due to intense precipitation and changes in land use (especially increased concrete surfaces due to residential and commercial area growth) and due to inadequate sewerage and drainage systems while the main nullahs, rivers, streams are flooded due to intense rainfall.

170. Moreover, due to lack of open spaces, water storage ponds and a properly designed urban drainage system, increased surface water due to heavy rainfall has been transported through the existing sewerage systems. This lack of capacity to drain away surface water due to heavy precipitation is most likely the potential cause of increased urban and seasonal flooding in Peshawar as well as disrupted waste water and solid waste disposal systems.

## 4 Description of Environment

### 4.1 General

171. Peshawar, the capital of KP province, is a metropolitan city and is located at the north-west end of Pakistan, about 160 km west of federal capital Islamabad. It is bounded by tribal agencies on its three borders.
172. Peshawar is a City district with a total population of 1.75 million people and contains four towns with each town consisting of union councils with a total of 92 union councils in Peshawar. There is only one tehsil in the district i.e. Peshawar tehsil and the total area of the district is 1,257 km<sup>2</sup>.<sup>6</sup>
173. The proposed project is located within Peshawar city. The description of various features of the project area environment including the physical, ecological, cultural and socio-economic environmental aspects are presented in the following sub-sections.

### 4.2 Physical Resources

#### 4.2.1 Topography

174. Peshawar is situated near the eastern end of the Khyber Pass and sits mainly on the Iranian plateau along with the rest of the Khyber-Pakhtunkhwa.
175. The Vale of Peshawar is covered with consolidated deposits of silt, sands and gravel of recent geological times. The cultivated tracts consist of rich, light and porous soil, composed of even mixture of clay and sand. The areas between the Kabul River and Budni Nala consist of flood Plains/Zones. The meander flood plain extends from Warsak in the Northwest towards Southeast in the upper Northern half of the district. The Kabul river enters the district in the Northwest.
176. The proposed project area is located within Peshawar city, which is a completely urban environment. The terrain consists of completely flat land with the only vegetation cover consisting of plants and trees scattered across the project corridor for landscaping and beautification of the city.

#### 4.2.2 Climate

177. Peshawar has a hot semi-arid steppe climate, which is very dry with little rainfall. It can rain at any time of the year but the rain does not last long. As well as being arid, the climate is extremely hot in the summer but slightly cooler in the winter months. There is no monsoon period. Throughout the year, temperatures fall dramatically at night, sometimes by as much as 20°C.

#### 4.2.3 Temperature

178. The warm season lasts from the April to September with an average daily high temperature of above 34°C. The cold season lasts from the December to February with an average daily high temperature below 21°C. The temperature profile for Peshawar is shown as **Figure 4.2** below.

<sup>6</sup> <https://en.wikipedia.org/wiki/Peshawar>



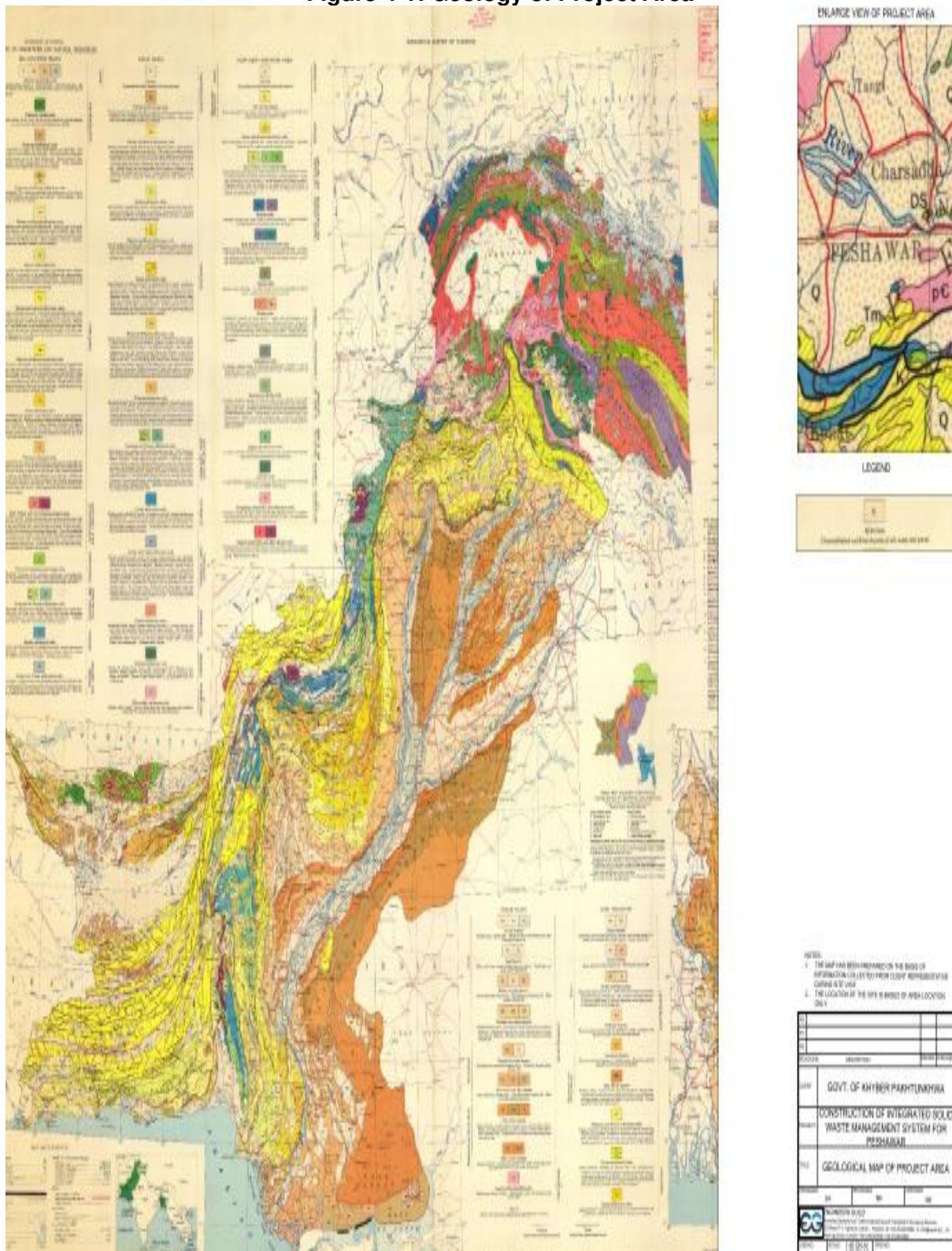
179. Analysis of historical data for Peshawar<sup>7</sup> for 1950-2016 shows an overall increasing trend where the maximum temperature has increased by 0.57°C while minimum temperature has increased by 0.49°C. The mean annual maximum temperature was 28°C to 31°C while the mean minimum temperature ranged between 15°C to 17.7°C. Temperature trend analysis of Peshawar is shown in **Figure 4.3**.

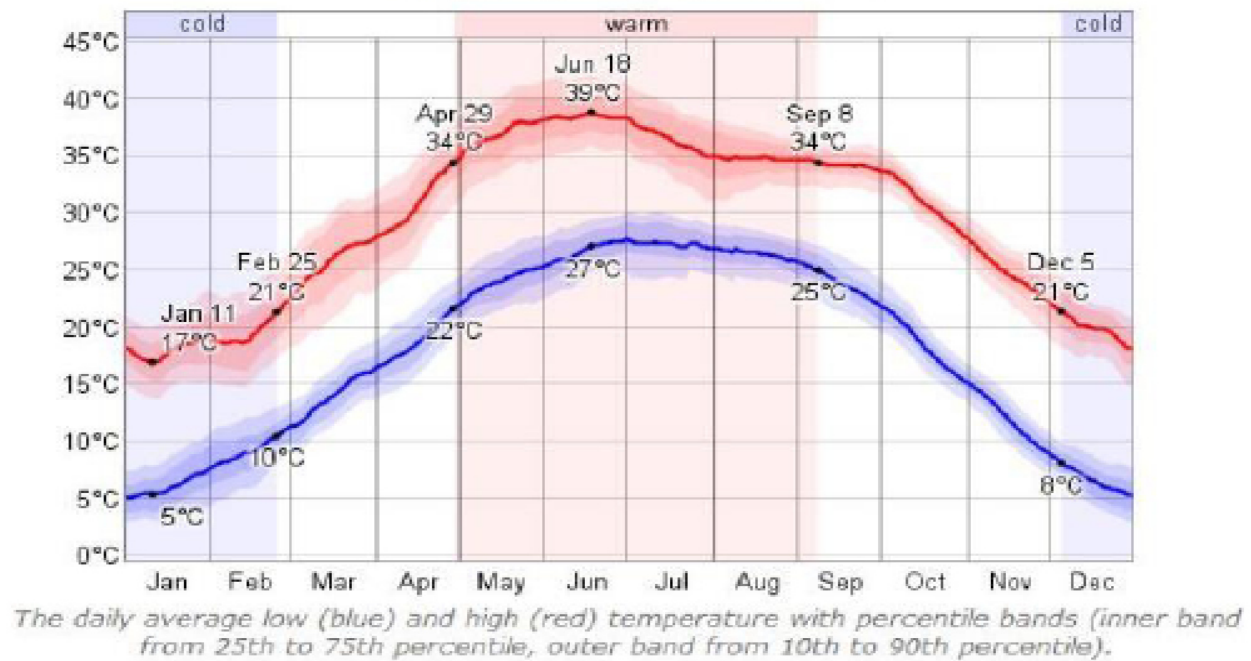
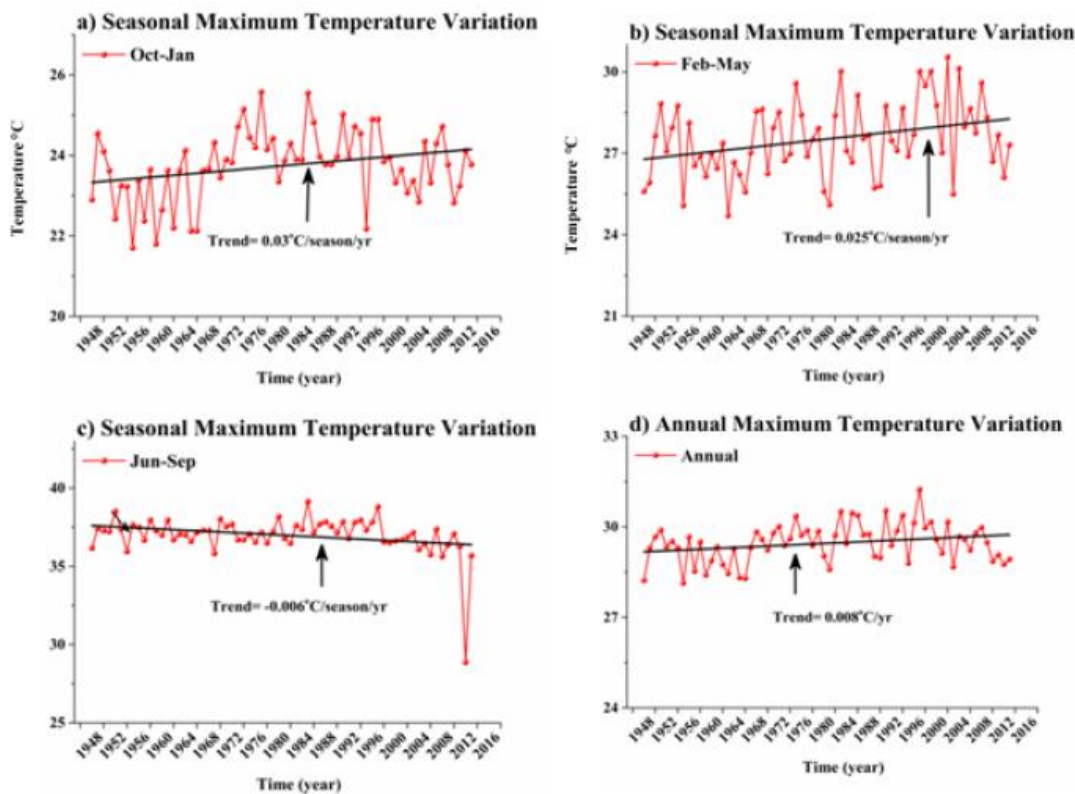
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<sup>7</sup> The weather data and information in this section is sourced from ADB (2017): UCCRTF TA-8913 PAK: Mainstreaming Climate Risk Management into Urban Infrastructure Investments through Urban Resilience Assessments (URAs), Peshawar City, Khyber Pakhtunkhwa, Pakistan.

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**Figure 4-2: Year round Temperature Profile of Peshawar City**

**Figure 4-3: Temperature trend analysis of Peshawar (1951-2016)**


180. Except for February in most of the winter to early summer months (December to May) the temperature shows rising trends during 1950-2015 ranging from 0.015°C/month/yr to



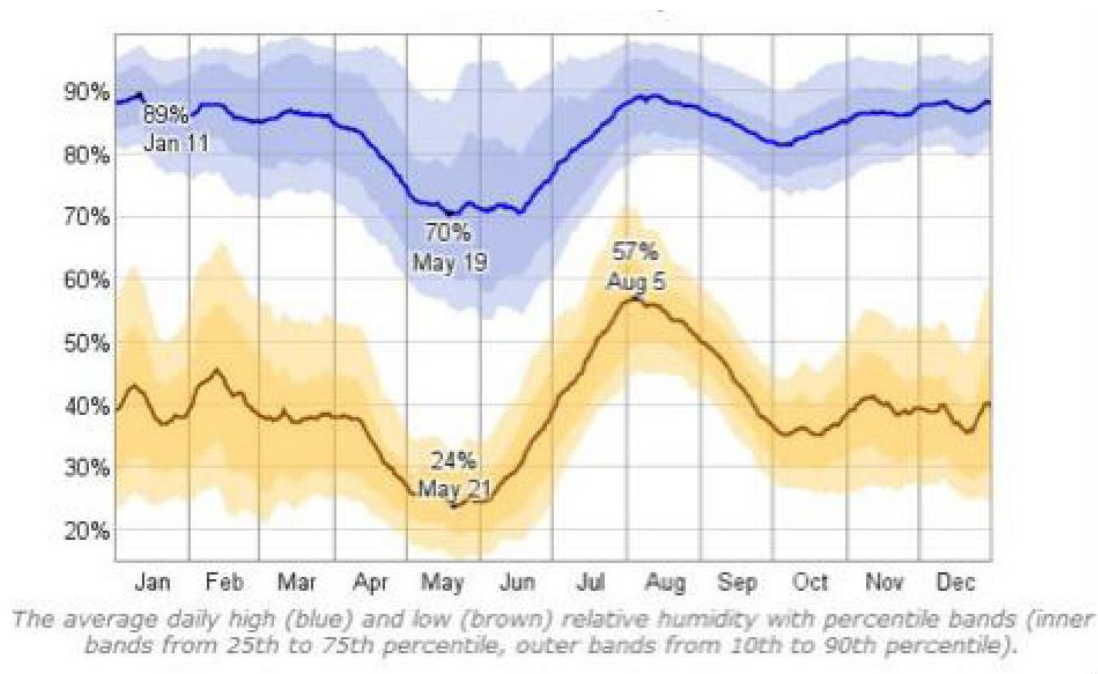
0.033°C/month/yr for December and May respectively. This means a rise in maximum temperature between 1°C to 2.2°C during last 66 years. Seasonal temperature rise is ranging between 1.6°C to 2°C (for Feb-May and Oct-Jan respectively), whereas monsoon season shows a statistically insignificant decline in temperature. Overall, it shows a temperature increase of 0.53°C during 1950-2016 where annual maximum temperature raised at 0.008°C/year.

181. Except for January, the minimum temperature shows rise during September-May where trends are statistically significant. During 1950-2015, monthly rise in minimum temperature ranges between 0.72°C for September and 2.3°C for February, which means more rise in minimum temperature compared to maximum temperature, and suggests increase in warm nights compared to warm days. For the same period, minimum temperature for October to January shows a rise of 1.13°C while February to May shows a rise of 1.83°C. Statistically insignificant rise in minimum temperature is observed in monsoon. Overall, there is an increase of 1.06°C during 1950-2016 with annual minimum temperature rising at 0.016°C/year.

#### 4.2.4 Relative Humidity

182. The relative humidity typically ranges from 24% (dry) to 89% (very humid) over the course of the year, rarely dropping below 15% (dry) and reaching as high as 99% (very humid) as can be seen in **Figure 4.4** below.
183. The air is driest around the 21<sup>st</sup> of May, at which time the relative humidity drops below 29% (dry) three days out of four; it is most humid around the 11<sup>th</sup> of January, exceeding 85% (humid) three days out of four.

**Figure 4-4: Humidity Profile of Peshawar City**

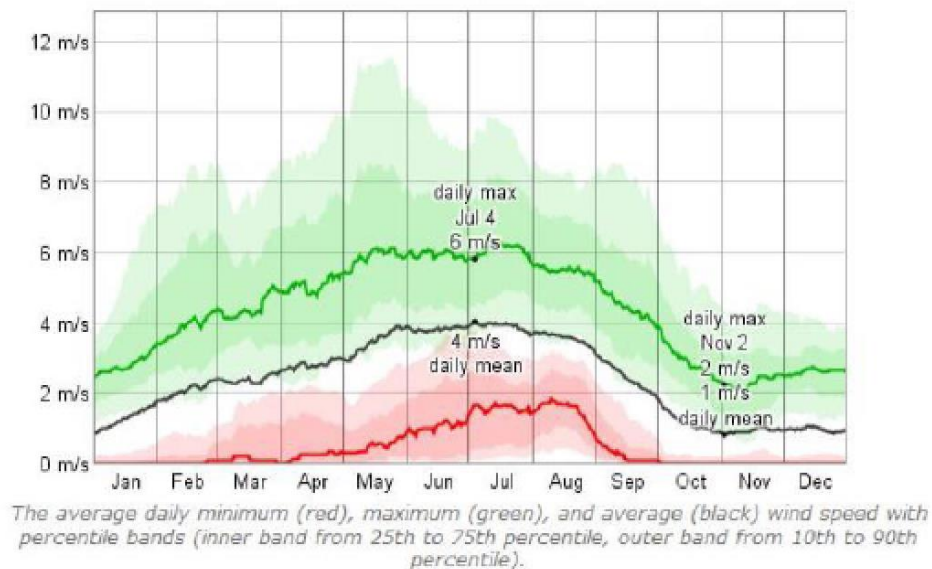


184. Although heatwaves<sup>8</sup> do not have a statistically significant trend in Peshawar, longer periods of rate of increase of maximum and minimum temperature together with heat waves and increased precipitation can cause increases in humidity and water consumption.

#### 4.2.5 Wind Speed

185. Over the course of the year, the typical wind speed vary between 0 m/s and 6 m/s (calm to moderate breeze), rarely exceeding 12m/s (strong breeze) as can be seen in **Figure 4.5** below.

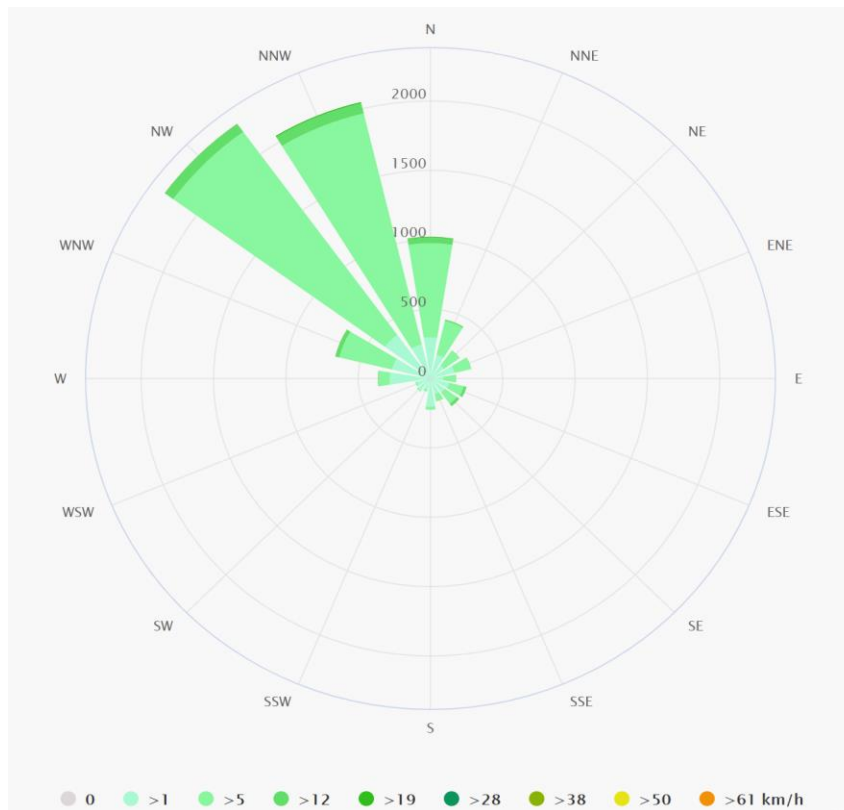
**Figure 4-5: Wind Speed Profile of Peshawar City**



<sup>8</sup> Heatwaves period can be defined as when consecutive 3-days temperature remains >45°C/day.

186. The Windrose profile for Peshawar is provided as **Figure 4.6** below.

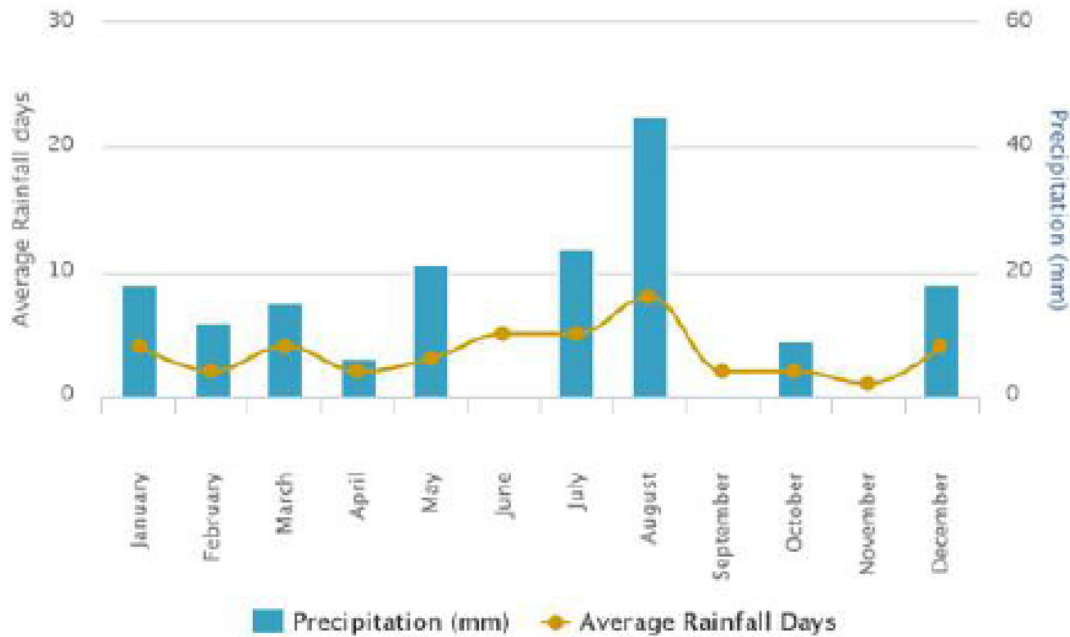
**Figure 4-6: Windrose for Peshawar<sup>9</sup>**



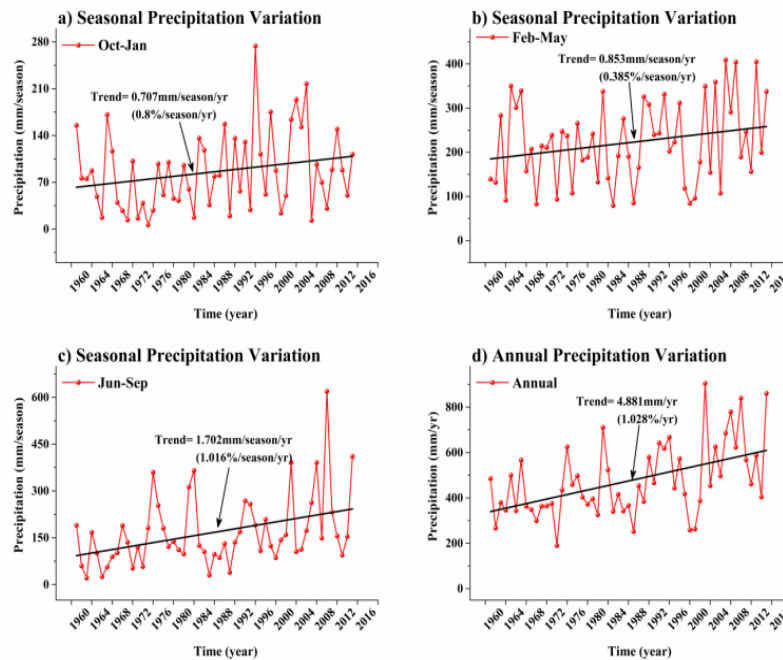
#### 4.2.6 Precipitation

187. The city's average annual rainfall during 1961-2015 period was 474.4 mm with the highest annual rainfall of 904.5 mm recorded in 2003 while the highest daily precipitation (274 mm) was recorded on 29th July 2010. The lowest rainfall (190 mm) was recorded in 1974 based on Pakistan Meteorological Department, (PMD) Peshawar climate station data. The annual precipitation together with an increase in extreme precipitation events in Peshawar have increased according to the historic precipitation data. During the last 50 years, overall 212 mm increase in annual precipitation during last five decades have been observed according to the precipitation extreme indices. Likewise, heavy precipitation events (rainfall > 10mm) increased by 8.2 days, while heavy precipitation events (> 20mm and > 25 mm) increased by 5 and 4 days respectively.

<sup>9</sup> [https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/peshawar\\_pakistan\\_1168197](https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/peshawar_pakistan_1168197). The meteoblue climate diagrams are based on 30 years of hourly weather model simulations and available for every place on Earth at 30 Km spatial resolution.

**Figure 4-7: Average Rainfall Profile of Peshawar City**

188. During the months of January, February, June, September and October statistically significant increase is observed in monthly precipitation data. Over the last 55 years, a total rise of about 18mm (maximum percentage increase of about 2.1% rise/month/yr) is observed in June precipitation data. During the same period (1961-2015), quantitatively maximum rise occurred during September, where a total of 23mm rise. Increasing trends are observed in seasonal precipitation during winter (October to January) and monsoon period (June to September). Spring to early summer period also shows rising trend but not statistically significant. Annual precipitation shows a statistically significant rising trend with a total of about 268.3 mm rise during 1961-2015 at a rate of 4.88mm/yr (about 1.02%/yr).

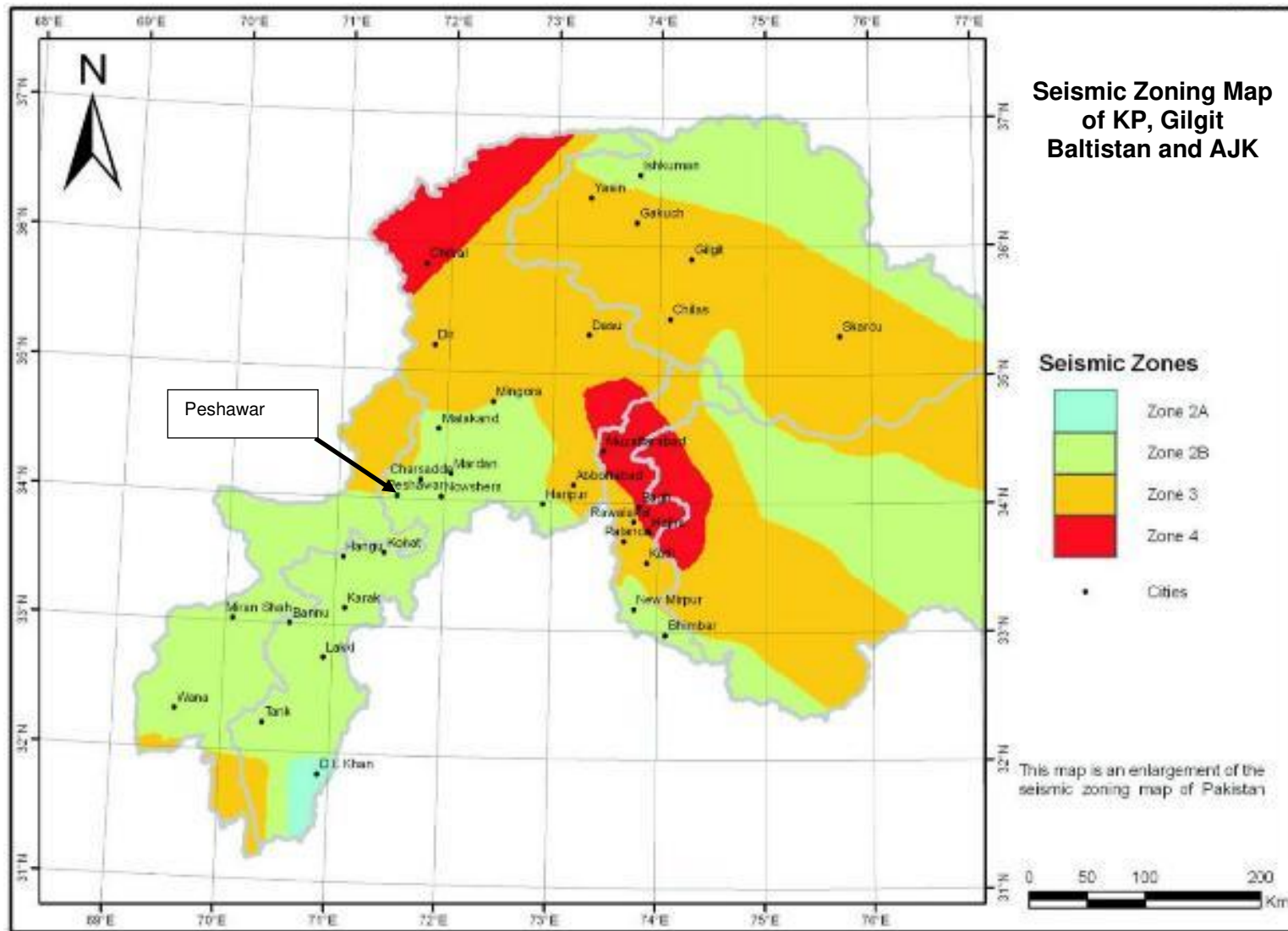
**Figure 4-8: Precipitation trend analysis of Peshawar (1951-2016)**

#### 4.2.7 Seismology

189. The seismic hazard in Peshawar is aggravated by increasing vulnerability due to population growth and expansion in infrastructure due to its political and regional importance. It is located in the western Himalayan region characterized by high seismicity rates due to its vicinity to the active plate boundary between the Indian and Eurasian plates. The seismic zone map of Pakistan is shown in Figure 4.9 below.
190. According to MOHW-PEC-NESPAK (2007), Peshawar is placed in Zone 2B. The Zone 2B has Peak Ground Acceleration (PGA) in the range of 0.16g to 0.24g for a return period of 475 years and is considered to be at 'Moderate' risk of a major earthquake event.
191. It is therefore, recommended that the project structures will be designed to cater for the requirements of Zone 2B of Building Code of Pakistan (2007).



Figure 4-9: Seismic Zones of Pakistan



#### 4.2.8 Surface water

192. There are four important rivers flowing in Peshawar region. Kabul River is the biggest river, which enters Peshawar near Warsak in the west, and discharges into Indus River, 4 km downstream of Jehangira. It divides Peshawar into the northern and southern part. Swat River enters Peshawar in the northwest near village Manda Qila and falls into Kabul River near Charsadda. Bara River flows from the south and enters Peshawar near Jhansi Post. It supplies Peshawar with drinking and irrigation water and discharges into Kabul River. It also drains large area of northern part of Peshawar and finally discharges in the Kabul River 5 km downstream of Nowshera.
193. No surface water body is present in the project area. The entire gravity irrigation system of the valley is controlled by the three headworks Warsak, Munda and Amandara. The first two are located within the Peshawar Valley whereas Amandara Headworks is located near Batkhela in Swat Valley. In addition to these headworks, Warsak weir, located 3 kms downstream of the Warsak Dam, provides diversions for the Kabul River Canal system.
194. There is heavy dependence on the Kabul, Bara and Swat rivers to obtain water for every day use for the residents of Peshawar. The Government authorities are planning a Peshawar Greater Water Supply Scheme, which will allow approximately 200 million gallons per day (MGD) to be pumped in from different rivers to meet the growing requirements of Peshawar.
195. Agriculture in Peshawar is largely dependent on Canals. Moreover, tube wells irrigation is also available in some places. The irrigated land in district Peshawar constitutes a large percentage as compared to other districts of Khyber Pakhtunkhwa. 73% of the rural mouzas are irrigated by canals while 15-20 % are irrigated by other sources including river, Tube-wells, ravine, and spring stream etc.
196. As far as the project area is concerned, there are no water bodies lying in close proximity of the project sites.

#### 4.2.9 Groundwater

197. Researchers of the University of Peshawar Attaullah Khan, Attaur Rahman, Samiullah and Muhammad Ali have published a research paper titled "Impact on the Ground Water Depletion in Peshawar". The research said that groundwater was the sole source of water supply to Peshawar. It stated that the district had more than 1,400 public tube-wells with a total discharge of 8 million gallons/hour. However, public tube-wells are not the only source of freshwater supply but private tube-wells, hand pumps and dug wells are also being used.<sup>10</sup>
198. The demand for freshwater increased from 56 million liters/day to over 213 million liters/day from 1981 to 2017. The projected demand of fresh water of the citizens in 2030 will rise to 310 ml/day. During the same period, the area under the built-up area has increased from 3.70 percent of the total geographical area to 16.27 percent and reduced the infiltration rate by 4 percent. The built-up area in Peshawar has increased to 20,451.39 ha (16.27 percent) in 2014 from 4,635 ha (3.7 percent) in 1981, marking an overall growth of 1,5816.39 ha (340 percent). With the same trend, the projected increase for the year 2030 might be 22 percent.

<sup>10</sup> <https://www.thenews.com.pk/print/875794-urbanisation-putting-strain-on-groundwater-in-peshawar>

199. The increase in impermeable surfaces has depleted the groundwater recharging rate. The recharge rate from precipitation has been reduced to 91.35 mm/year in 2014 from 108.75 mm/year in 1981. The study found the situation quite alarming in the old city due to the falling of water table and drying up of tube-wells. In some areas, the water table has lowered by more than 16 metres.
200. The Government authorities are planning a Peshawar Greater Water Supply Scheme, which will allow approximately 200 million gallons per day (MGD) to be pumped in from different rivers to meet the growing requirements of Peshawar.
201. Groundwater abstraction rate of the Peshawar District is directly linked with its increased population and rapid urbanisation (Adnan and Iqbal 2014). The annual rainfall recharge is very small and the groundwater infiltration from the distributary canals and irrigation is dependent on the influx from the Kabul and Bara rivers which may fluctuate based on the consumption from the upper catchment areas. It is worrisome that 95% of the population depend on the tube wells for drinking and other domestic purposes. Unregulated and increased pumping rates, along with construction of more impervious layers (concrete structures) in the urbanised areas may put the groundwater under even higher stress.
202. The water dependent private and public industries are also responsible for water crises. These include marble factories, paper mills, oil industries and automobile stations. As these industries grow with the passage of time more water is abstracted from the ground, with further depletion to groundwater a concern in the vicinity of these areas (Manzoor Ali, 2007). Past research studies on groundwater of Peshawar district have been carried out, giving more focus on the water quality. However, the aquifer assessment in response to pumping has not been investigated for the entire district.
203. As part of EIA baseline, ground water samples were collected and analyzed from EPA certified lab. The results of the tests are presented as **Annexure D**, which indicates that all parameters of the ground water samples taken are within the applicable NEQS/WHO guidelines with no exceedances observed. Ground water sampling location map is provided as **Figure 4-11**.

#### 4.2.10 Noise

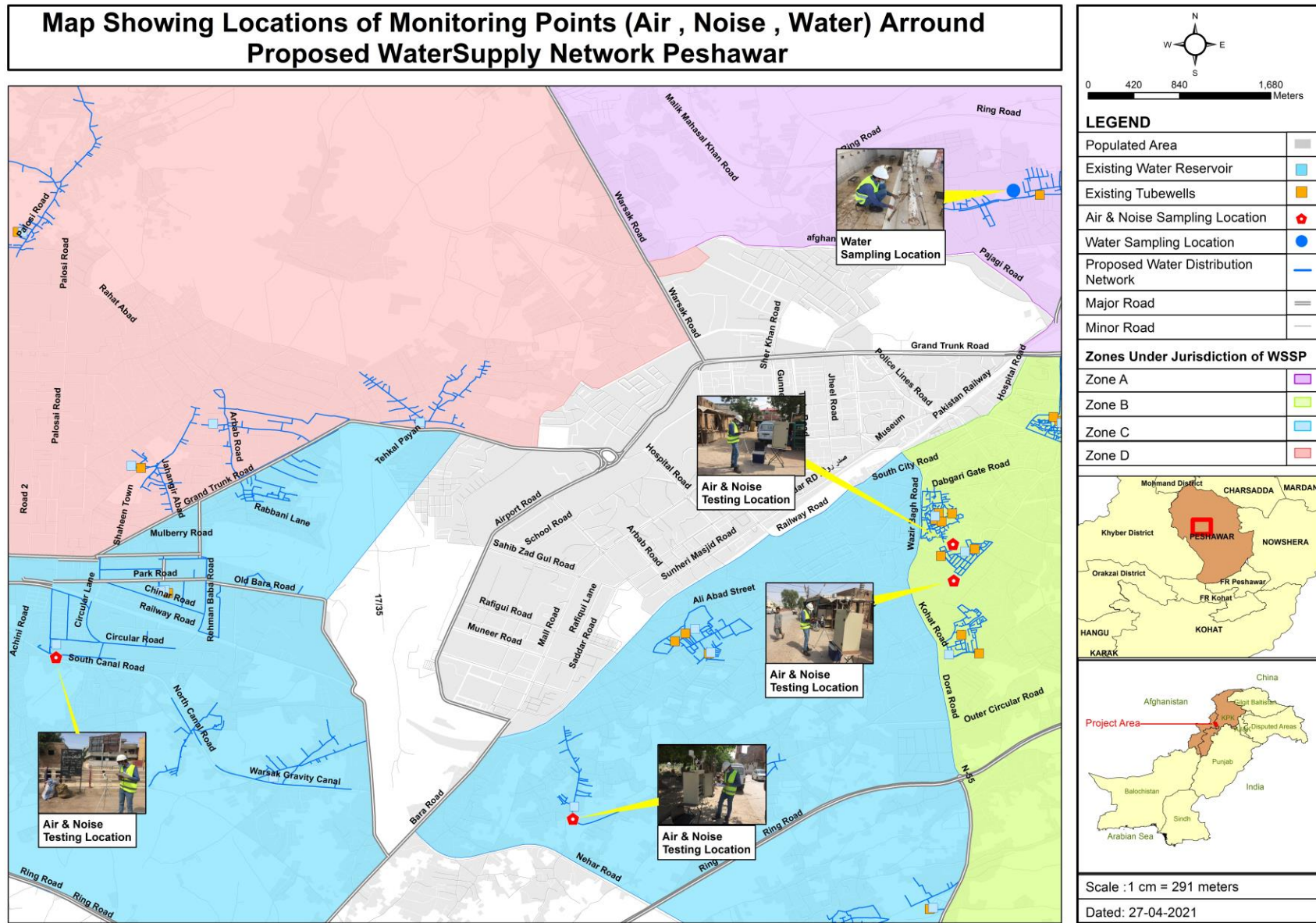
204. The map showing the selected ambient noise monitoring locations and their respective noise readings are provided as **Figure 4.11** below with the comparison of the results also presented in **Table 4.1** below. While the results indicate the ambient noise levels being within the most stringent guidelines during the daytime, however, exceedances were observed at the night time at all locations in the project area. This is not surprising since the project area consists completely of urban area that is a highly built environment with many congested areas and continuous movement of traffic and people during both the day and night times, making noise dissipation difficult.

#### 4.2.11 Air Quality

205. The map showing the selected air quality monitoring locations and their respective ambient air quality readings are provided as **Figure 4.11** below with the comparison of the results presented as **Table 4.2** below. Ambient air quality has been carried out at different locations in the project area where the works will be conducted.
206. As can be observed, in general the air shed seems to be of good quality with the ambient air quality within the acceptable NEQS standards with SO<sub>2</sub> only being exceeded at one location and PM<sub>10</sub> being the only pollutant that is exceeding the guidelines at all monitored

locations while  $PM_{2.5}$  only exceeded the standard at one monitored location. The high particulate matter levels are generally aligned with historical data for this area.

Figure 4-10: Sampling Locations for Environmental Monitoring



**Table 4.1: Ambient Noise Monitoring Results (24 hrs) in Project Area<sup>11</sup>**

Monitoring Location	Parameter	Noise Reading Results	Noise Guideline (Commercial Area)	Compliance Status for Commercial Areas
Day Time Readings (0600 to 2200)			Day time	
34° 1' 40.92"N 71° 34' 3.59"E	dB(A) Leq	59.5	65	
33° 59' 44.93"N 71° 33' 45.89"E		56.7		
33° 59' 55.78"N 71° 33' 45.59"E		61.3		
33° 58' 34"N 71° 31' 52.31"E		58.3		
33° 59' 22.07"N 71° 29' 18.29"E		61.0		
Night Time Readings (2200 to 0600)				Night time
34° 1' 40.92"N 71° 34' 3.59"E	dB(A) Leq	57.8	55	
33° 59' 44.93"N 71° 33' 45.89"E		55.3		
33° 59' 55.78"N 71° 33' 45.59"E		59.9		
33° 58' 34"N 71° 31' 52.31"E		56.9		
33° 59' 22.07"N 71° 29' 18.29"E		59.7		

 Exceedance from applicable guidelines

 'Within' applicable guidelines

<sup>11</sup> Hourly noise readings over a 24 hour period provided by the laboratory were segregated between the day time and night time timings and the respective group of monitored noise levels were averaged to obtain the noise levels provided in the table for each location for day and night times.

**Table 4.2: Comparison of ambient air quality results versus applicable Air Quality standards<sup>12</sup>**

Monitoring Location	Parameter	NO (ug/m <sup>3</sup> )	NO <sub>2</sub> (ug/m <sup>3</sup> )	CO (ug/m <sup>3</sup> )	SO <sub>2</sub> (ug/m <sup>3</sup> )	PM <sub>2.5</sub> (ug/m <sup>3</sup> )	PM <sub>10</sub> (ug/m <sup>3</sup> )
Applicable Guideline (ug/m <sup>3</sup> ) for 24 hrs	Average	-	80	-	20	25	50
34° 1' 40.92"N 71° 34' 3.59"E	-	14.35	19.41	0.91	21.77	23.55	73.62
33° 59' 44.93"N 71° 33' 45.89"E	-	13.26	14.41	0.85	16.81	18.65	59.12
33° 59' 55.78"N 71° 33' 45.59"E	-	12.39	13.07	0.79	14.47	14.45	61.42
33° 58' 34"N 71° 31' 52.31"E	-	14.08	16.95	0.96	19.66	20.95	70.32
33° 59' 22.07"N 71° 29' 18.29"E	-	13.08	14.33	0.89	16.61	25.85	79.62

■ Exceedance from applicable guidelines

■ 'Within' applicable guidelines

#### 4.2.12 Land Use

207. In term of population, Peshawar is the major city of KP. According to the census report of 1961, Peshawar share 29% of the total urban population of KP, and hence was representative of the old city. There was a considerable increase in population due to the migrants from Afghanistan where life and living situation were not friendly. Peshawar, sharing the social and cultural values, located closer to the border of Afghanistan proved to be the best option to live. Therefore, Peshawar always remained vulnerable to urban sprawl especially during Afghan War and recent American Invasion.
208. Raziq A, Xu A, Li Y, Zhao Q (2016) conducted a study to monitor the land use/land cover (LULC) changes and urban sprawl of Peshawar city with the application of geo-information

<sup>12</sup> The ambient air quality was monitored using the AQM 65, which is a fully integrated air monitoring station that delivers near reference levels of performance. The AQM 65 offers the optimal balance for measuring criteria pollutants to WHO air quality limits. With the AQM65 continuously measuring of common air pollutants was carried out and then results are produced on 24 hours average. AQM 65 ensures air quality data is reliable and robust in compliance to USEPA (40 CFR Part 53) and EU (2008/50/EC).



techniques by using Multi-Temporal Satellite Data between 1999 to 2016. The study identified built up area, agricultural land, barren land and water body as four major LULC classes that have provided a substantial change in the city of Peshawar.

209. The study observed significant changes in land use and land cover pattern in the city of Peshawar. Major parts of the agricultural land and barren land have converted into urban area. Water body has increased 0.27%. Similarly, the built-up land has increased 24.55 ha, whilst agricultural land has decreased 21.74 ha, barren land 3.04 ha, water body has increased 0.25 ha between 1999 and 2016. Major changes were observed in the built-up area, which rapidly increased at 26.59%, however, the substantial decreased is found in the agricultural land, barren land in 1999 to 2016.<sup>13</sup>

### 4.3 Ecological Environment

210. In order to identify ecological resources, ecological baseline survey was carried out by EDCM team. Detailed surveys were conducted for project scoping during the start of March and mid of April 2020. The city of Peshawar consists of a completely urban landscape with patches of plants and trees present across the city for the purpose of beautification and landscaping.
211. However, the project area is a disturbed area and is located in the urban sprawl of Peshawar city, consisting of large scale human settlements and thus the possibility of the Ludhar or any other threatened species being present is also extremely low.

#### 4.3.1 Flora

212. In the Peshawar valley, subsistence agriculture is widely practiced with wheat, barley, millet, corn, cotton, pepper and sugarcane being the primary crops. The annual cycle is divided into two planting and harvesting periods, one for wheat and barley in winter and another for corn in summers. Planting and harvesting of sugarcane overlaps both the periods. These crops are supplemented with a variety of vegetables and with clover, which is used in conjunction with millet as a fodder.
213. In many villages in the Peshawar valley, there are extensive pear, peach and apricot orchards and grape vineyards. Tobacco is also an important crop near the town of Nowshera. Wheat, cotton, pepper and particularly Tobacco and sugarcane are grown for the market as well as for local consumption.
214. The present flora of the irrigated areas is exotic. The common trees are mesquite, ber, different species of acacia and jand. The most common shrubs are tarmariax, articulata, spands, akk, small red poppy, spera, pueghambrigul, drab grass, spera, eamelthorl and pohli chaulai etc with the different flora in the project area shown in **Table 4.3** below.
215. Vegetation of the project area is dry deciduous scrub type. The stocking on the whole is poor. There are some species such as trees, grasses and shrubs are found near the project area. Good quality fodder grasses are also found at the moist places, where the incidence of grazing is less.

**Table 4.3: Existing Flora in Project Area**

<sup>13</sup> Raziq A, Xu A, Li Y, Zhao Q (2016) Monitoring of Land Use/Land Cover Changes and Urban Sprawl in Peshawar City in Khyber Pakhtunkhwa: An Application of Geo-Information Techniques Using of Multi-Temporal Satellite Data. J Remote Sensing & GIS 5: 174. doi: 10.4172/2469-4134.1000174



Scientific Name		Common Name	IUCN Status
<b>Tree</b>	Eucalyptus camaldulensis	Safeda	Data Deficient (DD)
	Olea Cuspidata	wild olive	Data Deficient (DD)
	Dodonaea Viscosa	Broad leaf hopbush	Least Concern (LC)
	Acacia Modesta	Phulai	Data Deficient (DD)
<b>Shrub</b>	Gymnosporia Royleana	Royle's Spike Thorn	Data Deficient (DD)
	Ziziphus nummularia	Jujube	Data Deficient (DD)
	Monothea Buxifolia	-	Data Deficient (DD)
<b>Grass</b>	Aristida Depressa	Aristida	Data Deficient (DD)
	Cymbopogon Jawarnica	East Indian lemongrass	Data Deficient (DD)
	Eleusine Flagellifera	Goosegrass	Data Deficient (DD)
<b>Fodder Grass</b>	Bothriochloa Pertusa	Indian bluegrass	Data Deficient (DD)
	Digitaria Bicornis	Crabgrass	Data Deficient (DD)

Source: EDCM Ecology Survey, April 2020

#### 4.3.2 Fauna

216. The fauna present in the project area of the landfill site is provided in **Table 4.4** below.

**Table 4.4: Existing Fauna in Project Area**

Mammals			
Common Name	Scientific Name	Common Name	Scientific Name
<b>Mongoose</b>	Herpestes anropunctatus	<b>Hare</b>	Lepus nigricolus
<b>Gheese/House Shrew</b>	Suncus marinus	<b>Ludhar</b>	Lutra persipiciata
<b>Bat</b>	Pipistralius terwis	<b>Jackal</b>	Canis auries
<b>Black Rat</b>	Ratus ratus	<b>Fox</b>	Vulpe bengalensis
<b>House Rat</b>	Mus musculus	<b>Hedge Hog</b>	Hemiechinus Sp.
<b>Mole Rat</b>	Bandicota bengalensis	<b>Porcupine/She</b>	Hystrixe indircia
<b>Squirrel</b>	Fumbulus penanti		
Birds			
<b>Dove/Common Dove</b>	Streptophelia senegalusis	<b>Indian Sand Martuis</b>	Riparia paludicola

<b>Dove/Common Dove</b>	Streptopelia tranquefabria	<b>Indian River Tern</b>	Sterna auranlia
<b>Larks</b>	Mirfa erythroptra	<b>Black Partridge</b>	Francolinus francolinus
<b>Larks</b>	Erimopterix grisea	<b>Common Babler/Bagla/Chakkira</b>	Turdoides candatus
<b>Larks</b>	Calaendrella cristata	<b>Neel Kanth</b>	Gracius garrulous
<b>Weaver Bird</b>	Ploceus phillipinus	<b>Grey Partridge</b>	Pyeronotus xythopygos
<b>Jungle Pigeon</b>	Teron walia	<b>Shrieks/Lali/Myna</b>	Passeriformes Sp.
<b>Crow</b>	Corcives abyssinica	<b>Owl</b>	Bubo africanus
<b>Sparrow</b>	Passer Sp.	<b>Black Rock Pigeon</b>	Columbia livia
<b>Reptiles</b>			
<b>Indian Cobra</b>	Naja naja		

Source: EDCM Ecology Survey, April 2020

217. Important mammal species found in the vicinity of the project area are mentioned below in the **Table 4.5** with their respective IUCN status in the Red List. No endangered species are present in the project area.

**Table 4.5: IUCN Status of Fauna in Project Area**

<b>Scientific Name</b>		<b>Common Name</b>	<b>IUCN Status</b>
<b>Mammals</b>	Vulpes Vulpes	Red Fox	Least Concern (LC)
	Canis Aureus	Golden Jackal	Least Concern (LC)
	Hystrix Indica	Indian Crested Porcupine	Least Concern (LC)
	Sus Scrofa	Wild Boar	Least Concern (LC)

\*IUCN Red List for species status of Pakistan. EDCM Ecology Survey April 2020

218. The commonly found avifauna of the project area are Shikra (Accipiter badius), Crow (Corvus splendens), Common kite (Milvus migrans), Sparrow (Passer domesticus), Pigeons (Columba livia), Dove (Streptopelia SSP.), Parrot (Psittacula krameri), Partridges. No migratory birds or their routes were found near the project site.

219. There is no protected area in the vicinity of the project area.

#### **4.4 Socio-economic Environment**

220. This section includes a summary of the prevailing socio-economic conditions in the project area and the population that will be potentially affected by the Project. To ascertain the socio-economic condition of the project area, primary and secondary data was collected including social and physical infrastructure in the project area.

221. According to a study conducted in 1993, on the poverty ranking of nine agro-climatic zones: districts and rural areas of Pakistan were ranked on a comparative scale for the

years 1985 and 1988. The study used 1 to 9 ranking scales. The rank 1 indicated the poorest districts. The study placed the Peshawar and surrounding areas at point 8 in 1985 and at point 6 in 1988. It means that this district falls in the slightly above the middle bracket of poverty. Livelihood of the workers living in the project area vary from 8000 to 20,000 rupees depending on the type of their work and type of the employment.

#### 4.4.1 Administrative Setup

222. The project area falls in the jurisdiction of Union Council (UC) Ormar Miana, Peshawar Town 4, Peshawar in Khyber Pakhtunkhwa Province. Under the latest revision of Pakistan's administrative structure, promulgated in 2001, Peshawar was given the status of a City district, and divided into four towns. Each town in turn consists of a number of union councils. There are a total of 92 union councils in district Peshawar.
223. There is only one tehsil in the district i.e. Peshawar tehsil. District administration is headed by the Deputy Commissioner (DC), who is assisted by district heads of departments. The main district departments include: administration, judiciary, police, education, health, communication and works, agriculture, forest, irrigation, telecommunication and livestock. The head of each district department is responsible for the performance of his department and is generally designated as the Deputy Director or District Officer.
224. The names of the major settlements falling in the project area are Ormar Miana, Shamshatoo, Garhi Faizuallah and Garhi Bazar.

#### 4.4.2 Demography and Population

225. The population of Peshawar district in 1998 was 2,026,851. The city's annual growth rate is estimated at 3.99% per year, and the population of Peshawar district is 4,269,079 according to the 2017 census, Peshawar is the sixth-largest city of Pakistan.

Districts	Area (km <sup>2</sup> )	Population (2017)	Density (people/km <sup>2</sup> )
<u>Peshawar</u>	1,257	4,269,079	3,400

\*Source District wise population Census 2017 by Pakistan Bureau of Statistics: Government of Pakistan.

226. Project area is primarily rural suburbs. The average family size in project area is 5.3. Most of the families are living in joint family system. Due to joint family system, the family size is large.

#### 4.4.3 Religion

227. Over 99% of the city's population is Muslim.
228. Despite overwhelmingly Islamic nature of modern Peshawar, it was previously home to other smaller communities such as Afghan Jews, Zoroastrian, Hindus and Sikhs. Its famous markets such as the Qissa Khawani Bazaar (market of story tellers) are emblematic of this mixture of culture and offer a variety of goods including gold and silver ornaments, traditional carpets, pottery, and clothing to artwork in wood, brass and precious stones. Even today, Peshawar is the commercial, economic, political and cultural capital of the Pashtuns as well as a major center of Hindko culture in Pakistan.

#### 4.4.4 Cultural and Archaeological sites

229. No archaeological and cultural site was observed in close proximity of the project area for the proposed works.
230. Peshawar is one of the most ancient cities of this region and for centuries has been a center of trade between Afghanistan, South Asia, and Central Asia as well as the Middle East. It is a conservative Islamic city with a rich history. Peshawar's inhabitants consist mainly of Pashtun and Hindkowans. In addition, many Punjabis, Chitralis, Tajiks, Uzbeks and Hazaras can be found in the city. Archaeological chance find procedure is provided as **Annexure G**.

#### 4.4.5 Ethnicities in Project Area

231. The primary data collected by the EDCM team during EIA baseline survey and public consultation shows the following ethnic diversity in the project area. None of these castes may be considered as indigenous people (IP) based on ADB SPS definition. The ethnicities present in the project area are provided in **Table 4.6** below.

**Table 4.6: Ethnicities in Project Area**

Settlement	Caste/ Tribe	Decision Making Process in Settlements	Locally Used Language
Shamshato	Barki, Ormar	Court of Law, Within caste group	Pashto
Garhi Gulla Khan	Barki	Court of Law, within caste group	Pashto
Ormar Maina	Ormar	Court of Law	Pashto
Garhi Faizuallah	Barki	Court of Law	Pashto

#### 4.4.6 Languages

232. Though Pashto followed by Hindko is the main language spoken in the district, other languages such as Urdu, Persian, Saraiki and Punjabi are also spoken by some of the residents of the district.

#### 4.4.7 Main Sources of Livelihood/Income

233. Major occupations in the project area are small business, shop keeping, government service, ex. government pensioner, farming and labor.

#### 4.4.8 Transport

234. There are four types of vehicles operating as public transport vehicles in Peshawar. The biggest capacity is Minibus, which also has two sub-types: Mazda minibus and Bedford buses. Both sub-types have similar size of approximately 8 meters long with capacity of 41 passengers inside the bus. Passengers also often sit on the roof, despite posing great danger to their life and others. At most, 11 passengers can sit on the roof.
235. The second vehicle type is the Ford wagon, with a capacity of 15 passengers. The seat configuration of the wagon makes passengers difficult to get in and get out of the vehicles, thus most of the passengers on wagon are typically as end-to-end passengers riding the entire route.

236. In addition to the above, the Suzuki vans have started to gain some public transport market shares, with at least 14 routes plying on Peshawar road. Suzuki vehicles are derived from pick-up minivans, modified with fragile roofs to provide cover for passengers. Despite their small size, the Suzuki can carry up to 18 passengers in total (inside and outside). Accident rates are not available, but it would not be surprising if they were listed as the most dangerous public transport option of Peshawar.
237. Small people carrier called Qingqi – named after the Pak-Chinese based motorcycle brand used as the vehicle, are also operating in Peshawar and relatively popular for short distance trips. This vehicle, a modified 3-wheeler with extra cabin at the back for passengers, has a capacity of 6 to 8 passengers.
238. In Peshawar, no public route map exists, although many routes operate in the city. The official data obtained from the Government only listed the minibuses, rocket bus and wagon. Suzuki and Qingqi are operating illegally so no official data is available. Based on the surveys conducted for this project, 7 minibus routes, 2 wagon routes, 13 Suzuki routes and 6 Qingqi routes have been identified.

#### **4.4.9 Industry**

239. Peshawar district is comparatively developed area in the province of Khyber Pakhtunkhwa. Khazana sugar mill and a number of small industrial units in the industrial estates located at Kohat road and Jamrud road are functioning, which are manufacturing hosiery, small arms, leather and foot wear, garments, ghee, soap, etc. Match factories, flour mills and steel re-rolling units are also operating in the district.
240. There are a total of 550 Industrial Units in district Peshawar that provide employment to 14,471 people and the total Investment of all these industries amounts to Rs. 5009.902 million.
241. There is no industry in the close proximity of the proposed project area.

#### **4.4.10 Health Care**

242. Presently, in district Peshawar, health services are provided by both Public and private institutions. There are 12 public hospitals - out of these, 3 are teaching hospitals, 72 private hospitals, 3 Rural Health Center (RHC), 37 civil dispensaries, 4 Maternal and Child Health (MCH) centers, 49 Basic Health Units (BHUs) and 4 Tuberculosis (TB) clinics in district Peshawar. The total beds strength of government teaching hospital is about 3460 beds. Also, there are 1,046 doctors, 176 dispensers, 708 nurses, 60 Lady Health Workers (LHW) and 1,888 other paramedical staff posted by the government in the district.

#### **4.4.11 Literacy Rate**

243. The literacy rate for population 10 years and above (2010-2011) was 54 percent (Males: 68%, Females: 38%).<sup>35</sup> which increased to 59% in 2013. For the urban rural comparison, the urban literacy rate is higher than the rural, which is 62 percent. Among urban community, literacy ratio for male is 75 and for female it is 47; whereas the rural literacy ratio is 45 percent, and in rural community, literacy ratio for male is 61 and for female it is 29. Adult literacy rate (> 15 years) is 51 percent. Gross Enrollment Rate (GER), at the primary level, is 93% (Male: 101%, Female: 85%). Net Enrollment Rate (NER), at the primary level, is 56% (Male: 59%, Female: 52%).

#### **4.4.12 Archaeological and Cultural Heritage**

244. There are no sites of archaeological or cultural heritage located in the project area.

#### **4.4.13 Energy Supplies**

245. The residents of project area are reliant on electricity available from the grid through PESCO (Peshawar Electric Supply Company). Due to long duration load-shedding particularly during summer, there is an increasing trend of using diesel generator and installing solar PV systems in both residences and businesses in order to ensure energy reliability.

#### **4.4.14 Major Source of Drinking Water**

246. The major sources of drinking water within the vicinity of the project area include community tube wells, individual and communal hand pumps.

#### **4.4.15 Social amenities in the project area**

247. During the field survey, the access/ availability of the social amenities/ basic infrastructure in the vicinity of the proposed landfill site was asked from the surveyed households as well as physically observed at site. It was noted that facilities such as Electricity, Sui Gas, Water Supply, Telephone, Sewerage Drainage, school are available in the settlement or in its vicinity.

#### **4.4.16 Gender Assessment**

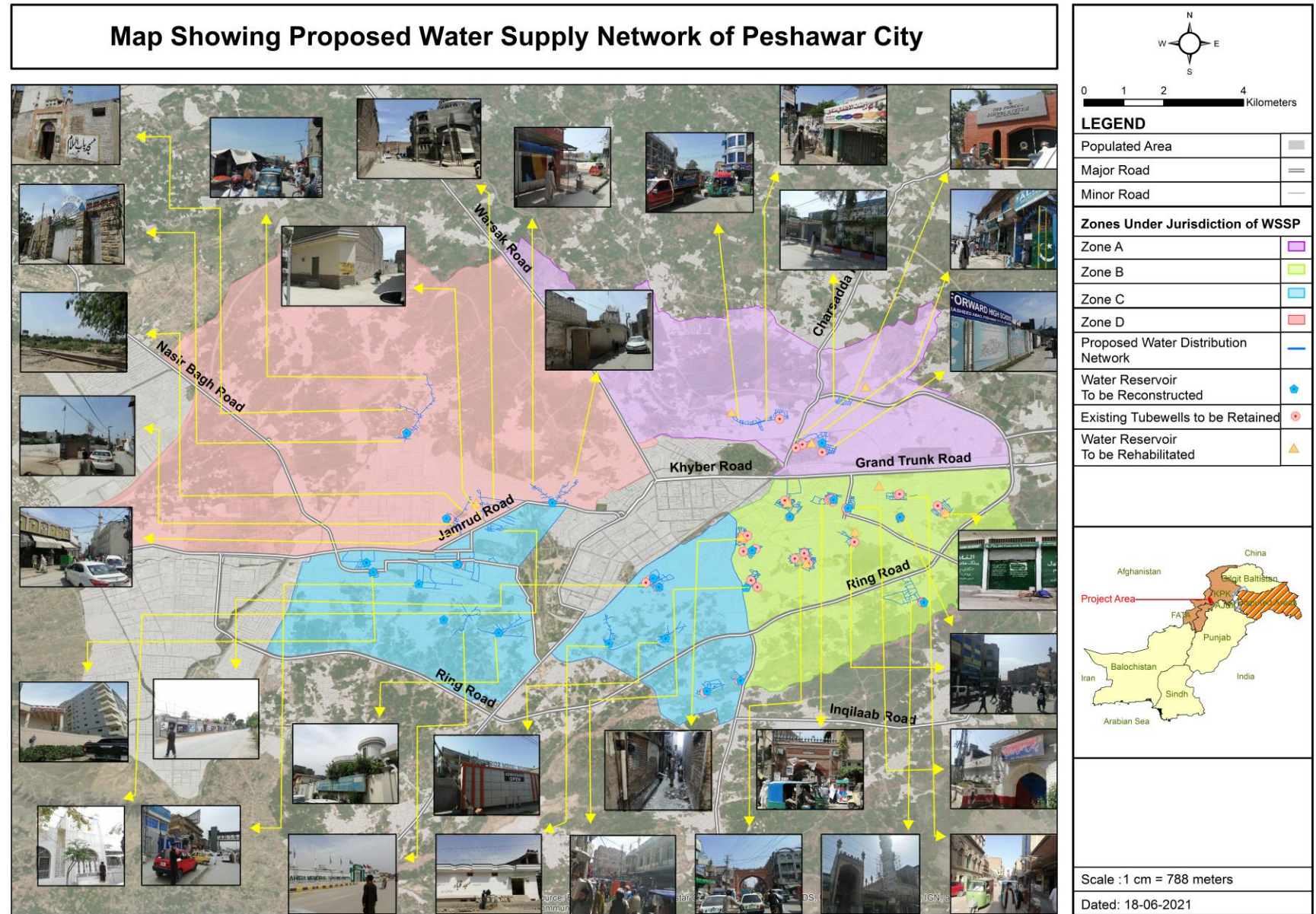
248. A Gender Action Plan (GAP) will be proposed to support the gender element of affected as well as the other households in the project area. PMU Gender specialist will facilitate women specifically (elderly and single women without male support) in preparation of requisites for compensation, which may include the following:
- Opening of bank accounts of women in their name and ensure transparency of transferring compensation allowance
  - Provide priority to vulnerable women/women headed families in compensation provision
  - Maintain gender segregated database
  - Ensure that women are aware about the amount of compensation provisions
  - Include gender disaggregated data in the monitoring and evaluation system
  - Ensure that women specific concerns and priorities are considered in resettlement process.

### **4.5 Sensitive Receptor Mapping**

249. The proposed landfill site location with the sensitive receptors i.e. residential settlements in the form of clusters and individual settlements are shown in **Figure 4.11** and **Table 4.7** below. As can be observed, being an urban built environment, there are a considerable number of settlements located in the project area, which adds to the sensitivity of this project considering the scale of the project and potential impacts to be expected during both the construction and operation phases of the project.



Figure 4-11: Sensitive Receptors and Prominent Structures within project area





**Table 4.7: Sensitive Receptor Map of Project Area**






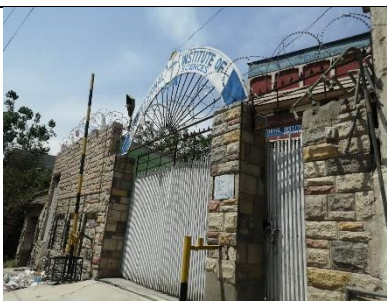


	
<p>School identified as a sensitive receptor in Zone A</p>	<p>School identified as a sensitive receptor in Zone A</p>
	
<p>Forward High School identified as a sensitive receptor in Zone A</p>	<p>Forces School System identified as a sensitive receptor in Zone A</p>
	
<p>School identified as a sensitive receptor in Zone A</p>	<p>Traffic rush at peak hours at a road intersection along the proposed pipeline network in Zone A</p>
	
<p>Food street identified as a sensitive receptor in Zone B</p>	<p>Superior Model School identified as a sensitive receptor in Zone B</p>







	
<p>Narrow streets along which pipeline network for Zone B is proposed</p>	<p>Traffic rush at peak hours on Rehmat Ullah Durrani Chowk in Zone B</p>
	
<p>Mosque identified as a sensitive receptor in Zone B</p>	<p>Al Falah Public High school identified as a sensitive receptor in Zone B</p>
	
<p>Typical view of traffic rush at peak hours in Zone B, along with a mosque identified as a sensitive receptor</p>	<p>Shah Qabool police station identified as a sensitive receptor in Zone B</p>
	

Typical view of traffic rush at peak hours in Zone B	Road intersection along the proposed pipeline network in Zone B
	
Mosque Quba identified as a sensitive receptor in Zone B	NCS University System identified as a sensitive receptor in Zone C
	
ICMS College System and Overhead bridge along the proposed Pipeline network in Zone C	Residential apartments along the proposed pipeline network in Zone C
	
Mosque identified as a sensitive receptor in Zone C	Mosque identified as a sensitive receptor in Zone C



	
<p>KP Technical Education Directorate identified as a sensitive receptor in Zone C</p>	<p>Sports academy identified as a sensitive receptor in Zone C</p>
	
<p>Road intersection along the proposed pipeline network Forest Bazaar in Zone D</p>	<p>Road intersection along the proposed pipeline network in Zone D</p>
	
<p>Graveyard identified as a sensitive receptor in Zone D</p>	<p>School identified as a sensitive receptor in Zone D</p>
	
<p>GGPS Hazar Khwani identified as a sensitive receptor in Zone D</p>	<p>Busy market road near Forest Bazaar in peak hours in Zone D</p>

	
<p>Public gathering place identified as a sensitive receptor in Zone D</p>	<p>Mosque identified as a sensitive receptor in Zone D</p>
	
<p>Mosque Baab Ul Islam identified as a sensitive receptor in Zone D</p>	<p>Road intersection along the proposed pipeline network in Zone D</p>

## 5 Analysis of Alternatives

### 5.1 Overview

250. The scope of works for the proposed activities consist of installing of new water supply while also rehabilitating existing infrastructure. The installation of new water supply infrastructure is based on detailed feasibility assessments focusing on assessing the city requirements with regards to the water supply and then determining the most suitable and effective alignment for laying the required infrastructure.

### 5.2 No Project' Option

251. At present, Peshawar city is urgently in need of immediate improvement of the water supply with the present status as follows:

#### **Water Sector<sup>14</sup>**

- Only 12 percent of the population is connected to the water supply system in the MC<sup>15</sup> area out of 41 percent served population;
- Leaked and old water distribution network consisting of Asbestos Cement (AC), Galvanized Iron (GI), Cast Iron (CI), Mild Steel (MS) and unplasticized polyvinyl chloride (Upvc) pipes;
- Mixing of sewage with water, resulting in contaminated water being supplied to households;
- Unbalanced pressures in the city;
- Water supply system operating on direct pumping mostly;
- Working hours of tubewells are only ten hours, which is not in accordance with Punjab Devolved Social Services Program (PDSSP) guidelines;
- Operational issues

### 5.3 Alternative use of technology (Construction equipment, methodology etc.)

252. The construction equipment and methodology to be used for the proposed project works consists of standard practices that are used globally. Thus, no alternative equipment options and/or methodologies were available.

<sup>14</sup> PC-1 document, Page 4

<sup>15</sup> Municipal Corporation

## 5.4 Selection of Underground Pipe Material

### 5.4.1 Pipe Material

253. Project requirement can be fulfilled through three types of pipes, depending upon the following critical aspects:

- Service Conditions
  - i. Pipeline pressure
  - ii. Corrosion potential of soil and
  - iii. Soil loads
- Availability
  - i. Sizes and
  - ii. Fittings
- Properties of Pipes
  - i. Strength
  - ii. Ductility
  - iii. Corrosion Resistance and
  - iv. Fluid Friction Resistance.
- Economics
  - i. Required life
  - ii. Maintenance
  - iii. Cost and
  - iv. Repair.

#### **Option 1: Ductile Iron Pipes**

254. Ductile iron pipe is a pipe made of ductile cast iron commonly used for potable water transmission and distribution. This type of pipe is a direct development of earlier cast iron pipe, which it has superseded. The ductile iron used to manufacture the pipe is characterized by the spheroidal or nodular nature of the graphite within the iron.

#### **Option 2: High Density Polyethylene (HDPE) Pipes**

255. HDPE pipe is a type of flexible plastic pipe used for fluid and gas transfer and is often used to replace ageing concrete or steel mains pipelines. Made from the thermoplastic HDPE (high-density polyethylene), its high level of impermeability and strong molecular bond make it suitable for high pressure pipelines. HDPE pipe is used across the globe for applications such as water mains, gas mains.

#### **Option 3: Steel Pipes**

256. Carbon steel is sometimes referred to as 'mild steel' or 'plain carbon steel'. Mild steel makes up the largest part of steel production and is used in a vast range of applications. They are strong and can be welded and joined with perfection.
257. Considering the project requirement, based on discharge and pressure in the pipelines, the ductile iron and steel pipes have been found suitable for large diameter pipelines. In the recent past, the high-density polyethylene pipes have been introduced in the water supply engineering and have the benefit of low friction co-efficient and less power consumption. In addition, there are other factors which determine the selection of material. The merits and demerits of each of pipe material are discussed in the **Table 5.1** below.

**Table 5.1: Merits and demerits of Pipes**

Pipe Material	Merits	Demerits
<b>Ductile Iron Pipe</b>	<ul style="list-style-type: none"> <li>• High strength for supporting earth loads, long life.</li> <li>• Yield Strength: 290,000 kPa (42,000 lb./in<sup>2</sup>)</li> <li>• Ultimate Strength: 414,000 kPa (60,000 lb./in<sup>2</sup>)</li> <li>• <math>E = 166 \times 106 \text{ kPa}</math> (<math>24 \times 106 \text{ lb./in}^2</math>)</li> <li>• Ductile, elongation ~ 10%</li> <li>• Good corrosion resistance</li> <li>• Wide variety of available fittings and joints</li> <li>• Available size: 100-2000 mm (4-80 in)</li> <li>• Wide range of available thicknesses</li> <li>• Good resistance to water hammer</li> <li>• Most widely used because of its stiffness, strength, toughness and durability in many kinds of ground</li> <li>• Easy to lay, because of push-on joints, specifically in urban area, the pace of work is fast than other types</li> </ul>	<ul style="list-style-type: none"> <li>• May required wrapping or Cathodic protection in corrosive soils</li> <li>• Maximum pressure = 2400 kPa (350 lb./in<sup>2</sup>)</li> <li>• High cost, especially for long freight hauls</li> </ul>

Pipe Material	Merits	Demerits
	of pipes such as MS or HDPE pipes.	
<b>High density Polyethylene (HDPE) Pipe</b>	<ul style="list-style-type: none"> <li>Tensile strength (hydrostatic design basis) = (8600 to 11,000 kPa) (1250 to 1600 lb./in<sup>2</sup>)</li> <li>Light weight, very durable, very smooth, liners and wrapping not required for corrosion protection; usually jointing method is thermal but fusion, which develops the full strength of the pipe; flanges can be provided; diameters from 100 through 1575 mm (4 through 63 in.);</li> <li>Low installed cost</li> <li>Can be easily tempered by miscreants</li> </ul>	<ul style="list-style-type: none"> <li>Subject (as are many plastics, including PVC) to permeation by low molecular weight organic solvents and petroleum products, unsuited for manifold piping for pumping stations; scratches on the pipe wall can significantly reduce service life; requires careful bedding and compaction beneath the spring line; cannot be solvent welded nor threaded.</li> </ul>
<b>Steel Pipe</b>	<ul style="list-style-type: none"> <li>High strength for supporting earth loads</li> <li>Yield strength: 207,000 - 414,000 kPa (30,000 – 60,000 lb./in<sup>2</sup>)</li> <li>Ultimate strengths: 338,000 – 518,000 kPa (49,000 – 75,000 lb./in<sup>2</sup>)</li> <li>E = 207 × 106 kPa (30 × 106 lb./in<sup>2</sup>)</li> <li>Ductile elongation 17-35%</li> <li>Pressure rating to 17,000 kPa (25,00 lb./in<sup>2</sup>)</li> <li>Diameters to 3.66 m (12 ft)</li> <li>Low cost, Widest variety of available fittings and joints</li> </ul>	<ul style="list-style-type: none"> <li>Poor corrosion resistance unless both lined and coated or wrapped</li> <li>May require cathodic protection in corrosive soils</li> <li>When steel pipelines pass parallel to and up to about 50 to 200 m away from overhead high voltage lines, stray electrical potential may be induced on the pipeline. This will require the pipeline to be earthed, thus adds to the complexity for the protection of steel pipes in urban areas</li> </ul>



Pipe Material	Merits	Demerits
	and custom fittings can be metered and welded <ul style="list-style-type: none"> <li>• Excellent resistance to water hammer</li> </ul>	<ul style="list-style-type: none"> <li>• Since MS pipes are welded at joints, and then each joint will have to X-Ray testing, the pace of work is very slow in urban areas as compared to DI pipes.</li> </ul>

258. In view of merits and demerits discussed in above table, HDPE<sup>16</sup> pipes have been proposed to be adopted because of durability and resistance to corrosion and cost.

<sup>16</sup> Pipe Material will be finalized at the time of Detail design by EPC Contractor and PMU.

## 6 Potential Environmental Impacts and Mitigation Measures

259. Potential impacts arising from design and construction and operation phase have been identified and assessed on the basis of field data, secondary data, expert opinion and examining previous similar projects in Pakistan. These include effects on physical, biological and socio-economic environments. Impacts associated with design, construction and operation phases of project components have been detailed in the section.
260. Impact-screening matrices during development phases i.e. project design, construction and operation are presented below.

### 6.1 Methodology for impact screening

261. The methodology for assessing the risk level associated with each potential impact is presented below.
262. Risk is assessed as the likelihood that the activity will have an effect on the environment as well as the consequence of the effect occurring. It is often described like this:

$$\text{Risk} = \text{Likelihood} \times \text{Consequence}$$

#### Likelihood Scale

Likelihood	Definition	Scale
Certain	Will certainly occur during the activity at a frequency greater than every week if preventative measures are not applied	5
Likely	Will occur more than once or twice during the activity but less than weekly if preventive measures are not applied	3
Unlikely	May occur once or twice during the activity if preventive measures are not applied	2
Rare	Unlikely to occur during the project	1

### Consequence Scale

Consequence	Definition	Score
Catastrophic	The action will cause unprecedented damage or impacts on the environment or surrounding communities	5
Major	The action will cause major adverse damage on the environment or surrounding communities	3
Moderate	No or minimal adverse environmental or social impacts	2
Minor	No or minimal adverse environmental or social impacts	1

### Risk Score Table

Likelihood	Consequence				
		Catastrophic	Major	Moderate	Minor
	Certain	25	15	10	5
	Likely	15	9	6	3
	Unlikely	10	6	4	2
	Rare	5	3	2	1

Risk: Significant: 15-25

Medium: 6-10

Low 1-5

263. Any 'Medium' to 'Significant' risk requires an environmental management measure to manage the potential environmental risk. Judgment will be required concerning the application of an environmental management measure to mitigate low risk situations.

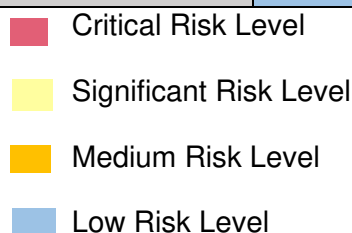
## 6.2 Design/Pre-Construction Phase

### *Impact Screening Matrix*

264. The 'activity wise' screening of potential impacts during the design/pre-construction phase is provided in **Table 6.1** below.

**Table 6.1: 'Activity Wise' screening of possible Impacts during Design/Pre-Construction phase**

Key Aspect	Proposed Activity				
	Tube well installation as part of rehabilitation	Overhead tank installation	Laying of water supply pipelines	Installation of Water Meters	Rehabilitation of TW, OHR & Pumping Machinery
<b>Pre-Construction Phase</b>					
Damage/disturbance to Utilities services	Low	Low	Significant	Low	Low
Traffic Management	Low	Low	Significant	Low	Low
Lack of integration of IEE/EMP requirements into Construction bid documents	Medium	Medium	Significant	Low	Medium
Planning of Material Haul Routes	Low	Low	Significant	Low	Low
Contractor's Environmental Safeguards Capacity	Medium	Medium	Medium	Low	Medium
Identification of locations of Labor Camps and ancillary facilities	Low	Low	Medium	Low	Low
Cultural Heritage & Religious Sites	Low	Low	Low	Low	Low
Land Acquisition and Resettlement Impacts	Low	Low	Low	Low	Low



### 6.2.1 Relocation of Utilities services

#### Impacts

265. Utility services such as water lines, gas pipelines, electrical cables and telephone lines lying in close proximity or passing along the alignments for the water pipeline to be laid or

near tubewell installation sites may need to be relocated, temporarily or permanently to prevent damage to them during the construction works.

### **Mitigation Measures**

266. Detailed field surveys will be conducted to assess any sub-surface utilities that might be present under the proposed alignments for the water pipeline to be laid or near tubewell installation sites. Furthermore, any power transmission lines and/or telephone lines passing in front of the project site or in close proximity to it shall be relocated prior to commencement of physical works.
267. Based on the utilities that are identified, a relocation plan of those utilities will be developed by the respective line agencies in close coordination with the PIU and implemented.
268. In case any utilities can be allowed to remain in place and avoidance of their damage is possible, the Contractor will need to be aware of the location of these services so that disruptions are not caused. In such a scenario, the responsibility for any repair of damaged services will lie with the Contractor.

## **6.2.2 Development of Traffic Management Plan**

### **Impacts**

269. In particular, the laying of water pipelines could result in heavy congestion due to the movement of construction heavy machinery and equipment with significant delays for traffic apart from posing a significant accident risk for vehicles.

### **Mitigation Measures**

270. A comprehensive plan shall be developed by the EPCM consultant and approved by the PIU that will contain traffic diversion onto alternate routes and management traffic flows to minimize congestion and the possibility of accidents. This plan shall be appended to the EMP and will be implemented by the Contractor.

## **6.2.3 Lack of integration of IEE/EMP requirements into Construction bid documents**

### **Impacts**

271. The bidding documents must reflect the requirement to select a qualified and experienced contractor from the perspective of ensuring implementation of required safeguards during project development.

### **Mitigation Measures**

272. The proposed 'Safeguards unit' that will be developed at the PMU will be assigned the task to check that design and bid documents are responsive to key environmental, social and safety considerations, and that the proposed method of work reflects the boundaries defined in the EMP. The bid documents must include the EMP and its implementation cost must be reflected in the BoQ.

## **6.2.4 Material Haul Routes**

### **Impacts**

273. Hauling of material can have significant impacts on the community, public safety, traffic congestion, air quality and lifespan of the Peshawar city road ways.

#### **Mitigation Measures**

274. The construction vehicles hauling materials along the Peshawar city roads and anywhere where there are sensitive receptors such as hospitals, schools and/or roadside residences will be limited and the PMU in collaboration with the CIU will establish a route plan to minimize this disruption which shall be appended to the EMP.

### **6.2.5 Contractor's Environmental Safeguards Capacity**

#### **Impacts**

275. The responsibility of the PMU in collaboration with the CIU is to review and finalize the documents relating to environmental issues. Contractors that do not possess the required capacity for safeguards management do not comply with workplace environmental, social and safety regulations.

#### **Mitigation Measures**

276. So far, local contractor firms in Pakistan working on large and medium scale environmentally sensitive projects have an unsatisfactory record for complying with workplace and environmental safety regulations. To address this, the contractor will be required to define an Occupational and Environmental Health and Safety procedure for all work, including work camp operation, management of cement dust, and use of Personal Safety Equipment. These procedures will be developed and approved by the PMU before the contractor commences any physical works on ground.

### **6.2.6 Identification of Locations for Labor Camps and ancillary facilities**

#### **Impacts**

277. The duration of the construction activity is expected to be 36 months and a considerable amount of work force will be engaged, particularly for laying the water supply pipelines. As a result, worker camps will need to be developed and ancillary facilities will need to be provided such as electricity, washrooms for labor with suitable effluent and sewage disposal facilities as well as water for their everyday use for drinking and bathing etc.

#### **Mitigation measures**

278. In order to prevent a nuisance, specific locations shall be designated along the proposed alignments for development of the labor camps. All necessary facilities and amenities shall be provided in these camps such as electricity, sufficient supply of water, solid and liquid effluent waste disposal facilities etc.
279. The use of proper planning while identifying locations for the labor camps will ensure there is minimal disturbance to all key receptors along the project alignments and the traffic is not disrupted by labor camps being set up roadside next to the construction sites.

### **6.2.7 Cultural Heritage & Religious Sites, Social Infrastructure**

**Impacts**

280. No temples or religious sites are in proximity to the works to cause a nuisance.
281. The sensitive receptors already identified in the project areas are all separated from the sub-project and there will be sufficient buffer distance between the works and these facilities such that no major significant impact would be expected from the works. However, consideration will be made not to construct at night, from 7 pm onwards till 6 am in the morning, to avoid nuisances.

**Mitigation Measures**

No mitigation measures are required.

**6.2.8 Land Acquisition and Resettlement Impacts****Impacts**

282. The proposed works will be conducted on publicly owned land and no land acquisition or resettlement is expected.

**Mitigation Measures**

No mitigation measures required.

**6.3 Construction Phase*****Impact Screening Matrix***

283. The screening of potential impacts during the construction phase is provided in **Table 6.2** below.

**Table 6.2: Screening of Possible Impacts during Construction Phase**

Key Aspect	Activity				
	Tube well installation as part of rehabilitation	Overhead tank installation	Laying of water supply pipelines	Installation of Water Meters	Rehabilitation of TW, OHR & Pumping Machinery
<b>Construction Phase</b>					
Traffic Management	Low	Low	Significant	Low	Low
Community Health and Safety	Low	Low	Medium	Low	Low
Air Quality	Low	Low	Medium	Low	Low
Noise	Low	Low	Medium	Low	Low

Key Aspect	Activity				
	Tube well installation as part of rehabilitation	Overhead tank installation	Laying of water supply pipelines	Installation of Water Meters	Rehabilitation of TW, OHR & Pumping Machinery
Occupational Health and Safety	Medium	Low	Medium	Low	Low
Disposal of Spoil and Solid Waste	Low	Low	Medium	Low	Low
Hazardous and Non-hazardous Waste Management	Low	Low	Medium	Low	Low
Loss of Access in project areas	Low	Low	Medium	Low	Low
Vegetation and Wildlife Loss	Low	Low	Low	Low	Low
Natural and Manmade hazards	Low	Low	Low	Low	Low
Historical/Archaeological Sites	Low	Low	Low	Low	Low
Employment Conflicts	Low	Low	Low	Low	Low

- Critical Risk Level
- Significant Risk Level
- Medium Risk Level
- Low Risk Level

### 6.3.1 Traffic Management

#### Impacts

284. The construction phase of the proposed sub-project, particularly the laying of the water supply pipelines, could result in heavy congestion due to the movement of construction heavy machinery and equipment with significant delays for traffic apart from posing a significant accident risk for vehicles.
285. The efficient management of traffic once the construction activity commences will be critical in order to minimize the risk of possible road accidents and construction related hazards.

#### Mitigation Measures



- Traffic signs and warning instructions shall be displayed at the sites and along the proposed routes being used by the construction traffic for the information of another road traffic as well.
- In addition, an awareness campaign will be launched for citizens of Peshawar city about the traffic management plan, closed streets, bypasses etc. through radio, television, newspapers etc. with a budget to be allocated for such a campaign.
- The potential risks of accidents to pedestrians and commuters while in the immediate vicinity of construction sites shall be conveyed to them in order to educate them and gain their cooperation and minimize the risk of accidents.
- Employ flag persons to control traffic at the work sites for safety reasons when construction equipment is entering or leaving the work area.
- The lane immediately in front of the work site must be closed and incoming traffic diverted away from the work site using rope or flagging to minimize risks and injuries from any falling objects.
- As much as possible, lifting and placing of any pre-cast sections will be done at night to minimize traffic congestion.
- Post traffic advisory signs (to minimize traffic build-up) in coordination with local authorities.
- Provide road signs indicating the lane is closed 500 m before the worksite.
- Use traffic cones to direct traffic to move to the open lane.
- Provide sufficient lighting at night within and in the vicinity of the construction site.
- Regularly monitor traffic conditions along access roads to ensure that project vehicles are not causing congestion.
- Define and observe schedules for different types of construction traffic trips (e.g., transport of any pre-cast sections, haulage of spoils, delivery of construction materials, etc.).
- As much as possible, schedule delivery of construction materials and equipment as well as transport of spoils during non-peak hours.
- Avoid movements of noisy vehicles during night time in vicinity of sensitive receivers.
- Ensure relocation of the affected public transport infrastructure (but stops, shelters etc.) prior to commencement of works.
- Comply with traffic regulations and avoid, where possible, roads with the highest traffic volumes, high density of sensitive receivers or capacity constraints are not used as access to and from the construction areas and spoil disposal sites.
- Install temporary accesses to properties affected by disruption to their permanent accesses.
- Reinstate good quality permanent accesses following completion of construction.

### **6.3.2 Community Health and Safety**

#### **Impacts**

286. The laying of water supply pipelines, in particular, will require the digging of trenches for laying these lines and will involve the use of considerable heavy machinery at the project site along with posing the risk of community members falling into these trenches. In addition, the risk to commuters on the road during the construction works will be significant and thus a number of precautionary measures will be necessary to minimize the risk of possible accidents.

### **Mitigation Measures**

287. The following mitigation measures will be implemented:
- Work areas outside the project site, especially where machinery is involved, will be barricaded and will be constantly monitored to ensure that local residents, particularly children stay away while excavated areas being prepared for laying of water pipelines and sewer lines will also be cordoned off. Also, no machinery will be left unattended, particularly in running condition.
  - Local communities in the project area will be briefed on traffic safety, especially women who are the main care providers to children.
  - Speed limit of 20 km/hr will be maintained by all project related vehicles and nighttime driving of project vehicles will be limited where possible.
  - Educate drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances and other construction materials during transport.

### **6.3.3 Air Quality**

#### **Impacts**

288. The proposed laying of water pipelines will involve large scale earth works and transporting and dumping large quantities of dry material. This will likely lead to an increase in SPM (Suspended Particulate Matter) in and around the construction zones.
289. Potential sources of particulate matter emission during construction activities include earthworks (dirt or debris pushing and grading), exposed surfaces, exposed storage piles, truck dumping, hauling, vehicle movement on unpaved roads, combustion of liquid fuel in equipment and vehicles, land excavation, and concrete mixing and batching.
290. Vehicles carrying construction material are expected to result in increased SPM levels near the haul roads. This can be of potential importance if the vehicles pass through the areas with a high concentration of sensitive receptors, such as schools and hospitals in this particular case. The list of sensitive receptors in the project area that are expected to be impacted by the dust emissions are provided as **Figure 4.11** and **Table 4.7**.
291. At the construction yard, the dust levels are also expected to increase due to unloading of construction materials. It shall be ensured that most of the excavated material will be used within the project, with minimal cut and fill material to come from outside the site.
292. The quantity of dust that will be generated on a particular day will depend on the magnitude and nature of activity and the atmospheric conditions prevailing on the day. Due to the uncertainty in values of these parameters, it is not possible to calculate the quantity from a 'bottom-up' approach, that is, from adding PM<sub>10</sub> emissions from every activity on the construction site separately. Typical and worst-case PM<sub>10</sub> emissions from construction

sites have been estimated<sup>17</sup> as 0.27 megagram per hectare per month of activity (Mg/ha-month) and 1.04 Mg/ha-month, respectively.

### Fugitive Dust Control

293. The source wise fugitive control measures are provided in **Table 6.3** below.

**Table 6.3: Control measures for Fugitive Dust emissions**

Source	Control Measures
Earth Moving	For any earth moving that is to take place in the immediate vicinity from the site boundary, watering must be conducted as required to prevent visible dust emissions
Disturbed Surface Areas	Apply dust suppression measures (clear vegetation only from areas where work is to commence, plant or mulch areas that will not receive traffic, construct artificial wind breaks or wind screens) frequently to maintain a stabilized surface.  Areas that cannot be stabilized, such as wind driven dust, must have an application of water at least twice a day
Inactive Disturbed Surface Areas	Apply dust suppressants (clear vegetation only from areas where work is to commence, plant or mulch areas that will not receive traffic, construct artificial wind breaks or wind screens) in sufficient quantity and frequency to maintain a stabilized surface
Unpaved Roads	Water all roads used for any vehicular traffic at least twice per day during active operations and restrict vehicle speed to 20 kmph.
Open Storage Piles	Apply water to at least 80 percent of the surface areas of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust or install an enclosure all along the storage piles
Track-out Control	Wash down of construction vehicles (particularly tyres) prior to departure from site.

### Mitigation Measures

294. The following mitigation measures will be adopted for preservation of the environment:

<sup>17</sup> Gaffney, G. and Shimp, D. 1997. *Improving PM<sub>10</sub> Fugitive Dust Emission Inventories*. Sacramento, CA. California Air Resource Board. <[www.arb.ca.gov/emisinv/pubs/pm10tmp.pdf](http://www.arb.ca.gov/emisinv/pubs/pm10tmp.pdf)>

- Along the project alignment with water pipelines being laid, water will be sprinkled every three hours and at a higher frequency if felt necessary, at all construction sites to suppress dust emissions.
- All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations.
- Stockpiled soil and sand shall be slightly wetted before loading, particularly in windy conditions.
- Fuel-efficient and well-maintained vehicles shall be employed to minimize exhaust emissions.
- Vehicles transporting soil, sand and other construction materials shall be covered with tarpaulin.
- Limit idling of vehicles to 3-5 minutes to reduce air pollution.
- Limitations to speeds of such vehicles as felt necessary. Transport through densely populated area shall be avoided.
- Concrete plants to be controlled in line with statutory requirements and shall not be close to sensitive receptors.
- Stack height of generators will be at least 3 meters above the ground.
- Project traffic will maintain maximum speed limit of 20 km/hr on all unsealed roads within project area.
- A minimum distance of 300 meters will be ensured between batching plant(s) and the nearest community.
- The need for large stockpiles shall be minimized by careful planning of the supply of materials from controlled sources. Stockpiles shall not be located within 50 m of schools, hospitals or other public amenities and shall be covered with tarpaulin when not in use and at the end of the working day to enclose dust. If large stockpiles (>25m<sup>3</sup>) of crushed materials are necessary, they shall be enclosed with side barriers and also covered when not in use.

### **Vehicular & Equipment Emissions**

295. It shall be ensured that the following measures are taken to control emissions from vehicles being used in the construction activity:
- Periodically check and conduct maintenance of the construction machinery and haul vehicles.
  - Regularly change the engine oil and use new engines/machinery/equipment having good efficiency and fuel burning characteristics.
  - Use of catalytic converters and low Sulphur fuels.
  - The stack height of generators will be at least 3 meters above the ground.
  - Idling of vehicles on the site will be limited to 3-5 minutes.
  - All type of machinery and generator must comply with the NEQS. Vehicles, which are not in compliance with NEQS will not be allowed to be used.
  - Training of the technicians and operators of the construction machinery and drivers of the vehicles.
  - Air quality monitoring at the project site during the construction phase.

### 6.3.4 Noise

#### Impacts

296. The laying of water pipelines will result in different construction equipment and machinery being used which will generate high noise levels at the project sites and in the project areas.
297. Mostly commercial facilities and a minor proportion of residences are lying within the corridor of impact. The detailed mapping of sensitive receptors has been conducted and the types of receptors are provided as as **Figure 4.11** and **Table 4.7**.
298. However, any required mitigation measures that shall be proposed will be to control potential impacts on noise to prevent any long-term impacts within the project area.
299. The assessment of the noise impacts on the sensitive receptors that have been identified at various locations in the project area depend upon:
  - Characteristics of noise source (instantaneous, intermittent or continuous in nature)
  - Time of day at which noise occurs, and
  - Location of noise source
300. Each construction phase has its unique noise characteristics due to use of different equipment items. The potential sources of noise during the preparation, construction, and worksite closure phases for the proposed works include equipment, machinery, and transportation used for the construction activities. The equipment used for construction will be the major source of noise. There will be temporary noise impacts in the immediate vicinity of the project sites, consisting primarily of commercial areas such as mosques, hospitals and schools.
301. The construction activities will include use of generators, excavators, concrete mixing trucks and back up alarms, which can generate significant noise.
302. Since various modern machines are acoustically designed to generate low noise levels, any high noise levels that might be generated will only be for a short duration during the construction phase.
303. Depending on the construction equipment used and its distance from the receptors, the community and the workers may typically be exposed to intermittent and variable noise levels. During the day, such noise results in general annoyance and can interfere with sleep during the night. In general, human sound perception is such that a change in sound level of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as a doubling or halving of sound level.
304. Due to the various construction activities, there will be temporary noise impacts in the immediate vicinity of the project site. The movement of heavy vehicles, loading, transportation and unloading of construction materials produces significant noise during the construction stage. However, these increased noise levels will prevail only for a short duration during the construction phase.
305. The **Table 6.4** below represents typical noise levels from various construction equipment items. It shall be noted that the values indicated in the table may differ depending on the brand and age of machinery provided/used by construction company.

**Table 6.4: Construction Equipment Noise Ranges, dB(A)**

Equipment	Peak Noise Range at 15 m	Typical Peak Sound Level in a Work Cycle <sup>a</sup> at 15 m	Typical 'Quieted Equipment' Sound Level <sup>b</sup> at 15 m	Construction Phase		
				Earthworks	Structures	Installation
Batching plant	82-86	84	81		Y	
Concrete mixers	76-92	85	82		Y	
Cranes	70-94	83	80		Y	Y
Excavators	74-92	85	82	Y		
Front loader	77-94	85	82	Y	Y	Y
Water bowzers	85-93	88	85	Y	Y	Y
Graders	72-92	85	82	Y		
Bulldozers	65-95	85	80	Y		
Pavers	87-89	88	80	Y		
Pumps	68-72	76	75	Y	Y	Y
Diesel generators	72-82	81	77		Y	Y
Drilling machines	82-98	90	87		Y	Y
Compressors	74-88	81	71		Y	
Dumpers	77-96	88	83	Y	Y	
Dump/flatbed Truck	75-85	80	77	Y	Y	Y

**Sources:** USEPA, 1971; <http://www.waterrights.ca.gov/EIRD/text/Ch11-Noise.pdf>;  
[http://www.lacsd.org/LWRP%202020%20Facilities%20Plan%20DEIR/4\\_6\\_Noise.pdf](http://www.lacsd.org/LWRP%202020%20Facilities%20Plan%20DEIR/4_6_Noise.pdf);  
<http://newyorkbiz.com/DSEIS/CH18Construction.pdf>

**Notes:**

- Where typical value is not cited in literature, mean of the peak noise range is assumed
- Quieted equipment can be designed with enclosures, mufflers, or other noise-reducing features. Where data is not available, a 3 dB reduction is assumed

306. Precise information on the type, quantity and location of equipment to be used during the construction phase is not available at this stage and will be dependent on the working methods of the selected contractors. However, preliminary calculations have been conducted to provide a general magnitude of the noise levels during various construction phases.

307. The mitigation measures listed below shall be implemented to minimize noise levels during the construction activity as far as possible.

**Mitigation Measures**

308. The following mitigation measures will be implemented:

- Equipment noise will be reduced at source by proper design, maintenance and repair of construction machinery and equipment. Noise from vehicles and power generators will be minimized by use of proper silencers and mufflers.
- Excessive noise emitting equipment will not be allowed to operate and will be replaced.

- Blowing of horns will be prohibited on access roads to work sites.
- As a rule, the operation of heavy equipment shall be conducted in daylight hours.
- Construction equipment, which generates excessive noise, shall be enclosed or fitted with effective silencing apparatus to minimize noise.
- Well-maintained haulage trucks will be used with speed controls.

### **6.3.5 Occupational Health and Safety**

#### **Impacts**

309. There is invariably a safety risk when construction works are conducted, and precautions will be needed to ensure the safety of the workers.

#### **Mitigation Measures**

310. The Contractor will be required to take measures such as:
- Ensuring that all workers are provided with and use appropriate Personal Protective Equipment (helmet, hand gloves, boots, masks etc);
  - Follow standard practices of safety checks as prescribed before use of equipment;
  - Provide on-site Health and Safety Training for all site personnel;
311. The Contractor will be required to prepare and implement an effective Worker Health and Safety Plan that is supported by trained first aid personnel and emergency response facilities. Construction contracts will include standard Worker Health and Safety measures and contractors will be bound to implement these fully. This will include mandatory wearing of dust masks for any cement handling operations or at any area where cement dust is in the air.
312. Monitoring will be required to ensure that the health and safety plan based on contract specifications is followed. Cement feed hopper areas will be inspected daily to ensure compliance with the requirement of dust masks.

### **6.3.6 Communicable diseases incl. COVID-19**

#### **Impacts**

313. Communicable diseases such as COVID-19 and HIV may be introduced due to the immigration of workers associated with the project.
314. Ministry of National Health Services, Regulations and Coordination, GoP has issued guidelines in April, 2020 for Health & Safety of Building and Construction Workers during COVID-19 outbreak. These guidelines are prepared for the workers involved in building and construction work during the current epidemic of COVID-19. These guidelines provide the safety measure to be implemented at the construction site having a dusty environment, continuous flow of different materials and make-shift type of arrangements for storage,

food and sanitation calls for implementation of safety precautions at the very basic level of personal hygiene only.

### **Mitigation measures**

315. A communicable diseases prevention program will be prepared for construction workers or residents near the construction sites.

### **COVID-19 specific measures WHO**

- All workers must perform complete sanitization at the site as per SOPs/guidelines issued by WHO and the national guidelines issued by the Government of Pakistan (GOP)<sup>18</sup>.
  - The WHO guidelines on use of masks are provided as **Annexure M**.
  - As soon as workers arrive at work site, their body temperature must be checked and in case any worker is assessed to be running a fever or suffering from a flu or cough, he must be informed to leave immediately and self-isolate for a two-week period and not report for work until this two-week mandatory period has been completed.
  - At the work site(s), social distancing measures must be strictly implemented and gathering of workers at any location at the work site(s) must be strictly forbidden. In case of workers not taking this measure seriously, strict penalties must be imposed to ensure implementation.
  - The work tasks must be divided into shifts, as far as possible, to reduce the workforce present at the work site(s) at any one moment and improve the working speed/efficiency.
  - All workers will be strictly advised to wash their hands as frequently as practicable and not to touch their face during work.
  - A supply of safe drinking water will be made available and maintained at the project site(s).
  - COVID awareness sign boards must be installed at the camp clinic and at the work site(s).
  - Contact details of all workers will be kept in a register on site in order to efficiently trace and manage any possible workers that might experience symptoms of COVID-19.
  - Prohibition of entry for local community/any unauthorized persons at work sites.
  - Proper hygiene practices in the toilets and washrooms will be implemented with proper and adequate use of soaps and disinfectant spray.
  - Social distancing must be maintained during the pick-up and dropping off of workers from their residences to and from the work site(s).
316. WHO advice on Use of Masks for the COVID-19 Virus has been attached as **Annexure N**.

<sup>18</sup> <https://covid.gov.pk/guideline>



## COVID-19 specific measures GOP

### Advice for Site Managers:

- Every construction project shall make proper arrangements for uninterrupted building services including but not restricted to, electricity, fuel, water supply, water disposal and sanitation, communication links, washrooms with hand hygiene and shower facility and with proper and adequate supply of soaps and disinfectants.
- Workers shall not use biometric attendance machines or crowd during attendance, entry or exit to the premises of the construction site.
- Ensure the availability of the thermal gun at the entry and exit of the construction site and no worker shall be allowed without getting his/her temperature checked.
- Site manager must maintain a register of all contact details with NID number and addresses of all present at the site in case a follow up or tracing and tracking of contacts is required at a later stage.
- Develop the employee roaster to decrease the number of people on the site very day. Split the shifts of the workers in morning and evening with limit of each shift to 8 working hours.
- Every worker must change into standard working attire at the time of commencement of duty and change back to their regular dress after taking shower when their duty hours end.
- In addition to all other internationally recognized safety precaution for construction workers and other staff, every individual must be provided with a face mask. It must be ensured that everyone during his or her presence at the site continues to wear the mask. Face mask shall be replaced as and when soiled or otherwise removed. Outer surface of face mask must not be touched with hands.
- Non-essential work trainings must be postponed avoiding gathering of people.
- Ensure the physical distance by creating more than one route of entry and exit to the site.
- Instruct the workers to inform the construction manager (or authorities) if
  - They develop any symptoms of cough, flu or fever.
  - They have been exposed to someone suspected or confirmed with COVID 19.
  - They have met someone who has a travel history of COVID 19 endemic country. They have travelled in last couple of days or plan to travel soon.
- All incidences of appearance of the symptoms of COVID-19 shall be immediately documented and maintained at the site and information regarding which shall be immediately communicated through e-mail or else, to the designated health facility, and the sick worker shall be transported to the health facility for further advice and action. The site manager must establish a link with a nearby healthcare facility with

arrangements for quick transportation of workers in case of an emergency.

- Persuade the workers to inform the authorities for their safety and of other if they observe any signs and symptoms in a colleague.
- Do not allow any worker at the construction site who has the symptoms.
- Display the awareness banners about hand hygiene and physical distancing, where you can, around the work site.
- Everyone on the construction site must observe sneezing and coughing etiquettes. Workers shall be requested and required to wash their hands as frequently as practicable and shall also be advised not to touch their face with their hands during work.
- Workers must maintain no less than two arm lengths between them before, during after work at all the times. They shall not make physical contact and shall be required to maintain separate personal gears and assets which must be clearly labelled and stored without intermix.
- Only sanitizeable dining surfaces shall be used, which must be cleaned before each service.
- The lunch breaks and stretch breaks of the workers must be staggered to avoid the clustering of workers. Workers must not sit at less than 2 meters distance in adequately ventilated areas, while having meals and while any other activity requiring interpersonal communications.
- In the wake of current restrictions on transportations site managers will ensure safe transport arrangements for worker which shall not be crowded and shall have social distancing in place during the entire process from pickups till drops at destination.
- In case of workers sleeping in at the site of construction, a safe distance of 2 meters must be ensured in the sleeping rooms, which must be adequately ventilated.
- A supply of safe drinking water must be made available at the project site and maintained.

**Advice for Construction Workers:**

- All possible and prescribed measures shall be taken to ensure your and others health. Enter your contact details in the register maintained at the site, in case a follow up or tracing and tracking of contacts is required at a later stage.
- Follow hygiene practices at washrooms and shower facility with proper and adequate use of soaps and disinfectants.
- Every worker must change into standard working attire at the time of commencement of duty and change back to their regular dress after taking shower when their duty hours end.

- In addition to all other internationally recognized safety precaution for construction workers and other staff, every individual must use face mask. Face mask shall be replaced as and when soiled or otherwise removed. Outer surface of face mask must not be touched with hands.
- Workers shall wash their hands as frequently as practicable and shall not to touch their face with their hands during work.
- Everyone on the construction site must observe sneezing and coughing etiquettes.
- Workers must maintain no less than two arm lengths between them before, during after work at all the times. They shall not make physical contact and shall be required to maintain separate personal gears and assets which must be clearly labelled and stored without intermix.
- Sick workers shall immediately inform the site manager and must get medical advice from nearby health Centre.
- Only sanitizeable dining surfaces shall be used.
- Do not sit at less than 2 meters distance while having meals, in adequately ventilated areas, and while any other activity requiring interpersonal communications.
- Do not use biometric attendance machines or crowd during attendance, entry or exit to the premises of the construction site.
- Use safe transport arrangements which shall not be crowded and shall have social distancing in place during the entire process from pickups till drops at destination.
- In case sleeping in at the site of construction, a safe distance of 2 meters must be ensured in the sleeping rooms, which must be adequately ventilated.

**Deliveries or Other Contractors Visiting the Site:**

- Non-essential visits to the construction sites will be cancelled or postponed.
- Delivery workers or other contractors who need to visit the construction site must go through temperature check before entering and will be given clear instructions for precautions to be taken while on site.
- Designate the workers, with protective gears or at least gloved and mask, to attend to the deliveries and contractors.
- Make alcohol-based hand sanitizer (at least 70%) available for the workers handling deliveries.
- Instruct the visiting truck drivers to remain in their vehicles and whenever possible make use of contactless methods, such as mobile phones, to communicate with your workers.

**6.3.7 Disposal of Spoil and Solid Waste**

**Impacts**

317. The proper disposal of Spoil and Solid waste in accordance with applicable regulations is necessary to ensure no significant impacts take place.

**Mitigation Measures**

- (i) Concrete, bricks and debris
318. All material that is produced shall be transported in tarpaulin-covered trucks for disposal to suitable location(s), which shall be pre-approved by the PMU. At these pre-selected locations, this extra material shall be disposed off in accordance with international best practices to ensure no impacts take place.
- (ii) Unused construction material (sand, crush), empty drums, concrete waste.
- Waste to be reused in the project or by other interested parties.
  - Identify potential safe disposal sites close to the project sites and obtaining approval for using these sites from PMU or use of sites designated in the Contract.
  - Used oil and lubricants will be recovered and reused or removed from the site in full compliance with national regulations.
  - Machinery will be properly maintained to minimize oil leakage during the construction.

**6.3.8 Hazardous and Non-Hazardous Waste Management****Impacts**

319. In the absence of national or domestic regulations and a waste management system in the project areas, waste disposal of materials containing contents of both hazardous and non hazardous nature such as scrap wood, bricks, concrete, asphalt, plumbing fixtures, piping, insulation (asbestos and non-asbestos), metal scraps, oil, electrical wiring and components, chemicals, paints, solvents etc. can potentially become a serious environmental issue, particularly with the local contractors. To avoid any potential issue, the PMU will need to impose adequate internal controls.

**Mitigation measures**

320. A waste management plan will be developed prior to the start of construction. This plan will cater to sorting of hazardous and non-hazardous materials prior to disposal, placing of waste bins at the project sites for waste disposal and an onsite hazardous waste storage facility.
321. Licensed waste contractors will be engaged to dispose off all non-hazardous waste material that cannot be recycled or reused.
322. Training will be provided to personnel for identification, segregation and management of waste.
323. In case asbestos is present in any existing facilities that need to be demolished in order to conduct works, it shall need to be ensured that internationally acceptable protocol is

implemented as part of the best practices to properly handle and dispose of the asbestos to prevent any damage to the health of all individuals exposed to the asbestos sheets. The steps to be followed to ensure safe handling of any materials containing asbestos are as follows:

- Identify asbestos at the workplace

The identification of asbestos at the workplace is the first step in managing the risk of exposure to asbestos. If someone with management or control is unsure that asbestos or ACM is present or not, it is always better to assume it is present and treat it with caution.

Where asbestos has been identified or is likely to be identified, an asbestos register must be prepared and kept at the workplace. This register must be maintained to ensure the information in it is up to date.

- Assessing the risk of exposure

If asbestos is in good condition and left undisturbed, it is unlikely that airborne asbestos fibres will be released into the air and the risk to health is low. Therefore, it is usually safe to leave it labelled and undisturbed, and review its condition over time.

However, if the asbestos has deteriorated, has been disturbed, or if asbestos-contaminated dust is present, the likelihood that exposure may occur is increased. A visual inspection of the material, its location and an understanding of the work practices at the workplace will assist this decision. Asbestos-related work activities will also need to be considered.

- Asbestos related work

Asbestos-related work activities are a type of work with asbestos which is permitted to occur in certain circumstances. It can include maintenance, plus unusual and infrequent activities (such as emergency activities).

- Asbestos management plans

A written asbestos management plan sets out how asbestos or ACM identified at the workplace will be managed. It must be prepared for the workplace if asbestos has been identified or assumed present, or is likely to be present from time to time at the workplace.

The plan must be maintained to ensure the information is up-to-date (at least every five years), and must be kept at the workplace to ensure it is accessible.

- Control measures

When choosing the most appropriate control measure, the following hierarchy of controls must be considered:

- eliminate the risk (eg remove the asbestos)
- substitute the risk, isolate the risk or apply engineering controls (eg enclose, encapsulate, seal)
- use administrative controls (eg safe work practices, labelling)
- use PPE.

A combination of these controls may be required in order to adequately manage and control asbestos.

- Indicating the presence of asbestos in the workplace

All identified or assumed asbestos, including where the asbestos is inaccessible, must be clearly indicated (eg using labels or, where appropriate, warning signs).

- Reviewing Control measures

Control measures that have been implemented must be reviewed and, if necessary, revised to make sure they work as planned and to maintain, so far as is reasonably practicable, a work environment that is without risks to health and safety.

If an asbestos register or asbestos management plan has been created for your workplace, they must be reviewed if circumstances change or are likely to change.

### **6.3.9 Loss of Access in Project Areas**

#### **Impacts**

324. It is currently not foreseen that there will be any access restriction for the businesses at the sides of the RoW i.e. the markets and vendors, as the construction will be phased and at no point will the road be completely closed off.

#### **Mitigation Measures**

325. The Contractor shall ensure that:
- Construction activities are phased out
  - At no point during the construction works will the road be completely closed off.
  - Access shall not be blocked due to construction works/equipment/vehicles to any of the businesses and/or residences.

### **6.3.10 Vegetation and Wildlife Loss**

#### **Impacts**

326. The project site and the project area in general consists of an urbanized built environment with little or no vegetation and no wildlife of concern present in the area.

#### **Mitigation Measures**

No mitigation measures required.

### **6.3.11 Natural and Anthropogenic Hazards**

#### **Impacts**

327. Natural disasters include windstorms, floods, earthquakes which may be experienced during the construction phase. However, the likelihood of such events is quite low and the effect on the proposed project works in the case of an occurrence of such a natural calamity on the health and safety of the workers and affected population can be minimized by adopting appropriate and adequate mitigation measures.
328. Fire accidents and terrorist/sabotage activities are something that cannot be predicted or foreseen but can be prepared for by taking precautionary measures such as training of staff and acquiring extra safety and security measures.

#### **Mitigation measures**

No mitigation measures required.

### **6.3.12 Historical/Archaeological Sites**

329. No historical/archaeological sites have been identified along the project areas.

#### **Mitigation measures**

330. If evidence of any archaeological remains is found during the construction activities, the excavation work will be stopped immediately, and necessary next steps taken to identify the archaeological discovery based on the 'Chance Find' procedures provided as **Annexure K**.

### **6.3.13 Employment Conflicts**

#### **Impacts**

331. The proposed project works are not likely to create any significant permanent job opportunities. Even unskilled and semi-skilled employment opportunities that are likely to be created will be for a short period, while the project is constructed. As persons with relevant skills may be available locally, people from Peshawar city and adjoining areas are likely to fill a significant number of the semi-skilled and skilled jobs.
332. This issue of provision of jobs can become particularly problematic if it is perceived by the local population that a significant number of construction-related jobs opportunities are not given to people from the local community. This can result in friction between local residents and construction workers from outside of the community.

#### **Mitigation measures**

333. The Construction Contractor will adopt a transparent hiring policy. Prior to the commencement of the construction activity, the local communities in the project areas of Peshawar city will be informed of the employment policy in place and number of people that can be employed for this project.
334. It will be ensured that maximum number of unskilled and semi-skilled jobs will be provided to the residents of Peshawar city and adjoining areas.
335. PMU will ensure a balanced process of employment of the communities in the project area with preference given to those most directly affected by the project.

#### **6.3.14 Construction site restoration**

##### **Impacts**

336. After completion of construction activity, the project facilities will be restored as close to its original condition as possible. One of the important tools is the photographic record of project facilities e.g., campsite(s) prior to set-up will be taken and will be compared after site restoration.
337. Unattended construction waste and excavated material along the RoW of transmission and water supply mains will be source of bad aesthetics within the city. Prior to the closure of a typical construction day, area needs to be cleared from all types of waste and construction material.

##### **Mitigation measures**

- Demobilization of all equipment and machinery;
- Disposal of any waste material remaining at the time of completion of the operation;
- Backfilling of all excavation followed by compactions;
- Dismantling and removal of fence or barriers surrounding the campsite area;
- General restoration of the site area, including landscaping and restoration of drainage, where required.
- PMU KPCIP through CSC will ensure that restoration of construction works at water transmission and supply mains will be carried out by contractors.
- PMU KPCIP will ensure periodic monitoring of such restorations.
- Contractors will develop site restoration protocols and will submit to CSC/PMU for review and approval.
- Construction site restoration protocols will be part of bidding documents and constructions contracts.
- Construction contractor will add restorations cost into BOQs.

#### **6.4 Impacts Associated with Operation of Water Supply facilities**

338. The potential impacts from operation of the water supply are provided as **Table 6.5** below.



**Table 6.5: Screening of Possible Impacts during Operation Phase**

S/No.	Potential Issues	Likelihood (Certain, Likely, Unlikely, Rare)	Consequence (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)	Residual Impact (Short term, Long term)
1	Water system leaks	Likely	Major	Medium	Long term
2	Contaminated water provided to customers due to lack of or improper treatment	Likely	Major	Medium	Long term
3	Intermittent water supply due to excessive groundwater abstraction	Likely	Major	Medium	Long term
4	Improved water availability	Positive impacts expected			Long term positive residual impact
5	Improvement in Public Health	Positive impacts expected			Long term positive residual impact

- Critical Risk Level
- Significant Risk Level
- Medium Risk Level
- Low Risk Level
- Positive Impacts

#### 6.4.1 Water system leaks

##### Impacts

339. Water system leaks can reduce the pressure of the water system compromising its integrity and ability to protect water quality (by allowing contaminated water to leak into the system) and increasing the demands on the source water supply and the amount of power used for pumping. Leaks in the distribution system can result from improper installation or maintenance, inadequate corrosion protection, settlement, stress from traffic and vibrations, frost loads, overloading and other factors.
340. Water supply lines may be periodically flushed to remove accumulated sediments or other impurities that have accumulated in the pipe. Flushing is performed by isolating sections of the distribution system and opening flushing valves or, more commonly, fire hydrants to cause a large volume of flow to pass through the isolated pipeline and suspend the settled sediment. The major environmental aspect of water pipe flushing is the discharge of flushed water, which may be high in suspended solids, residual chlorine, and other contaminants that can harm surface water bodies.

##### Mitigation Measures

341. Recommended measures to prevent, minimize, and control impacts from flushing of mains include:

- Ensure construction meets applicable standards and industry practices;
- Conduct regular inspection and maintenance;
- Implement a leak detection and repair program (including records of past leaks and unaccounted-for water to identify potential problem areas);
- Consider replacing mains with a history of leaks or with a greater potential for leaks because of their location, pressure stresses, and other risk factors;
- Discharge the flush water into a municipal sewerage system with adequate capacity;
- Discharge the flush water into a separate storm sewer system;
- Minimize erosion during flushing, for example by avoiding discharge areas that are susceptible to erosion and spreading the flow to reduce flow velocities.
- An emergency response plan is also provided as **Annexure F**.

#### **6.4.2 Contaminated water provided to customers due to lack of or improper treatment**

##### **Impacts**

342. The water abstracted from the tubewells as part of the proposed project may be contaminated and/or become contaminated over time due to lack of treatment and/or improper treatment of the water being abstracted. This could result in a public health emergency with this contaminated water leading to different illnesses for its consumers.

##### **Mitigation measures**

343. The following measures will be implemented:

- Water testing of each tubewell on a quarterly basis will be conducted to ensure there is no contamination.
- In case of contamination, the pumping of water from those tubewell(s) will be temporarily stopped until the cause and extent of the contamination has been assessed and necessary measures to remove the contamination have been implemented.
- Those tubewells that have been found to be contaminated once will be placed under a higher level of observation to ensure no future events of contamination take place again.

#### **6.4.3 Intermittent water supply due to excessive groundwater abstraction**

##### **Impacts**

344. Rehabilitation of existing tubewells and water abstraction from the tubewells could possibly result in ground water depletion in Peshawar. The operation of the rehabilitated tubewells could also reduce water levels in the existing adjacent tubewells.

##### **Mitigation measures**

345. The following measures will be implemented:

- Over pumping shall be avoided as over pumping can result in a lowering of ground water levels to the point where it is no longer feasible or possible to continue pumping.
- Periodic monitoring of tubewells recharge rate will be conducted to ensure continuous water availability for the project.
- In case any new tubewells are to be installed in the future, they shall be a minimum of 100 m away from any existing tubewells, unless it is established by hydrogeological study that the new tubewells will not affect the yield of the existing wells.

#### **6.4.4 Improved water availability**

##### **Impacts**

346. The continued supply of water due to the proposed project would be an indispensable facility in Peshawar since it will facilitate the domestic as well as commercial water requirements of people living in Peshawar. With the replacement of outlived/rusted pipelines, water shortages and leakage/wastage issues shall also be resolved. Moreover, the proposed intervention will provide improved and sustainable supply of water to the citizens of Peshawar for next thirty years.

##### **Mitigation measures**

No measures required.

#### **6.4.5 Improvements in Public Health**

##### **Impacts**

347. The clean ground water will reduce water borne disease, improve public health and ultimately reduced pressure on the health care system

##### **Mitigation measures**

No measures required.

#### **6.5 Cumulative Impacts**

348. No other infrastructure works are planned to be conducted along the proposed project alignments and project sites while these project works shall be conducted. Thus, no cumulative impacts are expected.

#### **6.6 Indirect and Induced Impacts**

349. The potential impact of development along the project alignments has been examined, which indicated that the existing and planned infrastructure such as water supply, wastewater collection and treatment, municipal solid waste collection and disposal would be adequate to accommodate any potential population intake as a result of the proposed project development. Impacts on the environment from air emissions, traffic and community noise, and treated effluent discharge have also been assessed and have found to be acceptable and within the carrying capacities of the environmental media.

350. Thus, negative indirect and induced impacts from the proposed project works are not expected.

## 7 Environmental Management Plan & Institutional Requirements

### 7.1 Introduction

351. The IEE has identified potential impacts that are likely to arise during proposed project in detail, both negative and positive impacts at each stage of the project. To minimize any potential adverse impacts, the IEE study has recommended mitigation measures in the EMP. The proposed mitigation measures have been based on the understanding of the sensitivity and behavior of environmental receptors in the project area, the legislative controls that apply to the project and a review of good industry practices for projects of similar nature. For residual impacts (impacts remaining after applying the recommended mitigation measures) and for impacts in which there can be a level of uncertainty in prediction at the IEE stage, monitoring measures have been recommended to ascertain these impacts during the course of the project activities.
352. The EMP has been developed to eliminate and/or mitigate the impacts envisaged at the design, construction and operation stages.
353. The detailed EMP provided in this document as **Table 7.1** ensures that the project activities have no detrimental effect on the surrounding environment. The Plan shall act as a guideline for incorporating environmental measures to be carried out by the contractors engaged for the proposed project. It shall also be used for other parties concerned for mitigating possible impacts associated with each project and will form part of the Contract documents to be considered alongside the specifications. This Plan shall act as the Environmental Management and Monitoring Plan during the construction and operation phase of the project and will allow for prompt implementation of effective corrective measures.

### 7.2 Environmental Management Plan (EMP)

354. The EMP attached with this report ensures the following:
- Delivery of the prescribed environmental outcomes during all phases of this sub-project;
  - Formulating a system for compliance with applicable legislative requirements and obligations and commitments for this sub-project.
  - Ensure that project design process incorporates best practice environmental design and sustainability principles to minimize potential impacts of construction and operation on the environment and community.
  - Ensure that the construction and operation work procedures minimize potential impacts on the environment and community.
  - Develop, implement and monitor measures that minimize pollution and optimize resource use.

### 7.3 Objectives of EMP

355. The EMP provides a delivery mechanism to address potential impacts of the project activities, to enhance project benefits and to outline standardized good practice to be adopted for all project works. The EMP has been prepared with the objectives of:
- Defining the roles and responsibilities of the project proponent for the implementation of EMP and identifying areas where these roles and responsibilities can be shared with other parties involved in the execution and monitoring of the project;
  - Outlining mitigation measures required for avoiding or minimizing potential negative impacts assessed by environmental study;
  - Developing a monitoring mechanism and identifying requisite monitoring parameters to confirm effectiveness of the mitigation measures recommended in the study;
  - Defining the requirements for communication, documentation, training, monitoring, management and implementation of the mitigation measures.

### 7.4 Environmental Management Monitoring and Reporting

356. During the construction phase, the overall responsibility for the implementation and monitoring of the EMP rests with the Project Director (PD), Project Management Unit (PMU), and KPCIP. The PD at the PMU, using the Construction Supervision Consultant (CSC), will supervise the implementation of the proposed mitigation measures and monitor the implementation progress in the field.
357. During the operation phase, the overall responsibility for the implementation and monitoring of the EMP rests with CEO WSSP. Project will be administered and monitored through City Implementation Unit (CIU) that will be developed within WSSP which will deliver services based on indicators sets out in Services and Assets Management Agreement (SAMA).
358. The specific roles and responsibilities for environmental management and monitoring are provided in **Table 7.1** below. The expected costs for implementing any required mitigation measures are provided in **Table 7.7** below.

#### 7.4.1 Inclusion of EMP in Contract documents

359. In order to make Contractors fully aware and responsible of the implications of the EMP and to ensure compliance, it is recommended that mitigation measures be treated separately in the tender documentation and that payment milestones will be linked to performance, measured by execution of the prescribed mitigation measures. Such a procedure would help ensure adequate management of project impacts is carried out during the construction and operation phases, where a consistent approach will be expected on behalf of the Contractor and its sub-contractors so that data and information collected from monitoring programs is comparable with baseline monitoring data.
360. The Contractor shall be made accountable through contract documents and/or other agreements for fulfilling the environmental safeguard obligations and delivering on the environmental safeguard components of the Project. Contractors shall be prepared to co-operate with the executing agency and supervising consultants and local population for the mitigation of adverse impacts. After the EMP's inclusion in the contract documents, the Contractor will be bound to implement the EMP and will engage appropriately trained

environmental and social management staff to ensure the implementation and effectiveness of the mitigation measures.

361. The Contractor is required to bid for executing the EMP, including the recommended mitigation measures and monitoring programs, as part of its Bill of Quantities (BOQ).

## **7.5 Institutional Arrangements**

362. The environmental management plan will require involvement of the following organizations for its implementation during construction and operation phases of the project:

### **7.5.1 Role of PMU, KPCIP, LGE RDD**

363. The PMU will:
- Provide support to ADB missions;
  - Coordinate activities with all stakeholders, review consultants, proposals, and provide overall guidance during various stages of project preparation;
  - Manage and ensure safeguard due diligence and disclosure requirements including resettlement and environmental safeguards in accordance with ADB's Safeguard Policy Statement (2009) and KP government requirements;
  - Manage and ensure effective implementation of the gender action plan;
  - Ensure submission of all IEE requirements as per law by responsible entities; and
  - Monitoring of activities of the entire project.

### **7.5.2 Role of the ADB**

364. The ADB will:
- Support the coordination and administration of the project;
  - Provide guidance to PMU KPCIP and WSSP on implementation issues and project design;
  - Disclose all safeguards documents, and monitor safeguards implementation;
  - Monitor and report project performance;
  - Conduct periodic review of the project;

### **7.5.3 Role of Construction Supervision Consultant (CSC)**

365. The CSC will be responsible for the following items:
- Incorporates into the project design the environmental protection and mitigation measures identified in the EMP for the design stage;
  - Assists PMU to ensure that all environmental requirements and mitigation measures from the IEE and EMP are incorporated in the bidding and contracts documents.

- Prior to construction, reviews the updated SSEMPs prepared by the contractor.
- Undertakes environmental management capacity building activities for relevant project focal staff including staff from contractors

#### **7.5.4 Role of KP EPA**

366. The KP EPA will have the following responsibilities with regards to this project:
- Provides regulatory compliance works for the project.
  - Reviews and approves environmental assessment report, submitted by PMU.
  - Issues environmental clearance certification for the Project based on their mandate and regulations.
  - Undertakes monitoring of the project's environmental performance based on their mandate.

#### **7.5.5 Role of Project Contractor**

367. The project contractor will be responsible for following items:
- Implementation of, or adherence to, all provisions of the IEE and EMP;
  - Preparation of site specific EMPs (SSEMPs) as required. SSEMPs will be prepared by Contractor's Environment Specialist, site in charge, HSE staff and project technical team before their mobilization and it will be submitted to Engineer of construction supervision consultant/PMU for review and approval. Site Specific EMP (SSEMP) Guide & Template for Guidance to Contractor has been attached as **Annexure I**.
  - Contractor's environmental performance will rest with the person holding the highest management position within the contractor's organization. Reporting to their management, the contractor's site managers will be responsible for the effective implementation of the EMP.
  - The Contractor will be required to have qualified Environmental Specialists in their team to ensure all mitigation measures are implemented during the different development phases of the project.

#### **7.5.6 Role of WSSP**

368. The WSSP will be responsible for following items:
- Implementation of, or adherence to, all provisions of the IEE and EMP
  - Preparation of site specific EMPs for operations phase
  - WSSP will be responsible to ensure that contractors engaged during the project operation phase are executing activities in compliance to IEE/EMP.
  - WSSP will be required to have qualified Environmental Specialist designated for project to ensure all mitigation measures are implemented in true letter and spirit.



- WSSP will design and drive behavior change campaigns to increase public participation and cooperation. Public cooperation will be extended through incentives and penalties to the public.
- WSSP will plan customer feedback surveys in order to ensure sustainable service delivery and to remove gaps in the system.

## 7.6 Monitoring Parameters

369. A monitoring plan for the pre-construction/design and construction phases of the project, indicating environmental parameters, frequency and applicable standards is provided below as **Table 7.2 and Table 7.3** below.
370. During the procurement/pre-construction period, the monitoring activities will focus on (i) checking the contractor's bidding documents, particularly to ensure that all necessary environmental requirements have been included; and (ii) checking that the contract documents' references to environmental mitigation measures requirements have been incorporated as part of contractor's assignment and making sure that any advance works are carried out in good time.
371. During the construction period, the monitoring activities will focus on ensuring that any required environmental mitigation measures are implemented to address possible impacts.
372. In general, the construction impacts will be manageable, and no insurmountable impacts are predicted, provided that the EMP is implemented to its full extent as required in the Contract documents. However, experience suggests that some Contractors may not be familiar with this approach or may be reluctant to carry out some measures. For the proposed project, in order that the Contractor is fully aware of the implications of the EMP and to ensure compliance, environmental measures must be costed separately in the tender documentation and listed as BOQ items, and that payment milestones must be linked to environmental performance, Vis a Vis the carrying out of the EMP.
373. The effective implementation of the EMP will be audited as part of the loan conditions by ADB, and as part of regulatory/NOC compliance by KP EPA. In this regard, the PMU/CSC will guide the design engineers and Contractors on the environmental aspects and necessary EMP documentation. Monitoring during project operation phase will be carried out by WSSP with support from PMU.

## 7.7 Environmental Training

### 7.7.1 Capacity Building and Training

374. Capacity building and training programs are necessary for the project staff in order to control the negative impacts resulting from the project construction and during its operation phase. They will also require trainings on monitoring and inspecting of such a project for environmental impacts and for implementation of mitigation measures.
375. The details of this capacity building and training program are presented in the **Table 7.4**.

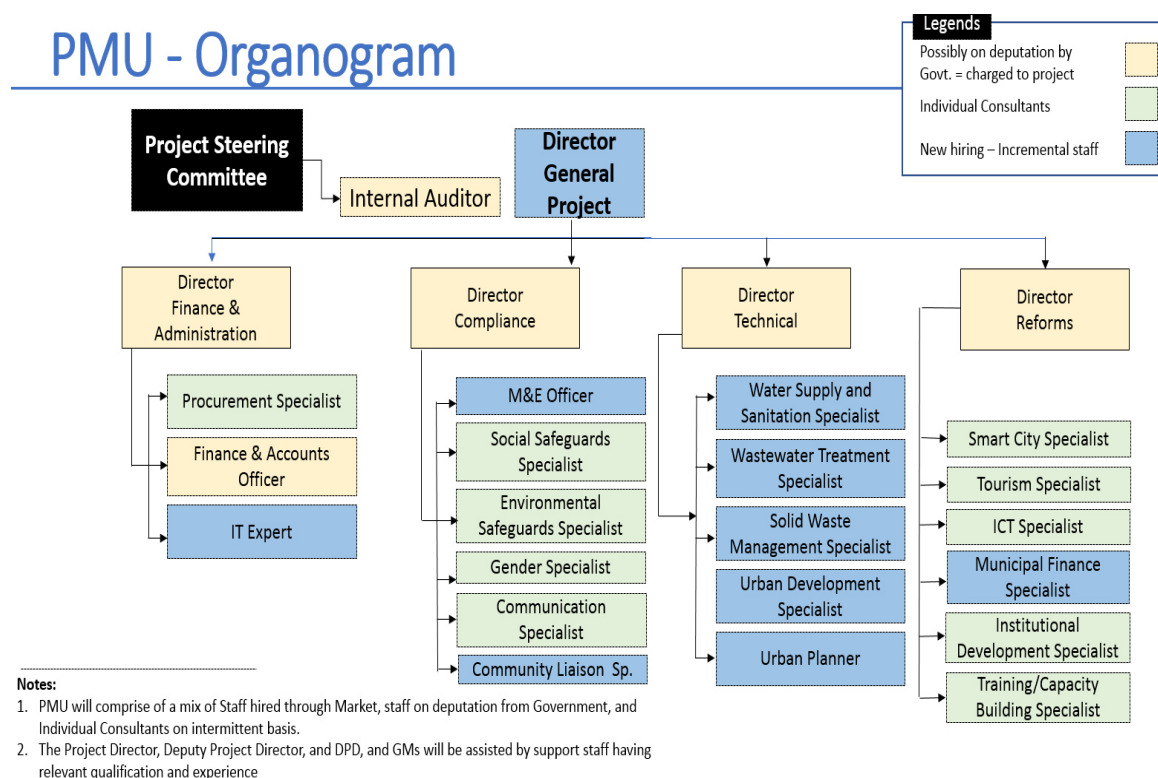
## 7.8 Environmental Staffing and Reporting Requirements

376. EMP implementation will be responsibility of all project stakeholders including PMU, WSSP, Project Construction contractors, O&M contractor and other suppliers involved in

the project. Requirement of environmental staffing will be part of bidding documents and necessary cost will be allocated as BOQ item by the bidder. PMU will maintain environmental safeguard staffing (Environmental/Environment Associate) for construction and operation phase of the project to monitor and supervise EMP implementation and performance. Environment expert will also be part of CSC technical team and will produce bi-weekly and monthly environmental compliance reports during construction phase. Environment expert of CSC will be responsible to monitor the implementation of EMP during construction phase by project contractors. Project contractors will also hire sufficient environmental officers to implement the EMP requirements and prepare necessary EMP documentation. Project contractor EMP staff will prepare daily environmental reports and submit to CSC for approval and record. Within city implementation unit (CIU), WSSP will hire qualified environmental specialist during operation phase of the project who will be responsible for EMP implementation and reporting by WSSP and its O&M contractors during operation. Monthly environmental compliance report will be prepared by WSSP and circulated to concerned authorities.

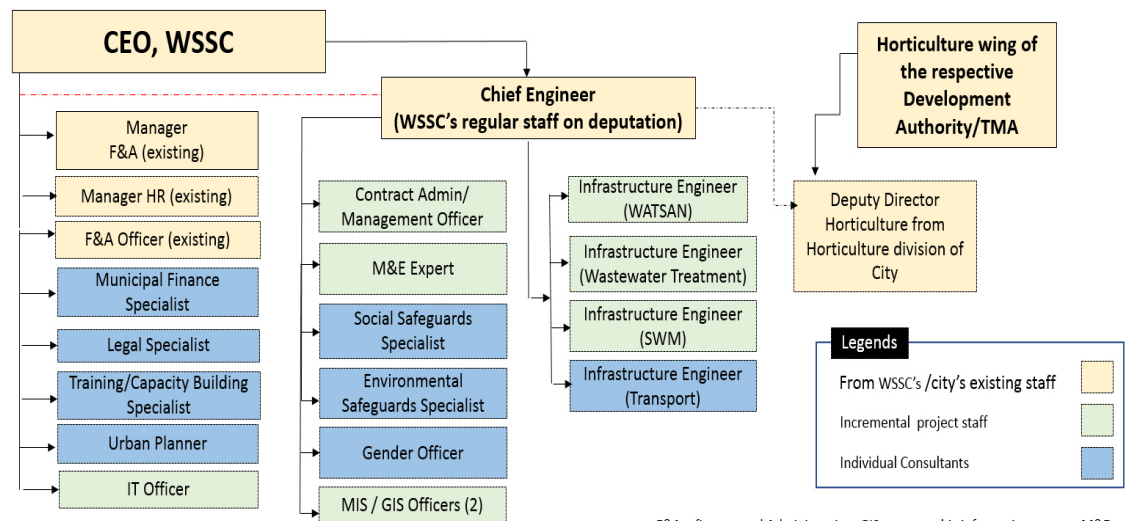
377. Organogram of PMU KPCIP within LGERDD and City implementation unit (CIU) within WSSCs is provided as **Figure 7-1 and 7-2**.

**Figure 7-1: Proposed Organogram of PMU KPCIP**



**Figure 7-2: Proposed Organogram of CIU WSSC Peshawar**

## CIU - Organogram



\* CIU will have these positions according to their respective subsector portfolio.

F&A = finance and Administration, GIS = geographic information system, M&E = monitoring & evaluation, SWM = solid waste management, WATSAN = water supply and sanitation, TMA = tehsil municipal authority, WSSC = water supply and sanitation company

**Table 7.1: Environmental Management Plan**

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
<b>Design/Pre-Construction Phase</b>	1.1	Relocation of Utilities services	<p>Detailed field surveys will be conducted to assess any sub-surface utilities that might be present under the proposed alignments for the water pipeline and sewers to be laid or near tubewell or filtration plant installation sites. Furthermore, any power transmission lines and/or telephone lines passing in front of the project site or in close proximity to it shall be relocated prior to commencement of physical works.</p> <p>Based on the utilities that are identified, a relocation plan of those utilities will be developed by the respective line agencies in close coordination with the PIU and implemented.</p> <p>In case any utilities can be allowed to remain in place and avoidance of their damage is possible, the Contractor will need to be aware of the location of these services so that disruptions are not caused. In such a scenario, the responsibility for any repair of damaged services will lie with the Contractor.</p>	CIU	PMU	BC: during detailed designing of the sub-project
	1.2	Traffic Management	Comprehensive plan shall be developed by the EPCM consultant and approved by the PIU that will contain traffic	CIU	PMU	BC: during detailed designing

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			diversion onto alternate routes and management traffic flows to minimize congestion and the possibility of accidents. This plan shall be appended to the EMP and will be implemented by the Contractor.			of the sub-project
	1.3	Lack of Integration of IEE/EMP requirements into bidding documents	The proposed 'Safeguards unit' that will be developed at the PMU will be assigned the task to check that design and bid documents are responsive to key environmental, social and safety considerations, and that the proposed method of work reflects the boundaries defined in the EMP. The bid documents must include the EMP and its implementation cost must be reflected in the BoQ.	CIU	PMU	BC: during detailed designing of the sub-project
	1.4	Material Haul routes	The construction vehicles hauling materials along the Peshawar city roads and anywhere where there are sensitive receptors such as hospitals, schools and/or roadside residences will be limited and the PMU in collaboration with the CIU will establish a route plan to minimize this disruption which shall be appended to the EMP. Vehicles to be used will be of good quality and well maintained and will meet the national emission standards for vehicles.	CIU	PMU	BC: during detailed designing of the sub-project

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			3.Idling of vehicles along the route will be limited to 3-5 minutes.			
	1.5	Contractor's Environmental Safeguards Capacity	So far, local contractor firms in Pakistan working on large and medium scale environmentally sensitive projects have an unsatisfactory record for complying with workplace and environmental safety regulations. To address this issue, the Contractor(s) will be required to define an Occupational Health and Safety procedure for all work, including work camp operation, management of cement dust and use of personal safety equipment. These procedures will be developed and approved by PMU in collaboration with the CIU before contractor starts civil work.	CIU	PMU	BC: during detailed designing of the sub-project
	1.6	Identification of Locations for Labor Camps and ancillary facilities	In order to prevent a nuisance, specific locations shall be designated along the proposed alignments for development of the labor camps. All necessary facilities and amenities shall be provided in these camps such as electricity, sufficient supply of water, solid and liquid effluent waste disposal facilities etc. The use of proper planning while identifying locations for the labor camps will ensure there is minimal disturbance to all key	CIU	PMU	BC

[illegible]

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>flagging to minimize risks and injuries from any falling objects.</p> <p>. As much as possible, lifting and placing of any pre-cast sections will be done at night to minimize traffic congestion.</p> <p>. Post traffic advisory signs (to minimize traffic build-up) in coordination with local authorities.</p> <p>. Provide road signs indicating the lane is closed 500 m before the worksite.</p> <p>. Use traffic cones to direct traffic to move to the open lane.</p> <p>0. Provide sufficient lighting at night within and in the vicinity of the construction site.</p> <p>1. Regularly monitor traffic conditions along access roads to ensure that project vehicles are not causing congestion.</p> <p>2. Define and observe schedules for different types of construction traffic trips (e.g., transport of any pre-cast sections, haulage of spoils, delivery of construction materials, etc.).</p> <p>3. As much as possible, schedule delivery of construction materials and equipment as well as transport of spoils during non-peak hours.</p> <p>4. Avoid movements of noisy vehicles during night time in vicinity of sensitive receivers that have been compiled and tabulated.</p>			



Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>5. Ensure relocation of the affected public transport infrastructure (but stops, shelters etc.) prior to commencement of works.</p> <p>6. Comply with traffic regulations and avoid, where possible, roads with the highest traffic volumes, high density of sensitive receivers or capacity constraints are not used as access to and from the construction areas and spoil disposal sites.</p> <p>7. Install temporary accesses to properties affected by disruption to their permanent accesses.</p> <p>8. Reinstate good quality permanent accesses following completion of construction.</p>			
	2.2	Community Health and Safety	<p>Work areas outside the project site, especially where machinery is involved, will be roped off and will be constantly monitored to ensure that local residents, particularly children stay away while excavated areas being prepared for laying of water pipelines and sewer lines will also be cordoned off. Also, no machinery will be left unattended, particularly in running condition.</p> <p>Local communities in the project area will be briefed on traffic safety, especially women who are the main care providers to children.</p>	Contractor	PMC, CIU	DC

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>Speed limit of 20 km/hr will be maintained by all project related vehicles and nighttime driving of project vehicles will be limited where possible.</p> <p>Educate drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances and other construction materials during transport.</p>			
	2.3	Air Quality	<p>Along the project alignment with water pipelines and trunk sewers being laid, water will be sprinkled every three hours and at a higher frequency if felt necessary, at all construction sites to suppress dust emissions.</p> <p>All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations.</p> <p>Stockpiled soil and sand shall be slightly wetted before loading, particularly in windy conditions.</p> <p>Fuel-efficient and well-maintained haulage trucks shall be employed to minimize exhaust emissions.</p> <p>Vehicles transporting soil, sand and other construction materials shall be covered with tarpaulin.</p> <p>Limitations to speeds of such vehicles as felt necessary.</p> <p>Transport through densely populated area will be avoided.</p>	Contractor	PMC, CIU	DC

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>Concrete plants to be controlled in line with statutory requirements and shall not be close to sensitive receptors. Stack height of generators will be at least 3 meters above the ground.</p> <p>Project traffic will maintain maximum speed limit of 20 km/hr on all unsealed roads within project area.</p> <p>A minimum distance of 300 meters will be ensured between batching plant(s) and the nearest community.</p> <p>The need for large stockpiles shall be minimized by careful planning of the supply of materials from controlled sources. Stockpiles will not be located within 50 m of schools, hospitals or other public amenities and shall be covered with tarpaulin when not in use and at the end of the working day to enclose dust. If large stockpiles (&gt;25m<sup>3</sup>) of crushed materials are necessary, they will be enclosed with side barriers and also covered when not in use.</p> <p>It shall be ensured that the following measures are taken to control emissions from vehicles being used in the construction activity:</p>			

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			2. Periodically check and conduct maintenance of the construction machinery and haul vehicles. 3. Regularly change the engine oil and use new engines/machinery/equipment having good efficiency and fuel burning characteristics. 4. Use of catalytic converters and low Sulphur fuels. 5. The stack height of generators will be at least 3 meters above the ground. 6. Training of the technicians and operators of the construction machinery and drivers of the vehicles. 7. Air quality monitoring at the project site during the construction phase.			
	2.4	Noise	1. Equipment noise will be reduced at source by proper design, maintenance and repair of construction machinery and equipment. Noise from vehicles and power generators will be minimized by use of proper silencers and mufflers. 2. Excessive noise emitting equipment will not be allowed to operate and will be replaced. 3. Blowing of horns will be prohibited on access roads to work sites. 4. As a rule, the operation of heavy equipment shall be conducted in daylight hours.	Contractor	PMC, CIU	DC

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>5. Construction equipment, which generates excessive noise, shall be enclosed or fitted with effective silencing apparatus to minimize noise.</p> <p>6. Well-maintained haulage trucks will be used with speed controls.</p>			
	2.5	Occupational Health and Safety	<p>Ensuring that all workers are provided with and use appropriate Personal Protective Equipment (helmet, hand gloves, boots, masks etc);</p> <p>Follow standard practices of safety checks as prescribed before use of equipment;</p> <p>Provide on-site Health and Safety Training for all site personnel;</p> <p>The Contractor will be required to prepare and implement an effective Worker Health and Safety Plan that is supported by trained first aid personnel and emergency response facilities. Construction contracts will include standard Worker Health and Safety measures and contractors will be bound to implement these fully. This will include mandatory wearing of dust masks for any cement handling operations or at any area where cement dust is in the air.</p> <p>Monitoring will be required to ensure that the health and safety</p>	Contractor	PMC, CIU	DC

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			plan based on contract specifications is followed. Cement feed hopper areas will be inspected daily to ensure compliance with the requirement of dust masks.			
	2.6	Communicable diseases incl. COVID-19	<p>1. A communicable diseases prevention program will be prepared for construction workers or residents near the construction sites.</p> <p><b>COVID-19 specific measures WHO</b></p> <p>2. All workers must perform complete sanitization at the site as per SOPs/guidelines issued by WHO and the national guidelines issued by the Government of Pakistan (GOP)<sup>19</sup>.</p> <p>3. The WHO guidelines on use of masks are provided as <b>Annexure M</b>.</p> <p>4. As soon as workers arrive at work site, their body temperature must be checked and in case any worker is assessed to be running a fever or suffering from a flu or cough, he must be informed to leave immediately and self-isolate for a two-week period and not report for work until this two-week mandatory period has been completed.</p> <p>5. At the work site(s),</p>	Contractor	PMC, CIU	DC

<sup>19</sup> <https://covid.gov.pk/guideline>

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>social distancing measures must be strictly implemented and gathering of workers at any location at the work site(s) must be strictly forbidden. In case of workers not taking this measure seriously, strict penalties must be imposed to ensure implementation.</p> <p>6. The work tasks must be divided into shifts, as far as possible, to reduce the workforce present at the work site(s) at any one moment and improve the working speed/efficiency.</p> <p>7. All workers will be strictly advised to wash their hands as frequently as practicable and not to touch their face during work.</p> <p>8. A supply of safe drinking water will be made available and maintained at the project site(s).</p> <p>9. COVID awareness sign boards must be installed at the camp clinic and at the work site(s).</p> <p>10. Contact details of all workers will be kept in a register on site in order to efficiently trace and manage any possible workers that might experience symptoms of COVID-19.</p> <p>11. Prohibition of entry for local community/any unauthorized persons at work sites.</p>			

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>12. Proper hygiene practices in the toilets and washrooms will be implemented with proper and adequate use of soaps and disinfectant spray.</p> <p>13. Social distancing must be maintained during the pick-up and dropping off of workers from their residences to and from the work site(s).</p> <p><b>COVID-19 specific measures</b></p> <p><b>GOP</b></p> <p><b>Advice for Site Managers:</b></p> <p>14. Every construction project shall make proper arrangements for uninterrupted building services including but not restricted to, electricity, fuel, water supply, water disposal and sanitation, communication links, washrooms with hand hygiene and shower facility and with proper and adequate supply of soaps and disinfectants.</p> <p>15. Workers will not use biometric attendance machines or crowd during attendance, entry or exit to the premises of the construction site.</p> <p>16. Ensure the availability of the thermal gun at the entry and exit of the construction site and no worker will be allowed without getting his/her temperature checked.</p> <p>17. Site manager must maintain a register of all contact details with NID number and</p>			



Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>addresses of all present at the site in case a follow up or tracing and tracking of contacts is required at a later stage.</p> <p>18. Develop the employee roaster to decrease the number of people on the site very day. Split the shifts of the workers in morning and evening with limit of each shift to 8 working hours.</p> <p>19. Every worker must change into standard working attire at the time of commencement of duty and change back to their regular dress after taking shower when their duty hours end.</p> <p>20. In addition to all other internationally recognized safety precaution for construction workers and other staff, every individual must be provided with a face mask. It must be ensured that everyone during his or her presence at the site continues to wear the mask. Face mask shall be replaced as and when soiled or otherwise removed. Outer surface of face mask must not be touched with hands.</p> <p>21. Non-essential work trainings must be postponed avoiding gathering of people.</p> <p>22. Ensure the physical distance by creating more than one route of entry and exit to the site.</p> <p>23. Instruct the workers to</p>			

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>inform the construction manager (or authorities) if</p> <p>24. They develop any symptoms of cough, flu or fever.</p> <p>25. They have been exposed to someone suspected or confirmed with COVID 19.</p> <p>26. They have met someone who has a travel history of COVID 19 endemic country. They have travelled in last couple of days or plan to travel soon.</p> <p>27. All incidences of appearance of the symptoms of COVID-19 shall be immediately documented and maintained at the site and information regarding which shall be immediately communicated through e-mail or else, to the designated health facility, and the sick worker shall be transported to the health facility for further advice and action. The site manager must establish a link with a nearby healthcare facility with arrangements for quick transportation of workers in case of an emergency.</p> <p>28. Persuade the workers to inform the authorities for their safety and of other if they observe any signs and symptoms in a colleague.</p> <p>29. Do not allow any worker at the construction site who has the symptoms.</p>			

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>30. Display the awareness banners about hand hygiene and physical distancing, where you can, around the work site.</p> <p>31. Everyone on the construction site must observe sneezing and coughing etiquettes. Workers shall be requested and required to wash their hands as frequently as practicable and shall also be advised not to touch their face with their hands during work.</p> <p>32. Workers must maintain no less than two arm lengths between them before, during after work at all the times. They shall not make physical contact and shall be required to maintain separate personal gears and assets which must be clearly labelled and stored without intermix.</p> <p>33. Only sanitizeable dining surfaces shall be used, which must be cleaned before each service.</p> <p>34. The lunch breaks and stretch breaks of the workers must be staggered to avoid the clustering of workers. Workers must not sit at less than 2 meters distance, in adequately ventilated areas, while having meals and while any other activity requiring interpersonal communications.</p> <p>35. In the wake of current</p>			

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>restrictions on transportations site managers will ensure safe transport arrangements for worker which will not be crowded and will have social distancing in place during the entire process from pickups till drops at destination.</p> <p>36. In case of workers sleeping in at the site of construction, a safe distance of 2 meters must be ensured in the sleeping rooms, which must be adequately ventilated.</p> <p>37. A supply of safe drinking water must be made available at the project site and maintained.</p> <p><b>Advice for Construction Workers:</b></p> <p>38. All possible and prescribed measures shall be taken to ensure your and others health. Enter your contact details in the register maintained at the site, in case a follow up or tracing and tracking of contacts is required at a later stage.</p> <p>39. Follow hygiene practices at washrooms and shower facility with proper and adequate use of soaps and disinfectants.</p> <p>40. Every worker must change into standard working attire at the time of commencement of duty and change back to their regular dress after taking shower when</p>			

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>their duty hours end.</p> <p>41. In addition to all other internationally recognized safety precaution for construction workers and other staff, every individual must use face mask. Face mask shall be replaced as and when soiled or otherwise removed. Outer surface of face mask must not be touched with hands.</p> <p>42. Workers will wash their hands as frequently as practicable and shall not to touch their face with their hands during work.</p> <p>43. Everyone on the construction site must observe sneezing and coughing etiquettes.</p> <p>44. Workers must maintain no less than two arm lengths between them before, during after work at all the times. They shall not make physical contact and shall be required to maintain separate personal gears and assets which must be clearly labelled and stored without intermix.</p> <p>45. Sick workers will immediately inform the site manager and must get medical advice from nearby health Centre.</p> <p>46. Only sanitizeable dining surfaces shall be used.</p> <p>47. Do not sit at less than 2</p>			

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>meters distance, which must be an adequately ventilated area, while having meals and while any other activity requiring interpersonal communications.</p> <p>48. Do not use biometric attendance machines or crowd during attendance, entry or exit to the premises of the construction site.</p> <p>49. Use safe transport arrangements which will not be crowded and will have social distancing in place during the entire process from pickups till drops at destination.</p> <p>50. In case sleeping at the site of construction, a safe distance of 2 meters must be ensured in the sleeping rooms, which must be adequately ventilated.</p> <p><b>Deliveries or Other Contractors Visiting the Site:</b></p> <p>51. Non-essential visits to the construction sites will be cancelled or postponed.</p> <p>52. Delivery workers or other contractors who need to visit the construction site must go through temperature check before entering and will be given clear instructions for precautions to be taken while on site.</p> <p>53. Designate the workers, with protective gears or at least gloved and mask, to attend to the deliveries and contractors.</p>			

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>54. Make alcohol-based hand sanitizer (at least 70%) available for the workers handling deliveries.</p> <p>55. Instruct the visiting truck drivers to remain in their vehicles and whenever possible make use of contactless methods, such as mobile phones, to communicate with your workers.</p>			
	2.7	Disposal of Spoil and Solid Waste	<p>Concrete, bricks and debris</p> <p>All material that is produced shall be transported in tarpaulin-covered trucks for disposal to suitable location(s), which shall be pre-approved by the CIU. At these pre-selected locations, this extra material shall be disposed off in accordance with international best practices to ensure no impacts take place.</p> <p><u>Unused construction material (sand, crush), empty drums, concrete waste.</u></p> <p>Waste to be reused in the project or by other interested parties. Identify potential safe disposal sites close to the project sites and obtaining approval for using these sites from CIU or use of sites designated in the Contract. Used oil and lubricants will be recovered and reused or removed from the site in full compliance with national regulations.</p>	Contractor	PMC, CIU	DC

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			Machinery will be properly maintained to minimize oil leakage during the construction.			
	2.8	Hazardous and Non-Hazardous Waste Management	<p>A waste management plan will be developed prior to the start of construction. This plan will cater to sorting of hazardous and non-hazardous materials prior to disposal, placing of waste bins at the project site for waste disposal and an onsite hazardous waste storage facility.</p> <p>Licensed waste contractors will be engaged to dispose off all non-hazardous waste material that cannot be recycled or reused.</p> <p>Training will be provided to personnel for identification, segregation and management of waste.</p> <p>In case asbestos is present in any existing facilities that need to be demolished in order to conduct works for the four Lots, it shall need to be ensured that internationally acceptable protocol is implemented as part of the best practices to properly handle and dispose of the asbestos to prevent any damage to the health of all individuals exposed to the asbestos sheets. The steps to be followed to ensure safe handling of any</p>	Contractor	PMC, CIU	DC



Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>materials containing asbestos are as follows:</p> <p>Identify asbestos at the workplace</p> <p>The identification of asbestos at the workplace is the first step in managing the risk of exposure to asbestos. If someone with management or control is unsure that asbestos or ACM is present or not, it is always better to assume it is present and treat it with caution.</p> <p>Where asbestos has been identified or is likely to be identified, an asbestos register must be prepared and kept at the workplace. This register must be maintained to ensure the information in it is up to date.</p> <p>Assessing the risk of exposure</p> <p>If asbestos is in good condition and left undisturbed, it is unlikely that airborne asbestos fibres will be released into the air and the risk to health is low. Therefore, it is usually safe to leave it labelled and undisturbed, and review its condition over time.</p> <p>However, if the asbestos has deteriorated, has been disturbed, or if asbestos-contaminated dust is present, the likelihood that exposure may occur is increased. A visual inspection of the material, its location and an understanding of the work practices at the</p>			

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>workplace will assist this decision. Asbestos-related work activities will also need to be considered.</p> <p>Asbestos related work</p> <p>Asbestos-related work activities are a type of work with asbestos which is permitted to occur in certain circumstances. It can include maintenance, plus unusual and infrequent activities (such as emergency activities).</p> <p>Asbestos management plans</p> <p>A written asbestos management plan sets out how asbestos or ACM identified at the workplace will be managed. It must be prepared for the workplace if asbestos has been identified or assumed present, or is likely to be present from time to time at the workplace.</p> <p>The plan must be maintained to ensure the information is up-to-date (at least every five years), and must be kept at the workplace to ensure it is accessible.</p> <p>Control measures</p> <p>When choosing the most appropriate control measure, the following hierarchy of controls must be considered:</p> <p>eliminate the risk (eg remove the asbestos)</p> <p>substitute the risk, isolate the risk or apply engineering</p>			

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			<p>controls (eg enclose, encapsulate, seal)</p> <p>use administrative controls (eg safe work practices, labelling)</p> <p>use PPE.</p> <p>A combination of these controls may be required in order to adequately manage and control asbestos.</p> <p>Indicating the presence of asbestos in the workplace</p> <p>All identified or assumed asbestos, including where the asbestos is inaccessible, must be clearly indicated (eg using labels or, where appropriate, warning signs).</p> <p>Reviewing Control measures</p> <p>Control measures that have been implemented must be reviewed and, if necessary, revised to make sure they work as planned and to maintain, so far as is reasonably practicable, a work environment that is without risks to health and safety.</p> <p>If an asbestos register or asbestos management plan has been created for your workplace, they must be reviewed if circumstances change or are likely to change.</p>			
	2.9	Loss of Access in Project Areas	<p>Construction activities are phased out.</p> <p>At no point during the construction works will the road be completely closed off.</p>	Contractor	PMC, CIU	DC

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
			Access shall not be blocked due to construction works/equipment/vehicles to any of the businesses and/or residences.			
	2.10	Historical/Archaeological Sites	If evidence of any archaeological remains is found during the construction activities, the excavation work will be stopped immediately and necessary next steps taken to identify the archaeological discovery based on the 'Chance Find' procedures	Contractor	PMC, CIU	DC
	2.11	Employment Conflicts	The Construction Contractor will adopt a transparent hiring policy. Prior to the commencement of the construction activity, the local communities in the project areas of Peshawar city will be informed of the employment policy in place and number of people that can be employed for this project. It will be ensured that maximum number of unskilled and semi-skilled jobs will be provided to the residents of Peshawar city and adjoining areas. PMU will ensure a balanced process of employment of the communities in the project area with preference given to those most directly affected by the project.	Contractor	PMC, CIU	DC

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
Operation Phase	3.1	Water system leaks	<p>Recommended measures to prevent, minimize, and control impacts from flushing of mains include:</p> <p>Ensure construction meets applicable standards and industry practices;</p> <p>Conduct regular inspection and maintenance;</p> <p>Implement a leak detection and repair program (including records of past leaks and unaccounted-for water to identify potential problem areas);</p> <p>Consider replacing mains with a history of leaks of with a greater potential for leaks because of their location, pressure stresses, and other risk factors;</p> <p>Discharge the flush water into a municipal sewerage system with adequate capacity;</p> <p>Discharge the flush water into a separate storm sewer system;</p> <p>Minimize erosion during flushing, for example by avoiding discharge areas that are susceptible to erosion and spreading the flow to reduce flow velocities.</p> <p>An emergency response plan is also provided as <b>Annexure F</b>.</p>	O&M Contractor/WSSCP	WSSCP, PMU	DO

Project Activities	Section	Impact	Mitigation Measures Recommended	Responsibility		Timing
				Execution	Monitoring	
	3.2	Contaminated water provided to customers due to lack of or improper treatment	Water testing of each tubewell on a quarterly basis will be conducted to ensure there is no contamination. In case of contamination, the pumping of water from those tubewell(s) will be temporarily stopped until the cause and extent of the contamination has been assessed and necessary measures to remove the contamination have been implemented. Those tubewells that have been found to be contaminated once will be placed under a higher level of observation to ensure no future events of contamination take place again.	O&M Contractor/WSSCP	WSSCP, PMU	DO
	3.3	Intermittent water supply due to excessive groundwater abstraction	Over pumping shall be avoided as over pumping can result in a lowering of ground water levels to the point where it is no longer feasible or possible to continue pumping. Periodic monitoring of tubewells recharge rate will be conducted to ensure continuous water availability for the project. In case any new tubewells are to be installed in the future, they shall be a minimum of 100 m away from any existing tubewells, unless it is established by hydrogeological study that the new tubewells will not affect the yield of the existing wells.	O&M Contractor/WSSCP	WSSCP, PMU	DO

**PMC** : Project Management Consultant  
**BC** : Before Construction  
  
**DC** : During Construction  
  
**CIU** : City Implementation Unit  
**DO** : During Operation

**Table 7.2: 'Pre-Construction' Environmental Monitoring Plan for Baseline Development**

Parameter to be measured	Objective of Monitoring	Parameters to be Monitored	Measurements	Location	Frequency	Responsibility
<b>Ambient Air Quality</b>	To establish baseline air quality levels	CO, NO <sub>2</sub> & PM <sub>10</sub> (particulate matter smaller than 10 microns) concentration at receptor level	1-hr and 24-hr concentration levels	At three random receptor locations in the project area, both upwind and downwind	Once	CSC
<b>Ambient Noise</b>	To establish baseline noise levels	Ambient noise level near receptors in project area	A-weighted noise levels – 24 hours, readings taken at 15 s intervals over 15 min. every hour, and then averaged	At three random receptor locations in the project area	Once	CSC
<b>Groundwater Quality in vicinity of project area</b>	To establish groundwater quality in project area	Groundwater quality in project area	Water samples for comparison against NEQS parameters	At two locations in the project area	Once	CSC

**Table 7.3: Construction Phase Monitoring Requirements**

<b>Project Activity and Potential Impact</b>	<b>Objective of Monitoring</b>	<b>Parameters to be Monitored</b>	<b>Measurements</b>	<b>Location</b>	<b>Frequency</b>	<b>Responsibility</b>
<b>Noise</b> Disturbance due to noise from construction activity	To determine the effectiveness of noise abatement measures on sound pressure levels	Ambient noise level at different locations in project area	A-weighted noise levels – 24 hours, readings taken at 15 s intervals over 15 min. every hour at 15 m from receptors, and then averaged	At three random receptor locations in project area	Quarterly basis on a typical working day	Contractor's Environmental officer, CSC
<b>Air Quality</b> Dust emissions from construction vehicles and equipment	To determine the effectiveness of dust control program on dust at receptor level	CO,NO <sub>2</sub> & PM <sub>10</sub> (particulate matter smaller than 10 microns) concentration at receptor level	1-hr and 24-hr concentration levels	At three random receptor locations in project area	Quarterly basis on a typical working day	Contractor's Environmental officer, CSC
		Visible dust	Visual observation of size of dust clouds, their dispersion and the direction of dispersion	Construction site	Once daily during peak construction period	Contractor's Environmental officer, CSC
<b>Safety precautions by Safety workers</b>	To prevent accidents for workers and general public	Number of near miss events and accidents taking place	Visual inspections	Construction site	Once Daily	Contractor's Environmental officer, CSC



<b>Project Activity and Potential Impact</b>	<b>Objective of Monitoring</b>	<b>Parameters to be Monitored</b>	<b>Measurements</b>	<b>Location</b>	<b>Frequency</b>	<b>Responsibility</b>
<b>Soil Contamination</b>	To prevent contamination of soil from oil and toxic chemical spills and leakages	Incidents of oil and toxic chemical spills	Visual inspections	At construction site and at vehicle and machinery refuelling & maintenance areas	Once a month	Contractor's Environmental officer, CSC
<b>Solid Waste &amp; Effluent disposal</b> Insufficient procedures for waste collection, storage, transportation and disposal	To check the availability of waste management system and implementation	Inspection of solid and liquid effluent generation, collection, segregation, storage, recycling and disposal will be undertaken at all work sites in project area	Visual inspections	At work sites in project area	Once daily	Contractor's Environmental officer, CSC

**Table 7.4: Operation Phase Monitoring Requirements**

<b>Project Activity and Potential Impact</b>	<b>Objective of Monitoring</b>	<b>Parameters to be Monitored</b>	<b>Measurements</b>	<b>Location</b>	<b>Frequency</b>	<b>Responsibility</b>
<b>Water Leakage monitoring</b>	To check for any leaks in the water pipelines	Visible dust	Visual observation of leakages	Water pipeline network	Once daily during peak construction period	WSSCP

<b>Project Activity and Potential Impact</b>	<b>Objective of Monitoring</b>	<b>Parameters to be Monitored</b>	<b>Measurements</b>	<b>Location</b>	<b>Frequency</b>	<b>Responsibility</b>
<b>Water Contamination Monitoring</b>	To assess whether the ground water being abstracted is contaminated	As per WHO/NEQS	Ground water samples for comparison against NEQS parameters	Random sampling of ten tube wells ensuring geographical spread across project area	Quarterly basis on a typical working day	WSSCP

**Table 7.5: Capacity Development and Training Programme**

<b>Provided by</b>	<b>Organized by</b>	<b>Contents</b>	<b>Target Audience</b>	<b>Venue</b>	<b>Duration</b>
<b>Pre-construction Phase</b> PMC offering specialized services in environmental management and monitoring	CSC & PMU	Short seminars and courses on: Environmental Management Plan and Environmental Monitoring Plan  These capacity development programs will be made participatory to the extent possible so it is more effective, with a large amount of learning by doing, role playing, group exercise, etc..  Assessments will also be conducted at the end of each training program to measure the effectiveness of the program, which will give more assurance that project activities will run smoothly.	Contractor staff	WSSC Office, Peshawar	One day long training seminar

Provided by	Organized by	Contents	Target Audience	Venue	Duration
<b>Construction Phase</b> PMC offering specialized services in social management and monitoring	CSC & PMU	Short seminar on Environmental risks associated with construction phase. Development of Environmental Performance Indicators Occupational Health and Safety (OHS) issues These capacity development programs will be made participatory to the extent possible so it is more effective, with a large amount of learning by doing, role playing, group exercise, etc.. Assessments will also be conducted at the end of each training program to measure the effectiveness of the program, which will give more assurance that project activities will run smoothly.	Contractor staff	WSSC Office, Peshawar	One day long training seminar

## 7.9 Environmental Management Costs

378. The **Table 7.6** below provides cost estimates for 'Pre-Construction phase' monitoring while the **Tables 7.7** and **7.8** provides cost estimates for 'Construction phase' and 'Operation phase' monitoring of key environmental parameters.
379. The costs associated with implementation of the EMP and the necessary mitigation measures are provided as **Table 7.9** below. The **Table 7.10** below provides the cost for capacity development and training programme for project contractors for the proposed project.

**Table 7.6: Cost Estimates for 'Pre-Construction Phase' Environmental Monitoring<sup>20</sup>**

Monitoring Component	Parameters	Quantity	Amount PKR	Details
<b>Air Quality</b>	CO, NO <sub>2</sub> , SO <sub>2</sub> , O <sub>3</sub> PM <sub>10</sub>	3 (Once only at 3 locations)	90,000	3 readings @ PKR 30,000 per sample
<b>Noise Levels</b>	dB(A)	3 (Once only at 3 locations)	90,000	3 readings @ PKR 30,000 per reading
<b>Ground Water Quality</b>	NEQS	2 (Once only at 2 locations)	60,000	2 readings @ PKR 30,000 per sample
<b>Contingencies</b>			12,000	5% of monitoring cost
<b>Total (PKR)</b>			<b>252,000</b>	

**Table 7.7: Annual Cost Estimates for 'Construction Phase' Environmental Monitoring<sup>21</sup>**

Monitoring Component	Parameters	Quantity	Amount PKR	Details
<b>Air Quality</b>	CO, NO <sub>2</sub> , PM <sub>10</sub>	12 (Quarterly basis at 3 locations)	360,000	12 readings @ PKR 30,000 per sample
<b>Noise Levels</b>	dB(A)	12 (Quarterly basis at 3 locations)	360,000	12 readings @ PKR 30,000 per reading
<b>Contingencies</b>			36,000	5% of monitoring cost
<b>Total (PKR)</b>			<b>756,000</b>	

<sup>20</sup> For air quality monitoring: 'Passive samplers' such as test tubes can be used or 'Active samplers' with sorbent tubes can also be used.

For noise monitoring: sampling equipment with duration greater than 1 hour can be used.

**1: To cover staff cost and expenses of Environmental Specialist for Contractor**

**Table 7.8: Annual Cost Estimates for 'Operation Phase' Environmental Monitoring<sup>22</sup>**

Monitoring Component	Parameters	Quantity	Amount PKR	Details
Water Contamination	NEQS/WHO	40 (Quarterly basis at 10 locations)	1,200,000	40 readings @ PKR 30,000 per sample
Contingencies			60,000	5% of monitoring cost
<b>Total (PKR)</b>			<b>1,260,000</b>	

**Table 7.9: Estimated Costs for EMP Implementation**

Item	Sub-Item	Estimated Total Cost (PKR)
Staff, audit and monitoring cost <sup>1</sup>	1 person for 24 months (@ 100,000 per month)	2,400,000
Monitoring Activities	Provided separately in Tables 7.5 and 7.6.	-
Mitigation Measures	As prescribed under EMP and EIA.	2,500,000
(i) Water sprinkling	To suppress dust emissions	800,000
(ii) Solid waste collection & disposal	From construction sites (based on initial estimates)	1,700,000
Contingencies	5% of EMP implementation cost	245,000
<b>Total Estimated Cost (PKR)</b>		<b>5,145,000</b>

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**1: To cover staff cost and expenses of Environmental Specialist for Contractor**

**Table 7.10: Cost of Capacity Development and Training Programme for Project Contractor(s)**

<b>Provided by</b>	<b>Organized by</b>	<b>Contents</b>	<b>No. of training events</b>	<b>Duration</b>	<b>Cost (PKR)</b>
<b>Pre-construction Phase</b> Monitoring Consultants/Organizations offering specialized services in environmental management and monitoring	CSC & PMU	Short seminars and courses on: Environmental Management Plan and Environmental Monitoring Plan	Two seminars for Contractor management staff and project staff	1 day	100,000/Training
<b>Construction Phase</b> Monitoring Consultants/Organizations offering specialized services in environmental management and monitoring	CSC & PMU	Short seminars on Environmental risks associated with construction phase. Development of Environmental Performance Indicators Occupational Health and Safety (OHS) issues	Two seminars for Contractor management staff and project staff dealing in environment and social issues	1 day	100,000/Training
<b>Total</b>			<b>200,000 (PKR 0.2 million)</b>		

## 8 Public Consultation and Information Disclosure

380. This section describes the process and outcomes of the consultations carried out with various groups of stakeholders as part of the environmental and social assessment. It includes a brief discussion on the concerns expressed by the stakeholders during the consultation meetings and responses provided in order to address the concerns through necessary mitigation measures.
381. The specific objectives of the consultation were: (i) obtaining local and indigenous knowledge about the environment and people living in the project area; (ii) interaction with the project affected population and other stakeholders for the collection of primary and secondary data on environment and people; and (iii) engaging stakeholders for maximization of the project benefits.
382. The public consultation process was carried out by the KPCIP-EDCM team from start in May, 2020. Mainly key informants were consulted for these meetings which were carried out in an open and frank atmosphere conducive to appreciation of the basic elements of the project and dissemination of information on beneficial and adverse impacts and mitigation for adverse impacts.
383. Information on positive and negative impacts associated with constructional and operational stage and proper mitigation of adverse impacts were shared at these consultations. Questionnaires for conducting FGDs and Surveys are attached as **Annexure B**.

### 8.1 Identification of Stakeholders

384. Stakeholders are considered to be individuals or organizations which have an interest in the proposed project or knowledge that would provide insight into issues or affect decision making related to the proposed project. On the basis of interest and role criteria, there are two types of stakeholders for the proposed project as described below.

#### 8.1.1 Primary Stakeholders

385. The primary stakeholders are primarily the Project Affected Persons (PAPs) and general public including women residing in the project area - for example, people living in the project area particularly those affected by the footprint of the proposed water supply project. These are the people who are directly exposed to the project's impacts though in most cases they may not be receiving any direct benefit from the project.

#### 8.1.2 Secondary Stakeholders

386. The secondary stakeholders are typically general public including women residing in the project area - for example, people living in the project area particularly those affected by the footprint of proposed water supply project. These also include institutional stakeholders – for instance, related government department/agencies, local government, and organizations that may not be directly affected by the project; however, they may influence the project and its design. They include project proponent local through WSSP, other concerned departments that may have a role during various phases of the project, regulatory agencies such as EPA, other relevant departments such as Forest and Wildlife, non-governmental organizations (NGOs), the broader interested communities, including academia and journalists and general public.

## 8.2 Consultation Process

387. As part of the present environmental and social assessment, detailed consultations were carried out through village meetings and focus group discussions (FGDs) with the communities, including women in the project area. Separate meetings were held with the institutional stakeholders in the form of one-to-one meetings i.e. with EPA, WSSP etc. Details of this consultation process are described below.

## 8.3 Consultation with Project Affected Peoples

388. The consultation with project affected peoples was carried out during the various site visits. All data of group discussion, individual discussion and FGDs was recorded.

### 8.3.1 Issues, Concerns and Findings of the Focal Group Discussion:

- The people living in the vicinity of the project area had some concerns related to the water supply system of the city. The existing water supply is not sufficient to cater the needs of nearby localities in terms of water demand.
- Broken lids of water tanks allow dust and dirt to settle down in the existing water storage tanks around city and thus making the drinking water impure.
- There are no special arrangements for cleaning the drains, it gets flooded with rainwater. With this, the wastewater often mixes into clean water pipeline and this water is again harmful to health. This is an indication of drinking water being contaminated at some point.

### 8.3.2 Responses and Proposed Solutions:

- Residents in the site's vicinity were assured that the proposed water supply project is proposed for the sole purpose to provide enough water supply to the residents of the city so they can fulfil their water needs.
- The new water supply network would improve the current situation of water tanks and pipeline network. All the damaged or repairable pipeline and water tanks would be replaced/rehabilitated with new structures.
- After installation of new water supply network, sufficient water would be supplied to every house in the parameter and hence water shortage would no longer exist and thus the burden on water pumps will lower as well.
- Locals will be preferred for jobs provision as this is both socially and economically favored and feasible.

## 8.4 Consultation with Official Stakeholders:

389. As part of environmental assessment, detailed meetings were held with the institutional stakeholders in the form of one-to-one meetings i.e. with EPA, WSSC Peshawar, PkHA, KP Irrigation department and District Administration. Details of this consultation process are described below

390. Officials of the Khyber Pakhtunkhwa Environmental Protection Agency (KP-EPA) have been consulted and briefed on the salient features of the project. Deputy Director KP-EPA



Mr. Waheed stated that proper mitigation plan will be designed and then implemented in the construction and operation phase of the project activities. Details of consultation meetings with official stake holders are mentioned as **Figure 8.1**.

391. Although the engagement is in its initial stages, at some point prior to and during construction the KP-EPA, as well as other KP government departments are expected to be increasingly involved in the stakeholder consultation process.

**Figure 8-1: Photographs of Consultations with Institutional Stakeholders**

	
Consultation with TMO and DC Peshawar	PMU & EDCM Environmental and Social Safeguards experts meeting WSSC-Peshawar officials
	
Meeting with KP EPA	Consultation with Irrigation Department

## 8.5 Consultation Plan for Construction and Operation Phase

392. Consultation plan for construction and operation phase of the proposed water supply project in Peshawar will be prepared in order to obtain the responses of project stakeholders and general public about the project. Periodic consultations and community feedback surveys will be carried out to develop positive perception about the project. Intended stakeholders for such consultations will be all stakeholders that are consulted at the time of IEE preparation and KPCIP PRF processing. Record of such consultations will

be maintained at PMU/WSSP offices and necessary changes in operational modalities will be introduced in the system in light of the response provided by the consultants.

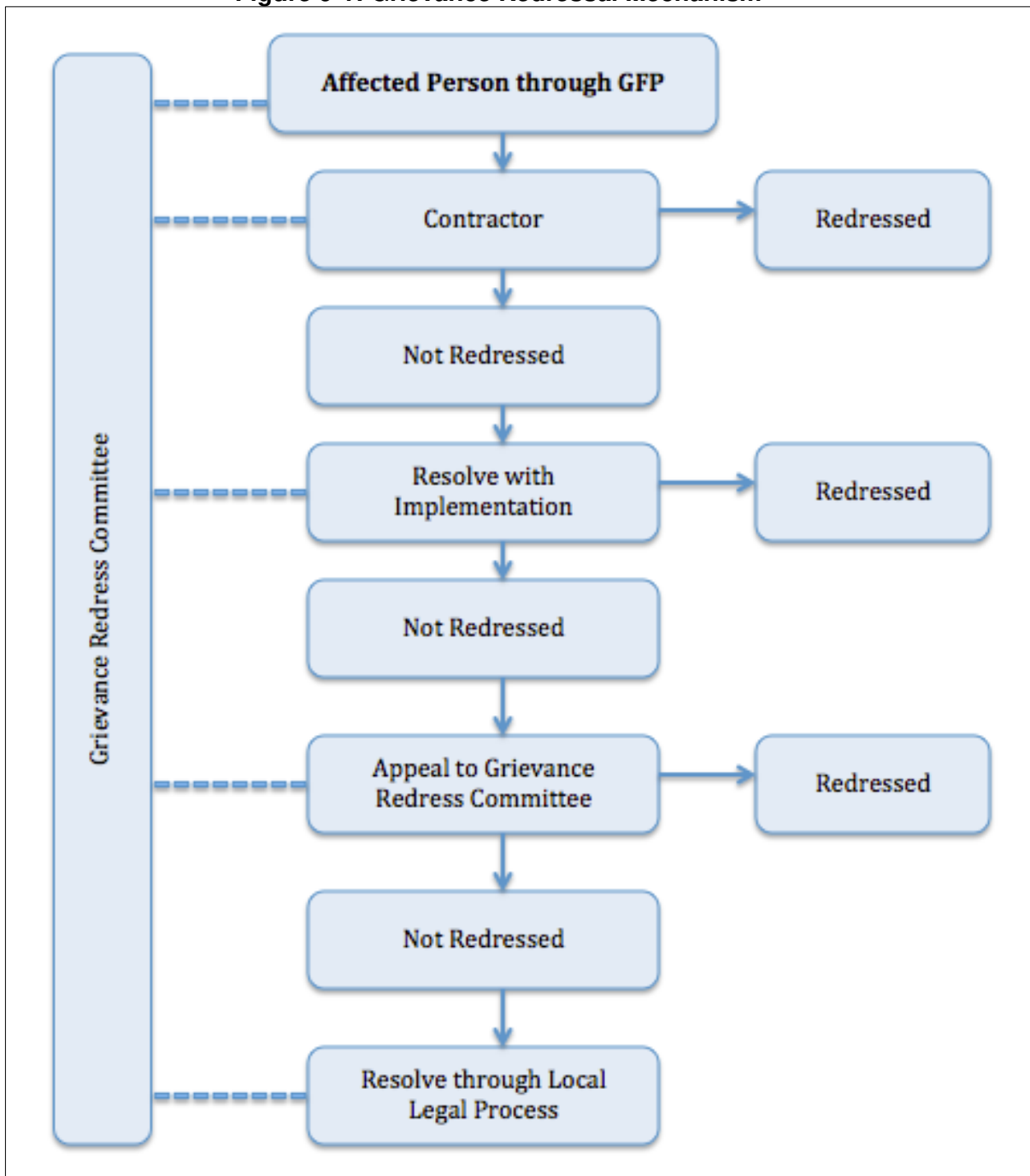
## 9 Grievance Redressal Mechanism

### 9.1 General

393. The ADB Policy (SPS 2009) requires establishment of a local grievance redress mechanism (GRM) to receive and facilitate resolution of the Displaced/Affected Persons concerns and grievances regarding the project's social and environment performance. The measures have been identified to mitigate any potential environmental and social impacts to be caused due to implementation of the proposed water supply project.
394. However, in spite of best efforts, there is chance that the individuals / households affected by the project or other stakeholders are dissatisfied with measures adopted to address adverse social impacts of the project. To address, such situation an effective Grievance Redress Mechanism (GRM) will be established to ensure timely and successful implementation of the project. It will also provide a public forum to the aggrieved to raise their objections and the GRM would address such issues adequately. It will receive, evaluate and facilitate the resolution of displaced persons' concerns, complaints and grievances about the social and environmental performance at the level of the project.
395. The GRM will aim to investigate charges of irregularities and complaints receive from any displaced persons and provide a time-bound early, transparent and fair resolution to voice and resolve social and environmental concerns link to the project.
396. The PMU KPCIP shall make the public aware of the GRM through public awareness campaigns. The name of contact person(s) and his/her phone number, PMU contact numbers will serve as a hotline for complaints and shall be publicized through the media and placed on notice boards outside their offices, construction camps of contractors, and at accessible and visible locations in the project area. The project information brochure will include information on the GRM and shall be widely disseminated throughout the p

397. roject area. Grievances can be filed in writing, via web-based provision or by phone with any member of the PMU.
398. **First tier of GRM.** The PMU is the first tier of GRM which offers the fastest and most accessible mechanism for resolution of grievances. The PMU staff for environment and social safeguards will be designated as the key officers for grievance redressal. Resolution of complaints will be completed within seven (7) working days. Investigation of grievances will involve site visits and consultations with relevant parties (e.g., affected persons, contractors, traffic police, etc.). Grievances will be documented and personal details (name, address, date of complaint, etc.) will be included, unless anonymity is requested. A tracking number will be assigned for each grievance, including the following elements:
- Initial grievance sheet (including the description of the grievance), with an acknowledgement of receipt handed back to the complainant when the complaint is registered;
  - Grievance monitoring sheet, mentioning actions taken (investigation, corrective measures);
  - Closure sheet, one copy of which will be handed to the complainant after he/she has agreed to the resolution and signed-off.
  - The updated register of grievances and complaints will be available to the public at the PMU office, construction sites and other key public offices in the project area. Should the grievance remain unresolved, it will be escalated to the second tier.
399. **Second Tier of GRM.** The PMU will activate the second tier of GRM by referring the unresolved issue (with written documentation) to the Water Sanitation and Services Company (WSSC), Peshawar who will pass unresolved complaints upward to the Grievance Redress Committee (GRC). The GRC will be established by WSSC Peshawar before start of site works. The GRC will consist of the following persons: (i) Project Director; (ii) representative of District government; (iii) representative of the affected person(s); (iv) representative of the local Deputy Commissioners office (land); and (v) representative of the KP EPA (for environmental-related grievances). A hearing will be called with the GRC, if necessary, where the affected person can present his/her concerns/issues. The process will facilitate resolution through mediation. The local GRC will meet as necessary when there are grievances to be addressed. The local GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within fifteen (15) working days. The contractor will have observer status on the committee. If unsatisfied with the decision, the existence of the GRC will not impede the complainant's access to the Government's judicial or administrative remedies.
400. The functions of the local GRC are as follows: (i) resolve problems and provide support to affected persons arising from various environmental issues and including dust, noise, utilities, power and water supply, waste disposal, traffic interference and public safety as well as social issues and land acquisition (temporary or permanent); asset acquisition; and eligibility for entitlements, compensation and assistance; (ii) reconfirm grievances of displaced persons, categorize and prioritize them and aim to provide solutions within a month; and (iii) report to the aggrieved parties about developments regarding their grievances and decisions of the GRC.

401. The WSSC Peshawar officers will be responsible for processing and placing all papers before the GRC, maintaining a database of complaints, recording decisions, issuing minutes of the meetings and monitoring to see that formal orders are issued and the decisions carried out.
402. **Third tier of GRM.** In the event that a grievance cannot be resolved directly by the PMU (first tier) or GRC (second tier), the affected person can seek alternative redressal through the district or sub-district committees as appropriate. The PMU or GRC will be kept informed by the district, municipal or national authority. The grievance redress mechanism and procedure are depicted in the **Figure 9.1** below. The monitoring reports of the EMP and RP implementation will include the following aspects pertaining to progress on grievances: (i) Number of cases registered with the GRC, level of jurisdiction (first, second and third tiers), number of hearings held, decisions made, and the status of pending cases; and (ii) lists of cases in process and already decided upon may be prepared with details such as Name, ID with unique serial number, date of notice, date of application, date of hearing, decisions, remarks, actions taken to resolve issues, and status of grievance (i.e., open, closed, pending).
403. In order to provide greater clarity, the pictorial description of the GRM is provided in **Figure 9.1** below.

**Figure 9-1: Grievance Redressal Mechanism**

## 10 Conclusion and Recommendations

404. The proposed water supply project in Peshawar is of high significance considering the urgent need for improving sustainable water supply system of Peshawar city.
405. Primary and secondary data has been collected and used to assess the environmental impacts of the Project. This IEE report highlights all potential environmental impacts associated with the project and recommends mitigation measures. Any environmental impacts associated with the project need to be properly mitigated, through the existing institutional arrangements described in this report.
406. The majority of the environmental impacts are associated with the design and operation phase of the project as they envisaged to be long-term, such as improper designing of distribution networks including transmission main. In addition, while the rehabilitation of existing tube wells is expected to have minimal impact on the ground water hydrology, however, a complete detailed hydrogeological study is proposed to have minimal impact on the ground water hydrology, however, additional hydrogeological assessments may still be undertaken, if deemed necessary, for the city in the recently developed master plan. Major impacts during construction phase would be related to traffic congestion and community health and safety issues during laying of water supply system in populated areas.
407. The implementation of mitigation measures during construction period will be the responsibility of the Contractor. Therefore, the required environmental mitigation measures will have to be clearly defined in the bidding and contract documents, and appropriately qualified environmental staff retained by the Consultant to supervise the implementation process. The EMP includes measures to minimize project impacts due to traffic, noise, air pollution, waste generation etc.
408. The EMP contained within this IEE document is considered sufficient for issuance as part of the Contracts to the successful bidder(s) and for subsequent use during the project works. It should be mentioned that prior to the commencement of works, this EMP must be further updated by the Contractor into site specific EMPs (SSEMPs) for review and approval of ADB. In these SSEMPs, aspects such as a detailed traffic management plan, identification of locations for disposal of debris and spoil and any other details which shall become available later must be included for efficient implementation of all proposed mitigation measures and the subsequent monitoring of these measures.
409. Based on the above, this report concludes that there are no potential adverse environmental impacts from proposed water supply infrastructure development. Impacts of less significance can be mitigated to an acceptable level by adequate implementation of the mitigation measures identified and suggested, hence, no significant or unacceptable change in the baseline environmental conditions will occur. Similarly, the project will have a visible positive impact on the socio-economic conditions of the local residents in terms of uninterrupted treated water supply and it will fix existing bottleneck of the system. Mitigation measures to help alleviating potential identified impacts have been recommended and an EMP has been provided for implementation of these mitigation measures. Further PMU KPCIP will ensure that selected construction contractor has contractual obligation with respect to EMP implementation. Also, WSSC Peshawar will ensure appropriate staffing and budgeting for effective implementation and monitoring of project EMP.

410. Based on the findings of the IEE, the subproject is unlikely to cause any significant, irreversible or unprecedented environmental impacts. The potential impacts localized, temporary in nature and can be addressed through proven mitigation measures. Hence, the classification of the subproject as Category B per ADB SPS, 2009 is confirmed. No further study or assessment is required at this stage.



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# ANNEXURES

# **Annexure A**

## **REA Checklist**

## Rapid Environmental Assessment (REA) Checklist

### Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

**Country/Project Title:** Pakistan – KPCIP Peshawar Water Supply Development

### Sector Division:

Improvement of water Supply System in Peshawar including:

- i) Rehabilitation and Provision of water reservoirs
- ii) New distribution network and water metering system

Screening Questions	Yes	No	Remarks
<b>A. Project Siting</b> Is the project area...			
▪ Densely populated?	✓		
▪ Heavy with development activities?	✓		
▪ Adjacent to or within any environmentally sensitive areas?		✓	
• Cultural heritage site		✓	
• Protected Area		✓	
• Wetland		✓	
• Mangrove		✓	

Screening Questions	Yes	No	Remarks
• Estuarine		✓	
• Buffer zone of protected area		✓	
• Special area for protecting biodiversity		✓	
• Bay		✓	
<b>B. Potential Environmental Impacts</b> Will the Project cause...			
▪ pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?		✓	Source of water would be the tube-wells.
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	
▪ hazard of land subsidence caused by excessive ground water pumping?		✓	
▪ social conflicts arising from displacement of communities?		✓	Not expected.
▪ conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		✓	
▪ unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	✓		Water treatment would be required at the source.
▪ inadequate protection of intake works or wells, leading to pollution of water supply?	✓		Adequate protection of intake works or wells will be carried out and project design need to address such issues,
▪ over pumping of ground water, leading to salinization and ground subsidence?	✓		
▪ excessive algal growth in storage reservoir?	✓		Treatment would be required to mitigate the effect
▪ increase in production of sewage beyond capabilities of community facilities?	✓		Increased water supply is expected to increase water usage and therefore the production of sewage water.

Screening Questions	Yes	No	Remarks
▪ inadequate disposal of sludge from water treatment plants?		✓	
▪ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		✓	
▪ impairments associated with transmission lines and access roads?	✓		
▪ health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	✓		Health hazards should be mitigated by reducing exposure to hazardous chemicals through proper storage and best management practices in line with IFC safety guidelines.
▪ health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project construction and operation?		✓	Not applicable. Only ground water abstraction will be conducted, ground water treatment is not part of the proposed project scope.
▪ dislocation or involuntary resettlement of people?		✓	
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		✓	
▪ noise and dust from construction activities?	✓		Noise and dust from construction can be minimized and managed with adequate mitigation measures.
▪ increased road traffic due to interference of construction activities?	✓		Traffic increase due to construction activities shall be managed by adhering to scheduled time based on lesser traffic volumes for movement of construction machinery. A proper traffic management plan shall be devised.
▪ continuing soil erosion/silt runoff from construction operations?	✓		Mitigation measures (temporary silt traps) will be adopted to minimize soil erosion/silt runoff.
▪ delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?		✓	Not applicable
▪ delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		✓	
▪ accidental leakage of chlorine gas?		✓	No chlorine is to be used.

Screening Questions	Yes	No	Remarks
▪ excessive abstraction of water affecting downstream water users?	✓		Controlled supply of water to avoid excessive consumption of water and ensure that other uses of water are not jeopardized.
▪ competing uses of water?		✓	
▪ increased sewage flow due to increased water supply	✓		Water supply is expected to increase water usage and therefore the production of increased sewage.
▪ increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant		✓	
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	The contractor shall ensure hiring of local labor and sustainable water usage.
▪ social conflicts if workers from other regions or countries are hired?		✓	Preference must be given to local hiring at the time of project execution.
▪ 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 operation and construction?	✓		Strict implementation of safety measures should be suggested in the EMP to reduce these impacts.
▪ community safety risks due to both accidental and natural hazards, 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?	✓		Safety measures (such as appropriate barriers or buffers) will be installed to keep the community at a safe distance from construction sites, thereby protecting them from accidental and natural hazards.

Climate Change and Disaster Risk Questions	Yes	No	Remarks
The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.			
• Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)?	✓		Yes, it is subject to earthquakes, landslides and storm surges (that could be aggravated by climate change).
▪ Could changes in temperature, precipitation, or extreme events patterns over the Project lifespan affect technical or financial sustainability (e.g., changes in rainfall patterns	✓		Mitigation measures in the project design shall be adopted to minimize the impact of higher precipitation

disrupt reliability of water supply; sea level rise creates salinity intrusion into proposed water supply source)?			and unpredictable weather events may change the construction schedule.
<ul style="list-style-type: none"> <li>Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?</li> </ul>		✓	Not envisioned.
<ul style="list-style-type: none"> <li>Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., by using water from a vulnerable source that is relied upon by many user groups, or encouraging settlement in earthquake zones)?</li> </ul>		✓	Not envisioned

Project fall in category: (A) \_\_\_\_\_ (B) ✓ \_\_\_\_\_ (C) \_\_\_\_\_ (F) \_\_\_\_\_

\* Hazards are potentially damaging physical events.



# **Annexure B**

## **Questionnaires for Conducting FGDs & Surveys**

Focal Group Discussion (FGDs)

Project Name:

Venue:

Sr no \_\_\_\_\_

Date:

Sr no	Name	Profession	CNIC	Moza/Village UC, Tehsil & District	Signature/Thumb
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

## SOCIO-ECONOMIC AND RESIDENTS' MEETINGS SURVEY FOR KPCIP LDP PROJECTS

Date: \_\_\_\_\_

Sr No. \_\_\_\_\_

## 1. Identification

1.1 Name of Respondent \_\_\_\_\_

1.2 Father's Name \_\_\_\_\_

1.3 Respondent CNIC No: \_\_\_\_\_

1.4 Tribe \_\_\_\_\_

1.5 Address; Village: \_\_\_\_\_

Town: \_\_\_\_\_

Tehsil: \_\_\_\_\_

District: \_\_\_\_\_

Province: \_\_\_\_\_

1.6 Demographic Profile of Respondent (Children up to 10 yrs (#): M \_\_\_\_\_, FM \_\_\_\_\_, =T \_\_\_\_\_)

Sr. No.	Relationship with Respondent (See codes)	Sex Male=1 Female=2	Age (Yrs.)	Education (See Codes)	Name of Business/ Occupation (See Codes)		Income From Business/ Occupation (Rs./ Annum)		Diseases During Last Year (See codes)
					Main	Secondary	Main	Secondary	
1	SELF								
2									
3									
4									
5									
6									
7									
8									
9									
10									

\*Other: Rent from property, remittances, net sale of items during a year, net income from agriculture etc.

Demographic Codes:

Relationship: 1=Self, 2=Wife, 3=Son, 4=Daughter, 5=Father, 6=Mother, 7=Brother, 8=Sister, 9=Grand Father, 10=Grand Mother, 11=Bhabhi, 12=Nephew, 13=Father-in-Law, 14=Mother-in-Law, 15=Others

Sex: 1=Male, 2=Female

Education: 1= Primary 2= Middle 3= Matric, 4= Intermediate, 5= BA/BSc, 6= MA/MSc, 7=LLB, 8=Engineer, 9=MBBS, 10=Technical Diploma, 11=Dars-e-Nizami, 12=CanRead Quran, 13=Can Insert Signatures, 14= Illiterate,

Occupations: 1=Agriculturist, 2=Shopkeeper, 3= Trader, 4= Govt. Servant, 5=Private Servant, 6=Timber Labour, 7=General Labour, 8=Livestock, 9=Fishing, 10=8=Driver, 11=Health Related, 12=Educator/Teacher, 13=House-Maid, 14= House Wife, 15=Gone Abroad, 16=Gone out City within Pakistan

Diseases: 1=Diarrhea, 2=Measles, 3=Hepatitis, 4=Typhoid, 5=HIV/AIDS, 6=Polio, 7=Cholera, 8=Tuberculosis, 9=Heart Disease, 10=No Disease,

1.7 Are you member of any village Community organization \_\_\_\_ 1. Yes ☐ 2. No ☐

1.8 If yes, which of the following organizations?

- i. Religious      ii. Political      iii. Law & Order  
 iv. Educational (formal/informal)  
 v. Community Organization      vi. Local Bazaar  
 vii. Youth Organization      viii. Any other  
 2. Land Utilization

Land	Acre	Kanal	Marla
Total Area owned			
Total Cultivated Area			
Area Under Rabi (winter) Crops			
Area Under Kharif (summer) Crops			
Uncultivated Area			
Waste land			
Area Under Farm Houses			
Barren Land			

2.1 Cropping Pattern, Yield and Cost

Sr. No.	Major Crops	Area Sown		Average. Production (Kgs)	Price/40 kgs (Rs.)	Total Cost Incurred (Rs.)
		Acre	Kanal			
1.	Wheat					
2	Maize					
3	Cotton					
4	Rice					
5	Sugarcane					
6	Orchards					
7	Other ( )					
8	Grand Total:					

2.2 Land Tenure Status: ☐ Owner ☐ Tenant ☐ Share Cropper ☐ Leaser

2.3 Land Rent (Rs. / acre) \_\_\_\_\_

3. Possession of Household Goods

Item	No.	Value (Rs.)	Item	No.	Value (Rs.)
Television			Car		
Washing machine			Van/Pickup		
Geyser			Gas Cylinder		
Electric fan			VCR/DVD Player		
Electric iron			Dish Antenna/Cable Connection		

Item	No.	Value (Rs.)	Item	No.	Value (Rs.)
Sewing machine			Telephone/Mobile		
Radio/tape recorder			Electric Water Pump		
Motor cycle/ scooter			Computer		
Other			Other		
Total:			Total:		

## 4. Average Monthly Expenditure on Food and Non-Food Items

## 4.1 Monthly Expenditure on Food &amp; Non-Food Items (Rs.)

## a) Expenditures on Food Items

Sr. No.	Item	Qty. / Month	Expenditure (Rs.)
1.	Wheat / Atta (Flour)		
2.	Maize Flour		
3.	Ghee		
4.	Sugar		
5.	Legumes		
6.	Vegetables		
7.	Tea Leaves		
8.	Milk		
9.	Other Specify		
10.	Total:		

## b) Exp. On Non-Food Items:

1.	Fire wood		
2.	Gas Cylinder		
3.	Kerosene Oil		
4.	Washing Material		
5.	Other Specify		
6.	Total:		

4.2 Expenditure on clothes and shoes during last year: Rs.

4.3 Occasional expenses during last year  
(such as meeting social obligation expenditure) Rs.

4.4 Av. Monthly utility bills for: Electricity (Rs.)

Communication (Rs.) Water (Rs.)

4.5 Annual Expenditure on Health Care (Rs.):

## 5. Social Organizations

5.1 Specify the existing village/social organizations in your area and state their functional status?

Sr. No.	Name of Organization	Category	Registered/ Unregistered	Functions
1		Religious		
2		Educational		
3		Skill Development		
4		Social Welfare		
5		Women Organization		
6		Other		

6. Leadership Pattern

6.1 Which type of people is influential in village matters and how they decide these matters?

Sr.#	Person / Status	Decision Pattern
1	MPA / MNAs	
2	Head of Tribe	
3	Spiritual / Religious Leader	
4	Land Lord / Lumber Dar	
5	School Teacher	
6	Community Leader	
7	Government Official	
8	Retd. Government Official	
9	Any other (specify)	

6.2 Were their decisions considered final and implemented successfully? ☐ 1. Yes  
☐ 2. No

i) Level of acceptability (%) \_\_\_\_\_ ii) Successful implementation (%) \_\_\_\_\_

6.3 Are the general relationship among people in the locality essentially based upon?

1. Competition \_\_\_\_\_ 2. Conflict \_\_\_\_\_  
3. Co-operation \_\_\_\_\_ 4. Don't Know \_\_\_\_\_

6.4 Were you involved in any dispute in the past 5 years? ☐ 1. Yes ☐ 2. No

6.5 If yes, what was the nature of dispute and how was it resolved  
Nature of Dispute \_\_\_\_\_ Method of Resolution \_\_\_\_\_

1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_

7. Credit

7.1 Have you obtained credit during last year? Yes [ ], No. [ ], if yes, source of credit: Formal [ ], Informal [ ]

7.2 Please write the name of relevant source

Formal source (s) \_\_\_\_\_

Informal source (s) \_\_\_\_\_

Percentage of interest \_\_\_\_\_

7.3 Purpose of Loan (Tick)

Purchase House ☐ Rs. \_\_\_\_\_  
 Business ☐ Rs. \_\_\_\_\_  
 Repair of House ☐ Rs. \_\_\_\_\_  
 Medicare of Family Member ☐ Rs. \_\_\_\_\_  
 Family/ Social matters ☐ Rs. \_\_\_\_\_  
 Farm inputs ☐ Rs. \_\_\_\_\_  
 Livestock ☐ Rs. \_\_\_\_\_  
 Other (specify) ☐ Rs. \_\_\_\_\_

7.4 Mode of repayment (Tick the relevant)

1) One time [ ] 2) Through installments [ ],  
 i) Quarterly installments [ ] ii) Six monthly [ ],  
 iii) Annual [ ] iv) Other (specify) \_\_\_\_\_

7.5 How much repayment has been made so far? a) 100% [ ], b) 75% [ ], c) 50% [ ], d) 25% [ ], Less than 25 % [ ]

8. Housing Conditions

8.1 Do you have your own house?

1) Yes \_\_\_\_\_ 2) No. \_\_\_\_\_

If yes then

8.2 Total Area of the house: square ft. Present Value (Rs) \_\_\_\_\_

Type of Room	No. of Room	Katcha (tick)	Pacca (tick)	Semi Pacca (tick)
Living rooms				
Animal shed				
Other shed				
Bathroom				
Latrine				
- Open				
- Flush				

Other

8.3 Other Assets

Area (ft.)

Shop(Sq. ft): L W

Khokha:

Electric Pump / Hand Pump (No.):

Hydropower Generator:

Other ( ) (No.):

8.4 Trees

- Mature Fruit Trees (No.):

- Mature Shade Trees (No.)

9. Access to Social Amenities (Tick)

Social Amenities	Available	Satisfactory	Non-Satisfactory	No Access
Electricity				
Sui Gas				
Water Supply				
Telephone				
Sewerage/Drainage				
BHU				
School				
Others				

10. Livestock Inventory

Livestock	No.	Present Value (Rs.)
Buffaloes		
Cows		
Horse		
Donkey		
Mule		
Sheep		
Goat		
Poultry		
Other		

11. Women's Participation and Decision Making in Different Activities

11.1 Women participation in different household activities:

Activities	Participation (%)	Decision Making (%)
Household activities		



Child caring	<input type="text"/>	<input type="text"/>
Farm/Crop activities	<input type="text"/>	<input type="text"/>
Livestock rearing	<input type="text"/>	<input type="text"/>
Sale & Purchase of properties	<input type="text"/>	<input type="text"/>
Social obligations (marriage, birthday & other functions)	<input type="text"/>	<input type="text"/>
Local representation (councilor/ political gathering)	<input type="text"/>	<input type="text"/>
Others	<input type="text"/>	<input type="text"/>

11.2 Women issues in the project area

\_\_\_\_\_

\_\_\_\_\_

11.3 Women views about the project

\_\_\_\_\_

\_\_\_\_\_

12. Perceptions of Respondents for Action Associated with the Project

	Increase	Decrease
Employment opportunities	<input type="text"/>	<input type="text"/>
Marketing facilities opportunities	<input type="text"/>	<input type="text"/>
Living standard	<input type="text"/>	<input type="text"/>
Unemployment	<input type="text"/>	<input type="text"/>
Income generating activities	<input type="text"/>	<input type="text"/>
Mobility (Access to Resources)	<input type="text"/>	<input type="text"/>
Quality of drinking water	<input type="text"/>	<input type="text"/>
Agriculture water	<input type="text"/>	<input type="text"/>
Trend of fish farm	<input type="text"/>	<input type="text"/>
Other specify _____		

13. General Remarks of the Respondents

14. Resettlement Part

14.1 Do you feel any resettlement impact? Yes \_\_\_\_\_ No \_\_\_\_\_

If yes then

Category	Area Acre	Kanal	Value of Land (Rs.)	Remarks
Cultivated				
Uncultivated				
Grazing				
Barren Land				
Waste Land				
Other				
Total				

14.2 Affected Cropping Area

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes then

Name of Crop	Acre	Kanal	Value (Rs.)
Rabi			
Kharif			
Total:			

14.3 Affected residential structures

Name of Structure	Types of Structures			Area		Value of Structure
	Kacha	Pacca	Semi Pacca	Sq. ft.	Rft.	
Houses						
Boundary Wall						
Other						

14.4 Impact on Farm House

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes then

Name	Type of Farm House			Area		Value (Rs.)
	Kacha	Pacca	Semi Pacca	Sq.ft	Rft.	
Rooms						
Cattle Shed						
Boundary Wall						
Other						

14.5 Impact of Tube wells

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes then

Types of Tube wells	No.	Value (Rs.)
Electric		
Diesel		
Turbine		
Other		
Total:		

14.6 Impact on Utility

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes then

Types	Nos. / Area
Electric poles	
Transformer	
Transmission line	
Telephone	
Other	
Total:	

14.7 Impact on Community Structure

Name	Yes	No	Value (Rs.)
Schools			
Mosque			
Graveyard			
Health Centre			
Shrine			
Others			
Total:			

14.8 How to shift shrines / graveyards?

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14.9 Miscellaneous Impacts of the Project

---



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14.10 Do you have any alternate residence place?

Yes ☐ No ☐

If yes then (tick relevant)

Own Land / House	Yes/No	Location	Distance from current residence (km)
Tenancy			
Relative			
Other			

14.11 Mode of Payment

Land for land \_\_\_\_\_  
 Cash compensation \_\_\_\_\_  
 Kind \_\_\_\_\_  
 Other \_\_\_\_\_

15. Project

\_\_\_\_\_

16. Views / Comments of Interviewers

\_\_\_\_\_  
 \_\_\_\_\_

Name & Signature of Interviewer: \_\_\_\_\_ Date: \_\_\_\_\_

# **Annexure C**

## **Details of public consultations**

**TO BE ADDED**

# **Annexure D**

## **Environmental Baseline Monitoring**

## Air Quality Particulate Matters



Integrated Environment Laboratory



## AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project		Supply Scheme in Peshawar
Monitoring Date:	05-04-2021	Reporting Date:	15-04-2021
Source:	Ambient Air	Monitoring Instrument:	AQMS 65, Serial #1310
GPS Coordinates:	34°1'40.92"N 71°34'3.59"E		

Sr. No	Time Hours	Parameters		Results (Average 24 Hrs)	
		PM <sub>2.5</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>
		Units ( $\mu\text{g}/\text{m}^3$ )	Units ( $\mu\text{g}/\text{m}^3$ )		
1.	09:00 A.M	27.8	85.8	23.55 ( $\mu\text{g}/\text{m}^3$ )	73.62 ( $\mu\text{g}/\text{m}^3$ )
2.	10:00 A.M	27.3	88.1		
3.	11:00 A.M	26	83.3		
4.	12:00 P.M	26.4	84.6		
5.	01:00 P.M	25.8	84.4		
6.	02:00 P.M	23.9	94.9		
7.	03:00 P.M	26.7	92.4		
8.	04:00 PM	27.4	86.6		
9.	05:00 PM	26.3	86.8		
10.	06:00 PM	24.1	83.4		
11.	07:00 PM	23.9	81.3		
12.	08:00 PM	21.3	78.6		
13.	09:00 PM	21.8	73.5		
14.	10:00 PM	20.2	70.6		
15.	11:00 PM	21.1	67.8		
16.	12:00 AM	19.4	65.3		
17.	01:00 AM	19.8	63.6		
18.	02:00 AM	24.3	60.5		
19.	03:00 AM	24.8	59.8		
20.	04:00 AM	25.3	53.5		
21.	05:00 AM	25.4	52.6		
22.	06:00 A.M	23.2	55.3		
23.	07:00 A.M	17	57.6		
24.	08:00 A.M	16.2	56.7		
NEQSAA				35 ( $\mu\text{g}/\text{m}^3$ )	150 ( $\mu\text{g}/\text{m}^3$ )
WHO				25 ( $\mu\text{g}/\text{m}^3$ )	50 ( $\mu\text{g}/\text{m}^3$ )

NEQSAA: National Environmental Quality Standards for Ambient Air

WHO: World Health Organization

## Note:

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- Quality was assured through self calibration of the instrument.
- The values were representing of monitoring conditions prevailing during the monitoring hours.
- The measurements were carried out on client request.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst:

Signature of Chief Chemist



FOR ENVIRONMENTAL MONITORING, ANALYSIS &amp; SURVEYS





### AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water Supply Scheme in Peshawar
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project	Reporting Date:	15-04-2021
Monitoring Date:	06-04-2021	Monitoring Instrument:	AQMS 65, Serial #1310
Source:	Ambient Air		
GPS Coordinates:	33°59'44.93"N 71°33'45.89"E		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		PM <sub>2.5</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>
		Units			
	Hours	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )	18.65 (µg/m <sup>3</sup> )	59.12 (µg/m <sup>3</sup> )
1	10:00 A.M	22.9	71.3		
2	11:00 A.M	22.4	73.6		
3	12:00 P.M	21.1	68.8		
4	01:00 P.M	21.5	70.1		
5	02:00 P.M	20.9	69.9		
6	03:00 P.M	19	80.4		
7	04:00 PM	21.8	77.9		
8	05:00 PM	22.5	72.1		
9	06:00 PM	21.4	72.3		
10	07:00 PM	19.2	68.9		
11	08:00 PM	19	66.8		
12	09:00 PM	16.4	64.1		
13	10:00 PM	16.9	59		
14	11:00 PM	15.3	56.1		
15	12:00 AM	16.2	53.3		
16	01:00 AM	14.5	50.8		
17	02:00 AM	14.9	49.1		
18	03:00 AM	19.4	46		
19	04:00 AM	19.9	45.3		
20	05:00 AM	20.4	39		
21	06:00 A.M	20.5	38.1		
22	07:00 A.M	18.3	40.8		
23	08:00 A.M	12.1	43.1		
24	09:00 A.M	11.3	42.2		
NEQSAA				35 (µg/m <sup>3</sup> )	150 (µg/m <sup>3</sup> )
WHO				25 (µg/m <sup>3</sup> )	50 (µg/m <sup>3</sup> )

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WHO: World Health Organization

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Signature of Analyst:

Signature of Chief Chemist



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Environmental Protection Agency (EPA-KPK) Certified



### AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project		Supply Scheme in Peshawar
Monitoring Date:	07-04-2021	Reporting Date:	15-04-2021
Source:	Ambient Air	Monitoring Instrument:	AQMS 65, Serial #1310
GPS Coordinates:	33°59'55.78"N 71°33'45.59"E		

Parameters				Results (Average 24 Hrs)	
Sr. No	Time	PM <sub>2.5</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>
		Units			
		( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )		
1	10:30 A.M	18.7	73.6	14.45 ( $\mu\text{g}/\text{m}^3$ )	61.42 ( $\mu\text{g}/\text{m}^3$ )
2	11:30 A.M	18.2	75.9		
3	12:30 P.M	16.9	71.1		
4	01:30 P.M	17.3	72.4		
5	02:30 P.M	16.7	72.2		
6	03:30 P.M	14.8	82.7		
7	04:30 PM	17.6	80.2		
8	05:30 PM	18.3	74.4		
9	06:30 PM	17.2	74.6		
10	07:30 PM	15	71.2		
11	08:30 PM	14.8	69.1		
12	09:30 PM	12.2	66.4		
13	10:30 PM	12.7	61.3		
14	11:30 PM	11.1	58.4		
15	12:30 AM	12	55.6		
16	01:30 AM	10.3	53.1		
17	02:30 AM	10.7	51.4		
18	03:30 AM	15.2	48.3		
19	04:30 AM	15.7	47.6		
20	05:30 AM	16.2	41.3		
21	06:30 A.M	16.3	40.4		
22	07:30 A.M	14.1	43.1		
23	08:30 A.M	7.9	45.4		
24	09:30 A.M	7.1	44.5		
NEQSAA				35 ( $\mu\text{g}/\text{m}^3$ )	150 ( $\mu\text{g}/\text{m}^3$ )
WHO				25 ( $\mu\text{g}/\text{m}^3$ )	50 ( $\mu\text{g}/\text{m}^3$ )

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WHO: World Health Organization

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Signature of Chief Chemist



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### AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water Supply Scheme in Peshawar
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project	Monitoring Instrument:	AQMS 65, Serial #1310
Monitoring Date:	08-04-2021	Reporting Date:	15-04-2021
Source:	Ambient Air		
GPS Coordinates:	33°58'34.00"N 71°31'52.31"E		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		PM <sub>2.5</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>
		Units			
	Hours	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )		
1	10:15 AM	25.2	82.5	20.95 (µg/m <sup>3</sup> )	70.32 (µg/m <sup>3</sup> )
2	11:15 AM	24.7	84.8		
3	12:15 PM	23.4	80		
4	01:15 PM	23.8	81.3		
5	02:15 PM	23.2	81.1		
6	03:15 PM	21.3	91.6		
7	04:15 PM	24.1	89.1		
8	05:15 PM	24.8	83.3		
9	06:15 PM	23.7	83.5		
10	07:15 PM	21.5	80.1		
11	08:15 PM	21.3	78		
12	09:15 PM	18.7	75.3		
13	10:15 PM	19.2	70.2		
14	11:15 PM	17.6	67.3		
15	12:15 AM	18.5	64.5		
16	01:15 AM	16.8	62		
17	02:15 AM	17.2	60.3		
18	03:15 AM	21.7	57.2		
19	04:15 AM	22.2	56.5		
20	05:15 AM	22.7	50.2		
21	06:15 AM	22.8	49.3		
22	07:15 AM	20.6	52		
23	08:15 AM	14.4	54.3		
24	09:15 AM	13.6	53.4		
NEQSAA				35 (µg/m <sup>3</sup> )	150 (µg/m <sup>3</sup> )
WHO				25 (µg/m <sup>3</sup> )	50 (µg/m <sup>3</sup> )

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### AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number:	KPCIP/ENV/43-2021	Site Address:	Replacement of water Supply Scheme in Peshawar
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project	Reporting Date:	15-04-2021
Monitoring Date:	09-04-2021	Monitoring Instrument:	AQMS 65, Serial #1310
Source:	Ambient Air		
GPS Coordinates:	33°59'22.07"N 71°29'18.29"E		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		PM <sub>2.5</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>
	Hours	Units ( $\mu\text{g}/\text{m}^3$ )	Units ( $\mu\text{g}/\text{m}^3$ )		
1	10:30 AM	30.1	91.8	25.85 ( $\mu\text{g}/\text{m}^3$ )	79.62 ( $\mu\text{g}/\text{m}^3$ )
2	11:30 AM	29.6	94.1		
3	12:30 PM	28.3	89.3		
4	01:30 PM	28.7	90.6		
5	02:30 PM	28.1	90.4		
6	03:30 PM	26.2	100.9		
7	04:30 PM	29	98.4		
8	05:30 PM	29.7	92.6		
9	06:30 PM	28.6	92.8		
10	07:30 PM	26.4	89.4		
11	08:30 PM	26.2	87.3		
12	09:30 PM	23.6	84.6		
13	10:30 PM	24.1	79.5		
14	11:30 PM	22.5	76.6		
15	12:30 AM	23.4	73.8		
16	01:30 AM	21.7	71.3		
17	02:30 AM	22.1	69.6		
18	03:30 AM	26.6	66.5		
19	04:30 AM	27.1	65.8		
20	05:30 AM	27.6	59.5		
21	06:30 AM	27.7	58.6		
22	07:30 AM	25.5	61.3		
23	08:30 AM	19.3	63.6		
24	09:30 AM	18.5	62.7		
NEQSAA				35 ( $\mu\text{g}/\text{m}^3$ )	150 ( $\mu\text{g}/\text{m}^3$ )
WHO				25 ( $\mu\text{g}/\text{m}^3$ )	50 ( $\mu\text{g}/\text{m}^3$ )

NEQSAA: National Environmental Quality Standards for Ambient Air  
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### AMBIENT GASEOUS MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project		Supply Scheme in
Monitoring Date:	05-04-2021	Reporting Date:	Peshawar
Source:	Ambient Air (Gaseous)	Monitoring Instrument:	15-04-2021
GPS Coordinates:	34° 1'40.92"N 71°34'3.59"E		AQMS 65, Serial # 1310

Sr. No	Time	Parameters			
		CO	NO	NO <sub>2</sub>	SO <sub>2</sub>
		Units			
	Hours	(mg/m <sup>3</sup> )	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )
1.	09:00 A.M	1.01	14.12	20.24	22.11
2.	10:00 A.M	0.96	14.43	20.01	22.24
3.	11:00 A.M	1.05	15.3	20.74	22.74
4.	12:00 P.M	1.04	15.25	21.28	22.58
5.	01:00 P.M	1.12	15.48	20.92	23.2
6.	02:00 P.M	1.1	14.24	20.08	22.86
7.	03:00 P.M	1.12	15.27	20.28	22.52
8.	04:00 P.M	1.1	15.15	20.66	22.24
9.	05:00 P.M	1.05	15.29	20.29	22
10.	06:00 P.M	1.04	14.34	19.88	21.14
11.	07:00 P.M	0.95	14.02	19.13	20.95
12.	08:00 P.M	0.74	14.23	18.04	22.09
13.	09:00 P.M	0.78	13.03	17.99	21.85
14.	10:00 P.M	0.87	13.11	17.81	21.04
15.	11:00 P.M	0.74	13.31	18.92	20.71
16.	12:00 A.M	0.69	13.47	18.61	21.45
17.	01:00 A.M	0.72	13.75	18.8	20.8
18.	02:00 A.M	0.66	14.09	19.06	21.24
19.	03:00 A.M	0.72	14.62	18.81	21.39
20.	04:00 A.M	0.74	14.31	19.64	21.49
21.	05:00 A.M	0.9	14.12	19.05	21.17
22.	06:00 A.M	0.91	14.4	18.28	21.59
23.	07:00 A.M	0.92	14.61	18.79	21.34
24.	08:00 A.M	1	14.47	18.6	21.94
Average Concentration		0.91	14.35	19.41	21.77
NEQSAA		05	40	80	120
		(24 hr)	(24 hr)	(24 hr)	(24 hr)
WHO		---	---	200	20
				(24 hrs)	(24 hrs)

NEQSAA: National Environmental Quality Standards for Ambient Air  
WHO: World Health Organization

#### Note:

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Signature of Analyst

Signature of Chief Chemist



### FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS

Creative House, 3rd Floor, Office # 302, Phase III Chowk, Hayatabad, Peshawar, Pakistan  
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Environmental Protection Agency (EPA-KPK) Certified



### AMBIENT GASEOUS MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water Supply Scheme in Peshawar
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project	Reporting Date:	15-04-2021
Monitoring Date:	06-04-2021	Monitoring Instrument:	AQMS 65, Serial # 1310
Source:	Ambient Air (Gaseous)		
GPS Coordinates:	33°59'44.93"N 71°33'45.89"E		

Sr. No	Time	Parameters			
		CO	NO	NO <sub>2</sub>	SO <sub>2</sub>
		Units			
	Hours	(mg/m <sup>3</sup> )	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )
1.	10:00 A.M	0.95	13.03	15.24	17.15
2.	11:00 A.M	0.9	13.34	15.01	17.28
3.	12:00 P.M	0.99	14.21	15.74	17.78
4.	01:00 P.M	0.98	14.16	16.28	17.62
5.	02:00 P.M	1.06	14.39	15.92	18.24
6.	03:00 P.M	1.04	13.15	15.08	17.9
7.	04:00 PM	1.06	14.18	15.28	17.56
8.	05:00 PM	1.04	14.06	15.66	17.28
9.	06:00 PM	0.99	14.2	15.29	17.04
10.	07:00 PM	0.98	13.25	14.88	16.18
11.	08:00 PM	0.89	12.93	14.13	15.99
12.	09:00 PM	0.68	13.14	13.04	17.13
13.	10:00 PM	0.72	11.94	12.99	16.89
14.	11:00 PM	0.81	12.02	12.81	16.08
15.	12:00 AM	0.68	12.22	13.92	15.75
16.	01:00 AM	0.63	12.38	13.61	16.49
17.	02:00 AM	0.66	12.66	13.8	15.84
18.	03:00 AM	0.6	13	14.06	16.28
19.	04:00 AM	0.66	13.53	13.81	16.43
20.	05:00 AM	0.68	13.22	14.64	16.53
21.	06:00 A.M	0.84	13.03	14.05	16.21
22.	07:00 A.M	0.85	13.31	13.28	16.63
23.	08:00 A.M	0.86	13.52	13.79	16.38
24.	09:00 A.M	0.94	13.38	13.6	16.98
Average Concentration		0.85	13.26	14.41	16.81
NEQSAA		05 (24 hr)	40 (24 hr)	80 (24 hr)	120 (24 hr)
WHO		---	---	200 (24 hrs)	20 (24 hrs)

NEQSAA: National Environmental Quality Standards for Ambient Air  
WHO: World Health Organization

**Note:**

- Selected measurement units were mg/m<sup>3</sup> and µg/m<sup>3</sup> otherwise stated.
- Quality was assured through self calibration of the instrument.
- The values were representing of monitoring conditions prevailing during the monitoring hours.
- The measurements were carried out on client request.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst:

Signature of Chief Chemist



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### AMBIENT GASEOUS MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water Supply Scheme in Peshawar
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project	Monitoring Instrument:	AQMS 65, Serial # 1310
Monitoring Date:	07-04-2021	Reporting Date:	15-04-2021
Source:	Ambient Air (Gaseous)		
GPS Coordinates:	33°59'55.78"N 71°33'45.59"E		

Sr. No	Time	Parameters			
		CO	NO	NO <sub>2</sub>	SO <sub>2</sub>
		Units			
	Hours	(mg/m <sup>3</sup> )	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )
1.	10:30 A.M	0.89	12.16	13.9	14.81
2.	11:30 A.M	0.84	12.47	13.67	14.94
3.	12:30 P.M	0.93	13.34	14.4	15.44
4.	01:30 P.M	0.92	13.29	14.94	15.28
5.	02:30 P.M	1	13.52	14.58	15.9
6.	03:30 P.M	0.98	12.28	13.74	15.56
7.	04:30 PM	1	13.31	13.94	15.22
8.	05:30 PM	0.98	13.19	14.32	14.94
9.	06:30 PM	0.93	13.33	13.95	14.7
10.	07:30 PM	0.92	12.38	13.54	13.84
11.	08:30 PM	0.83	12.06	12.79	13.65
12.	09:30 PM	0.62	12.27	11.7	14.79
13.	10:30 PM	0.66	11.07	11.65	14.55
14.	11:30 PM	0.75	11.15	11.47	13.74
15.	12:30 AM	0.62	11.35	12.58	13.41
16.	01:30 AM	0.57	11.51	12.27	14.15
17.	02:30 AM	0.6	11.79	12.46	13.5
18.	03:30 AM	0.54	12.13	12.72	13.94
19.	04:30 AM	0.6	12.66	12.47	14.09
20.	05:30 AM	0.62	12.35	13.3	14.19
21.	06:30 A.M	0.78	12.16	12.71	13.87
22.	07:30 A.M	0.79	12.44	11.94	14.29
23.	08:30 A.M	0.8	12.65	12.45	14.04
24.	09:30 A.M	0.88	12.51	12.26	14.64
Average Concentration		0.79	12.39	13.07	14.47
NEQSAA		05 (24 hr)	40 (24 hr)	80 (24 hr)	120 (24 hr)
WHO		---	---	200 (24 hrs)	20 (24 hrs)

NEQSAA: National Environmental Quality Standards for Ambient Air  
WHO: World Health Organization

#### Note:

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### AMBIENT GASEOUS MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project		Supply Scheme in
Monitoring Date:	08-04-2021	Reporting Date:	Peshawar
Source:	Ambient Air (Gaseous)	Monitoring Instrument:	15-04-2021
GPS Coordinates:	33°58'34.00"N 71°31'52.31"E		AQMS 65, Serial # 1310

Sr. No	Time	Parameters			
		CO	NO	NO <sub>2</sub>	SO <sub>2</sub>
		Units			
	Hours	(mg/m <sup>3</sup> )	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )
1.	10:15 AM	1.06	13.85	17.78	20
2.	11:15 AM	1.01	14.16	17.55	20.13
3.	12:15 PM	1.1	15.03	18.28	20.63
4.	01:15 PM	1.09	14.98	18.82	20.47
5.	02:15 PM	1.17	15.21	18.46	21.09
6.	03:15 PM	1.15	13.97	17.62	20.75
7.	04:15 PM	1.17	15	17.82	20.41
8.	05:15 PM	1.15	14.88	18.2	20.13
9.	06:15 PM	1.1	15.02	17.83	19.89
10.	07:15 PM	1.09	14.07	17.42	19.03
11.	08:15 PM	1	13.75	16.67	18.84
12.	09:15 PM	0.79	13.96	15.58	19.98
13.	10:15 PM	0.83	12.76	15.53	19.74
14.	11:15 PM	0.92	12.84	15.35	18.93
15.	12:15 AM	0.79	13.04	16.46	18.6
16.	01:15 AM	0.74	13.2	16.15	19.34
17.	02:15 AM	0.77	13.48	16.34	18.69
18.	03:15 AM	0.71	13.82	16.6	19.13
19.	04:15 AM	0.77	14.35	16.35	19.28
20.	05:15 AM	0.79	14.04	17.18	19.38
21.	06:15 AM	0.95	13.85	16.59	19.06
22.	07:15 AM	0.96	14.13	15.82	19.48
23.	08:15 AM	0.97	14.34	16.33	19.23
24.	09:15 AM	1.05	14.2	16.14	19.83
Average Concentration		0.96	14.08	16.95	19.66
NEQSAA		05 (24 hr)	40 (24 hr)	80 (24 hr)	120 (24 hr)
WHO		---	---	200 (24 hrs)	20 (24 hrs)

NEQSAA: National Environmental Quality Standards for Ambient Air

WHO: World Health Organization

#### Note:

- Selected measurement units were mg/m<sup>3</sup> and µg/m<sup>3</sup> otherwise stated.
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## AMBIENT GASEOUS MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water Supply Scheme in Peshawar
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project	Monitoring Instrument:	AQMS 65, Serial # 1310
Monitoring Date:	09-04-2021	Reporting Date:	15-04-2021
Source:	Ambient Air (Gaseous)		
GPS Coordinates:	33°59'22.07"N 71°29'18.29"E		

Sr. No	Time	Parameters			
		CO	NO	NO <sub>2</sub>	SO <sub>2</sub>
		Units			
	Hours	(mg/m <sup>3</sup> )	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )
1.	10:30 AM	0.99	12.85	15.16	16.95
2.	11:30 AM	0.94	13.16	14.93	17.08
3.	12:30 PM	1.03	14.03	15.66	17.58
4.	01:30 PM	1.02	13.98	16.2	17.42
5.	02:30 PM	1.1	14.21	15.84	18.04
6.	03:30 PM	1.08	12.97	15	17.7
7.	04:30 PM	1.1	14	15.2	17.36
8.	05:30 PM	1.08	13.88	15.58	17.08
9.	06:30 PM	1.03	14.02	15.21	16.84
10.	07:30 PM	1.02	13.07	14.8	15.98
11.	08:30 PM	0.93	12.75	14.05	15.79
12.	09:30 PM	0.72	12.96	12.96	16.93
13.	10:30 PM	0.76	11.76	12.91	16.69
14.	11:30 PM	0.85	11.84	12.73	15.88
15.	12:30 AM	0.72	12.04	13.84	15.55
16.	01:30 AM	0.67	12.2	13.53	16.29
17.	02:30 AM	0.7	12.48	13.72	15.64
18.	03:30 AM	0.64	12.82	13.98	16.08
19.	04:30 AM	0.7	13.35	13.73	16.23
20.	05:30 AM	0.72	13.04	14.56	16.33
21.	06:30 AM	0.88	12.85	13.97	16.01
22.	07:30 AM	0.89	13.13	13.2	16.43
23.	08:30 AM	0.9	13.34	13.71	16.18
24.	09:30 AM	0.98	13.2	13.52	16.78
Average Concentration		0.89	13.08	14.33	16.61
NEQSAA		05 (24 hr)	40 (24 hr)	80 (24 hr)	120 (24 hr)
WHO		---	---	200 (24 hrs)	20 (24 hrs)

NEQSAA: National Environmental Quality Standards for Ambient Air

WHO: World Health Organization

## Note:

- Selected measurement units were mg/m<sup>3</sup> and µg/m<sup>3</sup> otherwise stated.
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## Noise Level Monitoring



## NOISE LEVEL MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water Supply Scheme in Peshawar
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project	Reporting Date:	15-04-2021
Monitoring Date:	05-04-2021	Monitoring Instrument:	Noise Meter-IEC651-Type-2
Source:	Ambient Noise		
GPS Coordinates	34° 1'40.92"N 71°34'3.59"E		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	60.2	62.8	61.5
2.	10:00 A.M		60	62.5	61.25
3.	11:00 A.M		59.7	62.3	61
4.	12:00 P.M		59.5	62.1	60.8
5.	01:00 P.M		59.3	61.9	60.6
6.	02:00 P.M		59.1	61.7	60.4
7.	03:00 P.M		58.9	61.5	60.2
8.	04:00 PM		58.7	61.2	59.95
9.	05:00 PM		58.4	61	59.7
10.	06:00 PM		58.2	60.8	59.5
11.	07:00 PM		58	60.6	59.3
12.	08:00 PM		57.8	60.4	59.1
13.	09:00 PM		57.6	60.2	58.9
14.	10:00 PM		57.4	59.9	58.65
15.	11:00 PM		57.1	59.7	58.4
16.	12:00 AM		56.9	59.5	58.2
17.	01:00 AM		56.7	59.3	58
18.	02:00 AM		56.5	59.1	57.8
19.	03:00 AM		56.3	58.9	57.6
20.	04:00 AM		56.1	58.6	57.35
21.	05:00 AM		55.8	58.4	57.1
22.	06:00 A.M		55.6	58.2	56.9
23.	07:00 A.M		55.4	58	56.7
24.	08:00 A.M		55.2	57.8	56.5
NEQS limit : 65 dB					
WHO limit: 70 dB					

NEQS: National Environmental Quality Standards WHO: World Health Organization

Leq: Log Equivalent Continuous Sound Level

Note:

- Selected measurement units were dB (A) otherwise stated.
- Quality was assured through self calibration of the instrument.
- The values were representing of monitoring conditions prevailing during the monitoring hours.
- The measurements were carried out on client request.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

  
Signature of Analyst:

  
Signature of Chief Chemist







## NOISE LEVEL MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project		Supply Scheme in Peshawar
Monitoring Date:	06-04-2021	Reporting Date:	15-04-2021
Source:	Ambient Noise	Monitoring Instrument:	Noise Meter-IEC651-Type-2
GPS Coordinates	33°59'44.93"N 71°33'45.89"E		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	10:00 A.M	dB(A)	57.5	60.1	58.8
2.	11:00 A.M		57.3	59.8	58.55
3.	12:00 P.M		57	59.6	58.3
4.	01:00 P.M		56.8	59.4	58.1
5.	02:00 P.M		56.6	59.2	57.9
6.	03:00 P.M		56.4	59	57.7
7.	04:00 PM		56.2	58.8	57.5
8.	05:00 PM		56	58.5	57.25
9.	06:00 PM		55.7	58.3	57
10.	07:00 PM		55.5	58.1	56.8
11.	08:00 PM		55.3	57.9	56.6
12.	09:00 PM		55.1	57.7	56.4
13.	10:00 PM		54.9	57.5	56.2
14.	11:00 PM		54.7	57.2	55.95
15.	12:00 AM		54.4	57	55.7
16.	01:00 AM		54.2	56.8	55.5
17.	02:00 AM		54	56.6	55.3
18.	03:00 AM		53.8	56.4	55.1
19.	04:00 AM		53.6	56.2	54.9
20.	05:00 AM		53.4	55.9	54.65
21.	06:00 A.M		53.1	55.7	54.4
22.	07:00 A.M		52.9	55.5	54.2
23.	08:00 A.M		52.7	55.3	54
24.	09:00 A.M		52.5	55.1	53.8

NEQS limit : 65 dB

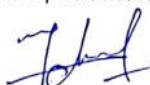
WHO limit: 70 dB

NEQS: National Environmental Quality Standards WHO: World Health Organization

Leq: Log Equivalent Continuous Sound Level

Note:

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## NOISE LEVEL MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project		Supply Scheme in Peshawar
Monitoring Date:	07-04-2021	Reporting Date:	15-04-2021
Source:	Ambient Noise	Monitoring Instrument:	Noise Meter-IEC651- Type-2
GPS Coordinates	33°59'55.78"N 71°33'45.59"E		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	10:30 A.M	dB(A)	62.1	64.7	63.4
2.	11:30 A.M		61.9	64.4	63.15
3.	12:30 P.M		61.6	64.2	62.9
4.	01:30 P.M		61.4	64	62.7
5.	02:30 P.M		61.2	63.8	62.5
6.	03:30 P.M		61	63.6	62.3
7.	04:30 PM		60.8	63.4	62.1
8.	05:30 PM		60.6	63.1	61.85
9.	06:30 PM		60.3	62.9	61.6
10.	07:30 PM		60.1	62.7	61.4
11.	08:30 PM		59.9	62.5	61.2
12.	09:30 PM		59.7	62.3	61
13.	10:30 PM		59.5	62.1	60.8
14.	11:30 PM		59.3	61.8	60.55
15.	12:30 AM		59	61.6	60.3
16.	01:30 AM		58.8	61.4	60.1
17.	02:30 AM		58.6	61.2	59.9
18.	03:30 AM		58.4	61	59.7
19.	04:30 AM		58.2	60.8	59.5
20.	05:30 AM		58	60.5	59.25
21.	06:30 A.M		57.7	60.3	59
22.	07:30 A.M		57.5	60.1	58.8
23.	08:30 A.M		57.3	59.9	58.6
24.	09:30 A.M		57.1	59.7	58.4

NEQS limit : 65 dB

WHO limit: 70 dB

NEQS: National Environmental Quality Standards WHO: World Health Organization  
 Leq: Log Equivalent Continuous Sound Level  
 Note:

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## NOISE LEVEL MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water Supply Scheme in Peshawar
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project	Reporting Date:	15-04-2021
Monitoring Date:	08-04-2021	Monitoring Instrument:	Noise Meter-IEC651-Type-2
Source:	Ambient Noise		
GPS Coordinates	33°58'34.00"N 71°31'52.31"E		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	10:15 AM	dB(A)	59.1	61.7	60.4
2.	11:15 AM		58.9	61.4	60.15
3.	12:15 PM		58.6	61.2	59.9
4.	01:15 PM		58.4	61	59.7
5.	02:15 PM		58.2	60.8	59.5
6.	03:15 PM		58	60.6	59.3
7.	04:15 PM		57.8	60.4	59.1
8.	05:15 PM		57.6	60.1	58.85
9.	06:15 PM		57.3	59.9	58.6
10.	07:15 PM		57.1	59.7	58.4
11.	08:15 PM		56.9	59.5	58.2
12.	09:15 PM		56.7	59.3	58
13.	10:15 PM		56.5	59.1	57.8
14.	11:15 PM		56.3	58.8	57.55
15.	12:15 AM		56	58.6	57.3
16.	01:15 AM		55.8	58.4	57.1
17.	02:15 AM		55.6	58.2	56.9
18.	03:15 AM		55.4	58	56.7
19.	04:15 AM		55.2	57.8	56.5
20.	05:15 AM		55	57.5	56.25
21.	06:15 AM		54.7	57.3	56
22.	07:15 AM		54.5	57.1	55.8
23.	08:15 AM		54.3	56.9	55.6
24.	09:15 AM		54.1	56.7	55.4

NEQS limit : 65 dB

WHO limit: 70 dB

NEQS: National Environmental Quality Standards WHO: World Health Organization

Leq: Log Equivalent Continuous Sound Level

Note:

- Selected measurement units were dB (A) otherwise stated.
- Quality was assured through self calibration of the instrument.
- The values were representing of monitoring conditions prevailing during the monitoring hours.
- The measurements were carried out on client request.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst

Signature of Chief Chemist



## FOR ENVIRONMENTAL MONITORING, ANALYSIS &amp; SURVEYS

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Environmental Protection Agency (EPA-KDA) Certified



## NOISE LEVEL MONITORING REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water Supply Scheme in Peshawar
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project	Reporting Date:	15-04-2021
Monitoring Date:	09-04-2021	Monitoring Instrument:	Noise Meter-IEC651-Type-2
Source:	Ambient Noise		
GPS Coordinates	33°59'22.07"N 71°29'18.29"E		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	10:30 AM	dB(A)	61.7	64.6	63.15
2.	11:30 AM		61.5	64.3	62.9
3.	12:30 PM		61.2	64.1	62.65
4.	01:30 PM		61	63.9	62.45
5.	02:30 PM		60.8	63.7	62.25
6.	03:30 PM		60.6	63.5	62.05
7.	04:30 PM		60.4	63.3	61.85
8.	05:30 PM		60.2	63	61.6
9.	06:30 PM		59.9	62.8	61.35
10.	07:30 PM		59.7	62.6	61.15
11.	08:30 PM		59.5	62.4	60.95
12.	09:30 PM		59.3	62.2	60.75
13.	10:30 PM		59.1	62	60.55
14.	11:30 PM		58.9	61.7	60.3
15.	12:30 AM		58.6	61.5	60.05
16.	01:30 AM		58.4	61.3	59.85
17.	02:30 AM		58.2	61.1	59.65
18.	03:30 AM		58	60.9	59.45
19.	04:30 AM		57.8	60.7	59.25
20.	05:30 AM		57.6	60.4	59
21.	06:30 AM		57.3	60.2	58.75
22.	07:30 AM		57.1	60	58.55
23.	08:30 AM		56.9	59.8	58.35
24.	09:30 AM		56.7	59.6	58.15

NEQS limit : 65 dB

WHO limit: 70 dB

NEQS: National Environmental Quality Standards WHO: World Health Organization

Leq: Log Equivalent Continuous Sound Level

Note:

- Selected measurement units were dB (A) otherwise stated.
- Quality was assured through self calibration of the instrument.
- The values were representing of monitoring conditions prevailing during the monitoring hours.
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Signature of Analyst

  
Signature of Chief Chemist



FOR ENVIRONMENTAL MONITORING, ANALYSIS &amp; SURVEYS



## Water Quality Analysis



## WATER ANALYSIS REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water Supply Scheme in Peshawar
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project.		
Sampling Date:	08-04-2021	Reporting Date:	15-04-2021
Source:	Ground Water	Sampling Done by:	Analyst
Location:	Jamilian Mosque	Analysis Method:	APHA/USEPA Standard Methods

Sr. No.	Parameters	Analysis Methods	Units	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	7.3
2.	Taste & Odor	In-house	--	Non Objectionable	Non Objectionable
3.	Color	APHA-2120 B/C	TCU	<15	5
4.	Turbidity	APHA-2130 B	NTU	<5	3
5.	E-Coli	APHA:9222 D	Number/100 mL	0 Number/100 mL	0
6.	Total Coliform	APHA:9222 B	Number/100 ML	0 Number/100 mL	0
7.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	<1000	227
8.	Total Hardness	APHA-2340 C	mg/L	<500	149
9.	Nitrate	APHA-4500NO3 B	mg/L	≤50	2.7
10.	Nitrite	APHA-4500NO2 B	mg/L	≤3	0.06
11.	Ammonia	APHA-4500-NH3-B	mg/L	-----	N.D
12.	Arsenic	APHA-3500As B	mg/L	≤0.05	N.D
13.	Antimony	APHA-3500Sb B	mg/L	<0.005	N.D
14.	Barium	APHA-3500Ba-B	mg/L	0.7	N.D
15.	Chloride	APHA-4500Cl- B	mg/L	<250	101
16.	Fluoride	APHA-4500F- C	mg/L	≤1.5	0.82
17.	Aluminum	APHA-3500 Al	mg/L	≤0.2	N.D
18.	Manganese	APHA-3500 MN-B	mg/L	≤0.5	N.D
19.	Mercury	APHA-3500 Hg-B	mg/L	≤0.001	N.D
20.	Iodine	-----	mg/L	-----	0.04
21.	Zinc	APHA- 3500 Zn B	mg/L	5.0	0.91
22.	Boron	APHA 4500 B- C	mg/L	0.3	N.D
23.	Chromium	APHA 3500 Cr B	mg/L	≤0.05	N.D
24.	Selenium	APHA- 3500 Se C	mg/L	0.01	N.D

NDWQS: National Drinking Water Quality Standards

## Note:

- Selected measurement units were mg/l otherwise stated.
- Quality was assured through self calibration of the instrument.
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- The report is not valid for court.

Signature of Analyst

Signature of Chief Chemist



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## WATER ANALYSIS REPORT

Reference Number	KPCIP/ENV/43-2021	Site Address:	Replacement of water Supply Scheme in Peshawar
Project Name:	Khyber Pakhtunkhwa Cities Improvement Project.		
Sampling Date:	08-04-2021	Reporting Date:	15-04-2021
Source:	Ground Water	Sampling Done by:	Analyst
Location:	Qasim Ali Khan Mosque	Analysis Method:	APHA/USEPA Standard Methods

Sr. No.	Parameters	Analysis Methods	Units	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	7.5
2.	Taste & Odor	In-house	--	Non Objectionable	Non Objectionable
3.	Color	APHA-2120 B/C	TCU	<15	4
4.	Turbidity	APHA-2130 B	NTU	<5	5
5.	E-Coli	APHA:9222 D	Number/100 mL	0 Number/100 mL	0
6.	Total Coliform	APHA:9222 B	Number/100 ML	0 Number/100 mL	0
7.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	<1000	281
8.	Total Hardness	APHA-2340 C	mg/L	<500	166
9.	Nitrate	APHA-4500NO3 B	mg/L	≤50	3.1
10.	Nitrite	APHA-4500NO2 B	mg/L	≤3	0.1
11.	Ammonia	APHA-4500-NH3-B	mg/L	-----	0.07
12.	Arsenic	APHA-3500As B	mg/L	≤0.05	N.D
13.	Antimony	APHA-3500Sb B	mg/L	<0.005	N.D
14.	Barium	APHA-3500Ba-B	mg/L	0.7	N.D
15.	Chloride	APHA-4500Cl- B	mg/L	<250	93
16.	Fluoride	APHA-4500F- C	mg/L	≤1.5	0.92
17.	Aluminum	APHA-3500 Al	mg/L	≤0.2	N.D
18.	Manganese	APHA-3500 MN-B	mg/L	≤0.5	N.D
19.	Mercury	APHA-3500 Hg-B	mg/L	≤0.001	N.D
20.	Iodine	-----	mg/L	-----	0.07
21.	Zinc	APHA- 3500 Zn B	mg/L	5.0	0.97
22.	Boron	APHA 4500 B- C	mg/L	0.3	N.D
23.	Chromium	APHA 3500 cr B	mg/L	≤0.05	N.D
24.	Selenium	APHA- 3500 Se C	mg/L	0.01	N.D

NDWQS: National Drinking Water Quality Standards

## Note:

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- Quality was assured through self calibration of the instrument.
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## FOR ENVIRONMENTAL MONITORING, ANALYSIS &amp; SURVEYS

Creative House, 3rd Floor, Office # 302, Phase III Chowk, Hayatabad, Peshawar, Pakistan



# **Annexure E**

## **Occupational Health and Safety Plan**

## General

Occupational Health and Safety covers all personnel working under the project and will be in line with the World Bank/IFC EHS guidelines on health and safety.

The Occupational Health and Safety program will aim to ensure that the workplace is safe and healthy by: addressing the hazards and risks at the workplace; outlining the procedures and responsibilities for preventing, eliminating and minimizing the effects of those hazards and risks; identifying the emergency management plans for the workplace or workplaces; and, specifying how consultation, training and information are to be provided to employees at various workplaces.

Some of the risks/hazards associated with workplaces are due to working close to or at sites associated with the various project construction activities. Other risks associated with the project construction phase include risk of increase of vector borne and other different diseases.

The following sections will be implemented during the construction phase to address and ensure workers' health and safety.

### a. Screening and regular unannounced checking of workers

As per the procedure for hiring workers, all contractors and labor agencies are required to make all prospective workers undergo medical tests to screen for diseases and sicknesses, prior to selection and employment of any worker. The contractor is also responsible for ensuring that no worker who has a criminal record is employed at the project site. It will be ensured that all workers undergo medical tests to screen diseases at source and at sites in consultation with the designated Health Officer.

In addition to this, the Project Management will also undertake sudden, unannounced checks on workers to look for diseases such as HIV, STDs, and hepatitis and take necessary steps as mandated by the Contractual agreement between the Contractor and the Worker(s).

### b. Minimizing hazards and risks at the workplace.

To ensure safety at all work sites, the following will be carried out:

- i. Installation of signboards and symbols in risky and hazardous areas, to inform workers to be careful.
- ii. Construction of barricades around construction sites and deep excavated pits, to cordon off and deter entry of unauthorized personnel and workers into these areas.
- iii. Providing a safe storage site/area for large equipment such as power tools and chains, to prevent misuse and loss.
- iv. Proper Housekeeping: Ensuring that materials are all stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling, or collapse. Brick stacks will not be more than 7 feet in height and for concrete blocks they will not be more than 6 feet high.
- v. Removing all scrap timber, waste material and rubbish from the immediate work area as the work progresses.

- vi. Where scaffolds are required, ensuring that each scaffold or its components shall be capable of supporting its own weight and at least 4 times the maximum intended load applied or transmitted to it. The platform/scaffold plank shall be at least 15 inches wide and 1.5 inches thick. The rope will be capable of supporting at least 6 times the maximum intended load applied or transmitted to that rope. Pole scaffolds over 60 feet in height shall be designed by a registered professional engineer and shall be constructed and loaded in accordance with that design. Where scaffolds are not provided, safety belts/safety nets shall be provided;
- vii. Ensure that all ramps or walkways are at least 6 feet wide, having slip resistance threads and not inclined at more than a slope of 1 vertical and 3 horizontals.
- viii. Stacking away all excavated earth at least 2 feet from the pit to avoid material such as loose rocks from falling back into the excavated area and injuring those working inside excavated sites.
- ix. Constructing support systems, such as bracing to adjoining structures that may be endangered by excavation works nearby.
- x. Only a trained electrician to construct, install and repair all electrical equipment to prevent risks of electrical shocks and electrocution.
- xi. Install fire extinguishers and/or other fire-fighting equipment at every work site to prepare for any accidental fire hazards.

#### c. Provision of Personal Protective Equipment

Risks to the health and safety of workers can be prevented by provision of Personal Protective Equipment (PPEs) to all workers. This will be included in the construction cost for each Contractor. Depending on the nature of work and the risks involved, contractors must provide without any cost to the workers, the following protective equipment:

- i. High visibility clothing for all personnel during road works must be mandatory.
- ii. Helmet shall be provided to all workers, or visitors visiting the site, for protection of the head against impact or penetration of falling or flying objects.
- iii. Safety belt shall be provided to workers working at heights (more than 20 ft.) such as roofing, painting, and plastering.
- iv. Safety boots shall be provided to all workers for protection of feet from impact or penetration of falling objects on feet.
- v. Ear protecting devices shall be provided to all workers and will be used during the occurrence of extensive noise.
- vi. Eye and face protection equipment shall be provided to all welders to protect against sparks.
- vii. Respiratory protection devices shall be provided to all workers during occurrence of fumes, dusts, or toxic gas/vapor.

viii. Safety nets shall be provided when workplaces are more than 25 feet (7.5 m) above the ground or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors or safety belts is impractical.

The specific PPE requirements for each type of work are summarized below.

Table E.1 PPE Requirement List

<b>Type of Work</b>	<b>PPE</b>
Elevated work	Safety helmet, safety belt (height greater than 20 ft.), footwear for elevated work.
Handling work safety	Helmet, leather safety shoes, work gloves.
Welding and cutting work	Eye protectors, shield and helmet, protective gloves.
Grinding work	Dust respirator, earplugs, eye protectors.
Work involving handling of chemical substances	Dust respirator, gas mask, chemical-proof gloves. Chemical proof clothing, air-lined mask, eye protectors.
Wood working	Hard hat, eye protectors, hearing protection, safety footwear, leather gloves and dust respirator.
Blasting	Hard hat, eye and hearing protection.
Concrete and masonry work	Hard hat, eye protectors, hearing protection, safety footwear, leather gloves and dust respirator.
Excavation, heavy equipment, motor graders, and bulldozer operation	Hard hat, safety boots, gloves, hearing protection.
Quarries	Hard hat, eye protectors, hearing protection, safety footwear, leather gloves and dust respirator.

#### d. Procedures to Deal with Emergencies such as Accidents, Sudden Illness and Death of Workers

First aid kits will be made available at all times throughout the entire construction period by the respective contractors. This is very important, because most work sites will be at some distance from the nearest hospital. In addition to the first aid kits, the following measures will be in place:

- i. Provision of dispensaries by the individual EPC contractor.
- ii. A vehicle shall be on standby from the Project Office so that emergency transportation can be arranged to take severely injured/sick workers to the nearest hospital for immediate medical attention.

iii. A designated Health Officer/worker for the Project will be identified as a focal person to attend to all health and safety related issues. This employee's contact number will be posted at all work sites for speedy delivery of emergency services. The focal person shall be well versed with the medical system and facilities available at the hospital.

iv. Communication arrangements, such a provision of radios or mobile communication for all work sites, for efficient handling of emergencies, will be made.

e. Record Maintenance and Remedial action

The Project Management will maintain a record of all accidents and injuries that occur at the work site. This work will be delegated by the contractor to the site supervisor and regularly reviewed every quarter by project management. Reports prepared by the contractor shall include information on the place, date and time of the incident, name of persons involved, cause of incident, witnesses present and their statements. Based on such reports, the management can jointly identify any unsafe conditions, acts or procedures and recommend for the contractor to undertake certain mitigate actions to change any unsafe or harmful conditions.

f. Compensation for Injuries and Death

Any casualty or injury resulting from occupational activities will be compensated as per the local labor laws. Where compensation is sought by the injured party, proper procedures for documentation of the case will be followed, including a detailed report on the accident, written reports from witnesses, report of the examining doctor and his/her recommendation for treatment. Each individual contractor will be responsible for ensuring compensation for the respective workers.

g. Awareness Programs

The Project management will undertake awareness programs through posters, talks, and meetings with the contractors to undertake the following activities:

i. Dissemination sessions will clarify the rights and responsibilities of the workers regarding interactions with local people (including communicable disease risks, such as HIV/AIDS), work site health and safety, waste management (waste separation, recycling, and composting), and the illegality of poaching.

ii. Make workers aware of procedures to be followed in case of emergencies such as informing the focal health person who in turn will arrange the necessary emergency transportation or treatment.

h. Nomination of a Health and Safety Focal Person

Within each site (especially if different sites are being implemented by different contractors), a Health and Safety Focal Person will be appointed. The Terms of Reference for the focal person will mainly be as follows:

i. Function as the focal person/representative for all health and safety matters at the workplace;

- ii. Responsible for maintaining records of all accidents and all health and safety issues at each site, the number of accidents and its cause, actions taken and remedial measures undertaken in case of safety issues;
- iii. Be the link between the contractor and all workers and submit grievances of the workers to the contractor and instructions/directives on proper health care and safety from the contractors back to the workers;
- iv. Ensure that all workers are adequately informed on the requirement to use Personal Protective Equipment and its correct use;
- v. Also responsible for the first aid kit and making sure that the basic immediate medicines are readily available.

# **Annexure F**

## **Emergency Response Plan**

## **F.1 PURPOSE**

The purpose of this Emergency Response Procedure is to provide measures and guidance for the establishment and implementation of emergency preparedness plans for the project. The aim of the Emergency Response Procedure is to:

- (i) Ensure all personnel and visitors to the office/job sites are given the maximum protection from unforeseen events.
- (ii) Ensure all personnel are aware of the importance of this procedure to protection of life and property.

## **F.2 EMERGENCY PREPARATION AND RESPONSE MEASURE SCOPE**

The emergency management program is applied to all Project elements and intended for use throughout the Project life cycle. The following are some emergencies that may require coordinated response.

- (i) Construction Accident
- (ii) Road & Traffic Accident
- (iii) Hazardous material spills
- (iv) Structure collapse or failure
- (v) Trauma or serious illness
- (vi) Sabotage
- (vii) Fire
- (viii) Environmental Pollution
- (ix) Loss of person
- (x) Community Accident

## **F.3 RESPONSIBILITIES**

The detailed roles and responsibilities of certain key members of the Emergency Response team available to assist in emergency are provided in **Table G.1** below.



**Table F.1 Emergency Response Team**

<b>Action Group</b>	<b>Responsibility</b>
Emergency Coordinator	<p>Overall control of personnel and resources.</p> <p>The Emergency Coordinator will support and advise the Site Safety Supervision as necessary.</p> <p>Serves as public relations spokes persons, or delegates to some staff member the responsibility for working with news media regarding any disaster or emergency. Also assure proper coordination of news release with appropriate corporate staff or other designated people.</p>
Site Safety Supervision (Emergency Commander)	<p>Overall responsibility for activating emergency plan and for terminating emergency actions.</p> <p>Be alternative of emergency response chairpersons.</p> <p>Disseminates warnings and information as required to ensure all people in the immediate area have been warned and evacuated either by alarms or by word of mouth.</p> <p>Supervise the actions of the Emergency Response Team to ensure all persons are safe from the danger.</p> <p>Notify outside authorities if assistance is required.</p> <p>Carries the responsibility for coordinating actions including other organizations in accordance with the needs of the situation.</p> <p>Ensure maximum co-operation and assistance is provided to any outside groups called to respond to an emergency.</p> <p>Establish and appoint all emergency organization structure and team.</p> <p>Assures adequate delegation of responsibilities for all key positions of assistants on the Project to assist with any foreseeable emergency.</p> <p>Ensure resources available to purchase needed emergency response equipment and supplies.</p> <p>Assures that all persons on the Emergency Response Team aware and fully understand their individual responsibilities for implementing and supporting the emergency plan.</p>

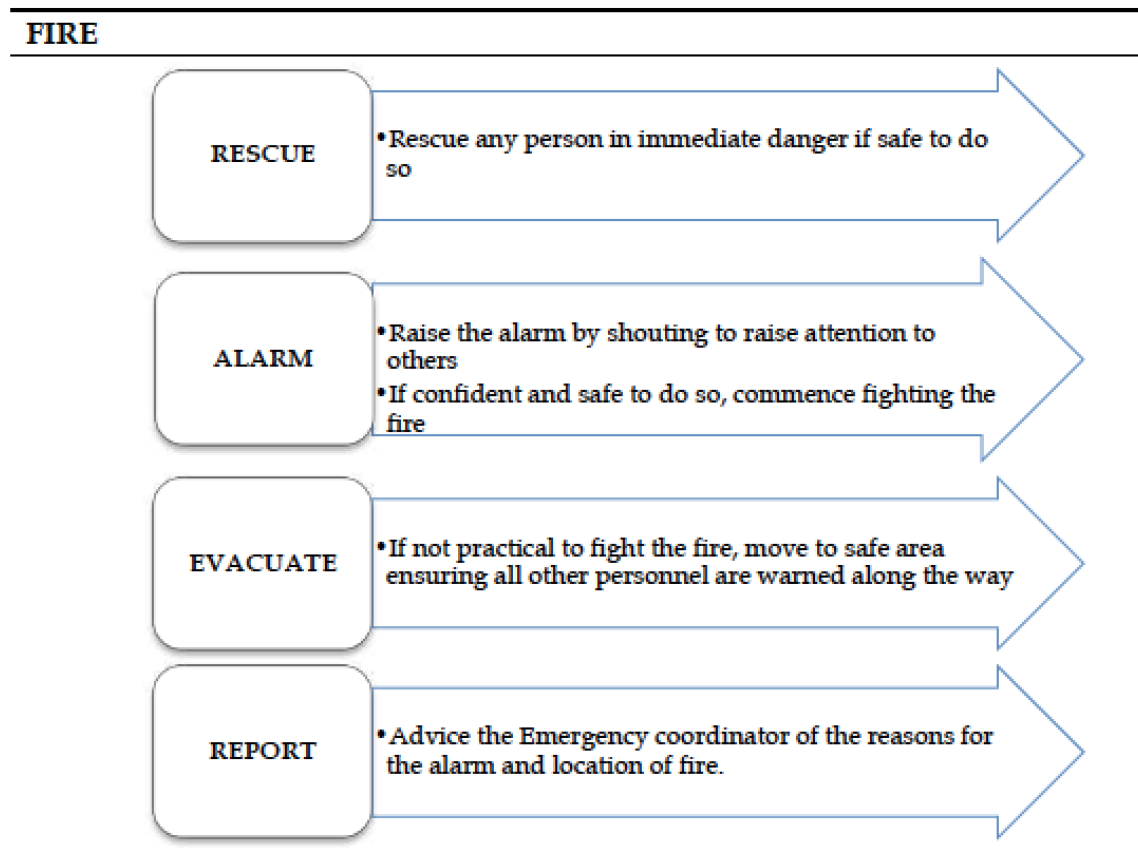
Action Group	Responsibility
	<p>Establish the emergency drill schedule of all identified emergency scenarios, track the status and evaluate the emergency.</p> <p>The Emergency Commander shall ensure that senior management personnel have been reported of the emergency as soon as practical after the event.</p>
Security Team	<p>Ensure that the exit route is regularly tested and maintained in good working order.</p> <p>Maintain station at the security gate or most suitable location to secure the area during any emergency such that only authorized personnel and equipment may enter, prevent access to the site of unauthorized personnel.</p> <p>Assist with strong/activation of services during an emergency.</p> <p>Ensure vehicles and obstructions are moved to give incoming emergency vehicles access to the scene, if ambulance or emergency services are attending the site, ensure clear access and personnel are located to direct any incoming emergency service to the site of emergency.</p>
Rescue & Medical Team	<p>Protect the injured from further danger and weather.</p> <p>Provide treatment to the victim(s) to the best of their ability by first aid and then transfer to hospital.</p> <p>Remain familiar with the rescue activities and rescue apparatus.</p> <p>Assist outside medical services personnel when they arrive</p>
General Administration Team	<p>Response to support any requested general facilities for assisting Emergency Response Team in their work.</p>
Government Relation Team	<p>Coordinate with local government on a matter of concerned in the emergency response plan to liaise with local officers in their affair for support Emergency Response Team.</p> <p>Coordinate emergency plan with the government authorities, local community.</p>
Environment Team	<p>In case of emergency related to the environmental pollution such as the chemical spill, oil spill into the ambient, the environment team will support the technical advice to control and mitigate the pollution until return to the normal situation.</p>

Action Group	Responsibility
Department Heads	<p>Call up of personnel into the safe location for protective life and property.</p> <p>Take immediate and appropriate action while Emergency Response Team is being mobilized.</p> <p>Keep in touch with the Emergency Commander</p> <p>Control and supervise operators and contractors on the implementation of this procedure, with consultation with Safety Team as necessary.</p> <p>Provide and maintain emergency equipment of their responsible areas.</p>
Other Staff and Employees	<p>All other staff and employees will remain at their workstations or assembly point unless directed otherwise from Emergency Response Team.</p> <p>Each supervisor will ensure that all members of his work group are accounted for and keep in touch with each of their Department Head.</p>

#### F.4 PROCEDURE

Emergency situation and injuries to person can occur at any time or place either on Project site or elsewhere. The most two common types of emergencies on site are fire and serious accident.

Figure F.1 Emergency Procedure for Fire

Fig  
A

take the following action:

If a hazard exists consider your own safety then if possible remove the hazard or the injured person.

Assess the patient by checking for Airway, Breathing, Pulse and obvious

Report directly to First Aid or Security Centers, when raising the alarm you must clearly give the following information;

- Your name and the detail of accident
- The location of the injured person(s)
- The number of persons injured
- The extent of the injuries, if known
- What known hazards are in the area

Make the injured person as comfortable as possible

Treat the obvious injuries

Reassure the injured person

## **F.5 COMMUNICATION WITH AUTHORITIES / PRESS AT SITE**

In the event of an accident or incident, only senior staff is permitted to give factual information to the authorities for resource of liability exposure. The press must be avoided politely, at all costs, with the terse comment that “the matter is under investigation and relevant information when available will be provided by our Head Office” Do not ever give your opinion or story.

### **First Aid Persons**

Upon advice of medical emergency, make immediate assessment to response required and if necessary, advise security to summon ambulance or medical assistance, the qualified first aid attendant will also,

Provide treatment to the victim(s) to the best of his/her ability.

Ensure the safety of victims by ceasing any work activity in the area.

Protect the injured from further danger and weather.

Assist medical services personnel when they arrive.

### **General Administration Team**

Upon advice of medical emergency, maintain contact with first aid personnel and summon ambulance if required.

### **Security Team**

If ambulance or emergency services are attending the site, ensure clear access and personnel are located to direct vehicle closest to the scene.

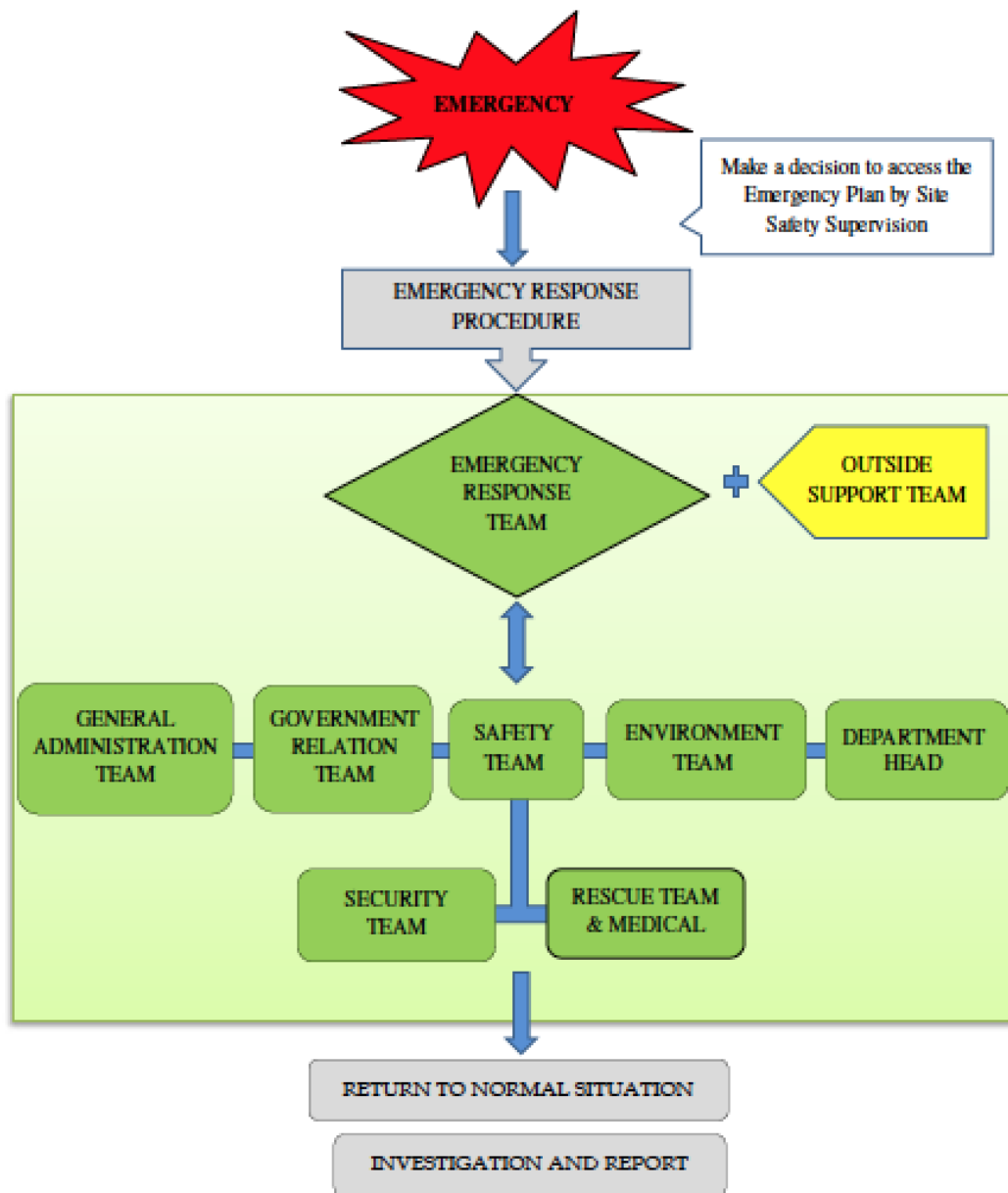
Prevent access to the site of unauthorized personnel (press, etc.).

### **Emergency Coordinator**

The Emergency Coordinator shall assist emergency personnel at the scene as required through allocation of company resources.

The Emergency Coordinator shall ensure next-of-kin are properly notified as soon as possible and give whatever company support and assistance is necessary to assist them bundle the situation

The Emergency Coordinator shall ensure that senior management personnel are advised of the emergency as soon as practical after the event.



Note: Name of contact person and call number from Owner/ Contractor to be determined.

## F.5 INCIDENT AND ACCIDENT REPORT

Section A: Identification Data										
Report No:		Date of Reported:			Reporter:			Sign:		
Job Title:					Company Name:					
Section B: Violence Rate										
Accident Violence: <input type="checkbox"/> 01-Death <input type="checkbox"/> 02-Serious Injury <input type="checkbox"/> 03-Lost Time Injury <input type="checkbox"/> 04-First Aid <input type="checkbox"/> 05- Not Injury <input type="checkbox"/> 06-Near Miss Property Damage Cost: <input type="checkbox"/> 1-2,000 USD <input type="checkbox"/> 2,001-10,000 USD <input type="checkbox"/> 10,001-50,000 <input type="checkbox"/> > 50,001										
Section C: Environmental Impact										
Affected area		<input type="checkbox"/> Construction area			<input type="checkbox"/> Public area					
Receptor		<input type="checkbox"/> None			<input type="checkbox"/> Workers			<input type="checkbox"/> Community		
Type of pollution		<input type="checkbox"/> Physical			<input type="checkbox"/> Chemical			<input type="checkbox"/> Biological		
Toxicity		<input type="checkbox"/> Non-toxic			<input type="checkbox"/> Low - toxic			<input type="checkbox"/> High - toxic		
Return to Normal		<input type="checkbox"/> 1 day			<input type="checkbox"/> 1 day to 1 week			<input type="checkbox"/> ≥ 1 week		
Cumulative impact		<input type="checkbox"/> Non-cumulative			<input type="checkbox"/> Cumulative					
Section D: Injured/illness Employee										
1.Name:		Sex:	Date of Birth:			Age:	Regular Job Title:		Experience:	
		<input type="checkbox"/> Male <input type="checkbox"/> Female	Month	Day	Year				In this job title	In this Project
									Years	Weeks
Site:		Company:		Reference:			Phone No:		Social Security Number:	
Part of Body Injured or Affected:					Nature of Injury or Illness:					
<input type="checkbox"/> Head <input type="checkbox"/> Hands <input type="checkbox"/> Face <input type="checkbox"/> Nose					<input type="checkbox"/> Laceration <input type="checkbox"/> Amputation <input type="checkbox"/> Puncture <input type="checkbox"/> Fracture					
<input type="checkbox"/> Eyes <input type="checkbox"/> Legs <input type="checkbox"/> Teeth <input type="checkbox"/> Neck					<input type="checkbox"/> Strain & Sprain <input type="checkbox"/> Burns <input type="checkbox"/> Contusion <input type="checkbox"/> Dry Heat Friction					
<input type="checkbox"/> Trunk <input type="checkbox"/> Toes <input type="checkbox"/> Elbow <input type="checkbox"/> Shoulder					<input type="checkbox"/> Hernia <input type="checkbox"/> Foreign Body <input type="checkbox"/> Chemical <input type="checkbox"/> Contamination					
<input type="checkbox"/> Back <input type="checkbox"/> Ankle <input type="checkbox"/> Wrist <input type="checkbox"/> Foot					<input type="checkbox"/> Skin (Occupational) <input type="checkbox"/> Rash <input type="checkbox"/> Irritation					
<input type="checkbox"/> Arms <input type="checkbox"/> Thump <input type="checkbox"/> Fingers <input type="checkbox"/> Internal										
Remark: .....					Remark: .....					
Section D: Injured/illness Employee										
2.Name:		Sex:	Date of Birth:			Age:	Regular Job Title:		Experience:	
		<input type="checkbox"/> Male <input type="checkbox"/> Female	Month	Day	Year				In this job title	In this Project
									Years	Weeks
Site:		Company:		Reference:			Phone No:		Social Security Number:	
Part of Body Injured or Affected:					Nature of Injury or Illness:					
<input type="checkbox"/> Head <input type="checkbox"/> Hands <input type="checkbox"/> Face <input type="checkbox"/> Nose					<input type="checkbox"/> Laceration <input type="checkbox"/> Amputation <input type="checkbox"/> Puncture <input type="checkbox"/> Fracture					
<input type="checkbox"/> Eyes <input type="checkbox"/> Legs <input type="checkbox"/> Teeth <input type="checkbox"/> Neck					<input type="checkbox"/> Strain & Sprain <input type="checkbox"/> Burns <input type="checkbox"/> Contusion <input type="checkbox"/> Dry Heat Friction					
<input type="checkbox"/> Trunk <input type="checkbox"/> Toes <input type="checkbox"/> Elbow <input type="checkbox"/> Shoulder					<input type="checkbox"/> Hernia <input type="checkbox"/> Foreign Body <input type="checkbox"/> Contamination <input type="checkbox"/> Chemical					
<input type="checkbox"/> Back <input type="checkbox"/> Ankle <input type="checkbox"/> Wrist <input type="checkbox"/> Foot					<input type="checkbox"/> Skin (Occupational) <input type="checkbox"/> Rash <input type="checkbox"/> Irritation					
<input type="checkbox"/> Arms <input type="checkbox"/> Thump <input type="checkbox"/> Fingers <input type="checkbox"/> Internal										
Remark: .....					Remark: .....					
Section E: Accidents/incident Details										
Date Accident/Incident Occurred:			Time Accident/Incident Occurred:				Exact Location of the Accident / Incident:			

<b>Details of the actual Job Being done at the time:</b>		
<b>Details of Accident / Incident / What actually happened?</b>		
<b>Section F: Accident Cause (Basic cause mark X / Contributing cause, if any mark O)</b>		
<b>UNSAFE CONDITIONS</b> 1 <input type="checkbox"/> Inadequately Guarded 2 <input type="checkbox"/> Unguarded 3 <input type="checkbox"/> Defective Tools, Equipment, or Substance 4 <input type="checkbox"/> Unsafe Design or Construction 5 <input type="checkbox"/> Hazardous Arrangement 6 <input type="checkbox"/> Unsafe Illumination 7 <input type="checkbox"/> Unsafe Ventilation 8 <input type="checkbox"/> Unsafe Clothing 9 <input type="checkbox"/> Insufficient Instruction 10 <input type="checkbox"/> Lack of system of work Why was the unsafe act committed? _____	<b>UNSAFE ACTS</b> 1 <input type="checkbox"/> Operating Without Authority / Training 2 <input type="checkbox"/> Operating at Unsafe Speed 3 <input type="checkbox"/> Marking SHE Device Inoperative 4 <input type="checkbox"/> Using Unsafe Equipment or Equipment Unsafely 5 <input type="checkbox"/> Unsafe Loading, Placing, Mixing 6 <input type="checkbox"/> Taking Unsafe Position 7 <input type="checkbox"/> Working on Moving or Dangerous Equipment 8 <input type="checkbox"/> Distraction, Teasing, Horse Play 9 <input type="checkbox"/> Failure to use Personal Protective Devices 10 <input type="checkbox"/> Lack of effective instruction or supervision Why did the unsafe condition exist? _____	
<b>Section G: Guide to Corrective Action (Base on the cause checked above, I am taking the following corrective action)</b>		
<b>UNSAFE ACT</b> <input type="checkbox"/> Stop the Behaviour <input type="checkbox"/> Study the job <input type="checkbox"/> Instruct (tell-show-try-check) <input type="checkbox"/> Follow Up <input type="checkbox"/> Enforce	<b>UNSAFE CONDITION</b> <input type="checkbox"/> Remove <input type="checkbox"/> Guard <input type="checkbox"/> Warn <input type="checkbox"/> Supervisory Training	<b>If Supervisor can't handle, then recommend to</b> <input type="checkbox"/> Site Engineer, or <input type="checkbox"/> Site Manager, or <input type="checkbox"/> Project Manager, or <input type="checkbox"/> Safety Committee
<b>Detail below any immediate remedial actions that have been taken:</b>		
<b>Detail below any corrective and preventative actions that could be taken to prevent future re-occurrence:</b>	<b>Responsible</b>	<b>Completion Date</b>



<b>Section H: Witness Statement</b>			
<b>Witness Name</b>		<b>Interviewer Name</b>	
<b>Section I: Reviewed &amp; Recommend by</b>			
Recommendation:			
<b>Reviewed By:</b>	<b>Position:</b>	<b>Signature:</b>	<b>Date:</b>
<b>Remarks :</b> If Accident or Incident happened with lost time injury and affected to the publicity must further report to Safety Department; : First Aid Cases will not applicable to this form; : The accident report shall submit to Safety Department within 3 days : Attached the photograph or sketch the location of accident / incident;			

# **Annexure G**

## **Archaeological ‘Chance Find’ procedure**

## Background

The purpose of this document is to address the possibility of archaeological deposits becoming exposed during ground altering activities within the project area and to provide protocols to follow in the case of a chance archaeological find to ensure that archaeological sites are documented and protected as required.

Archaeological sites are an important resource that is protected for their historical, cultural, scientific and educational value to the general public and local communities. Impacts to archaeological sites must be avoided or managed by development proponents. The objectives of this 'Archaeological Chance Find Procedure' are to promote preservation of archaeological data while minimizing disruption of construction scheduling/ It is recommended that due to the moderate to high archaeological potential of some areas within the project area, all on site personnel and contractors be informed of the Archaeological Chance Find Procedure and have access to a copy while on site.

### Potential Impacts to Archaeological Sites

Developments that involve excavation, movement, or disturbance of soils have the potential to impact archaeological materials, if present. Activities such as road construction, land clearing, and excavation are all examples of activities that may adversely affect archaeological deposits.

### Archaeological 'Chance Find' Procedure

If you believe that you may have encountered any archaeological materials, stop work in the area and follow the procedure below:

The following 'chance-find' principles will be implemented by the contractor throughout the construction works to account for any undiscovered items identified during construction works:

- (i) Workers will be trained in the location of heritage zones within the construction area and in the identification of potential items of heritage significance.
- (ii) Should any potential items be located, the site supervisor will be immediately contacted and work will be temporarily stopped in that area.
- (iii) If the site supervisor determines that the item is of potential significance, an officer from the department of Archaeology (DoA) will be invited to inspect the site and work will be stopped until DoA has responded to this invitation.
- (iv) Work will not re-commence in this location until agreement has been reached between DoA and proponent as to any required mitigation measures, which may include excavation and recovery of the item.
- (v) A precautionary approach will be adopted in the application of these procedures.

### Detailed Procedural Steps

If the Director, department of Archaeology receives any information or otherwise has the knowledge of the discovery or existence of an antiquity of which there is no owner, he shall, after satisfying himself as to the correctness of the information or knowledge, take such steps with the

approval of the Government, as he may consider necessary for the custody, preservation and protection of the antiquity.

Whoever discovers, or finds accidentally, any movable antiquity shall inform forth with the Directorate within seven days of its being discovered or found.

If, within seven days of his being informed, the Director decides to take over the antiquity for purposes of custody, preservation and protection, the person discovering or finding it shall hand it over to the Director or a person authorized by him in writing.

Where the Director decides to take over an antiquity, he may pay to the person by whom it is handed over to him such cash reward as may be decided in consultation with the Advisory Committee.

The Director or any officer authorized by him with police assistance may, after giving reasonable notice, enter into, inspect and examine any premises, place or area which or the sub-soil of which he may have reason to believe to be, or to contain an antiquity and may cause any site, building, object or any antiquity or the remains of any antiquity in such premises, place or area to be photographed, copied or reproduced by any process suitable for the purpose.

The owner or occupier of the premises, place or area shall afford all reasonable opportunity and assistance to the Director.

No photograph, copy of reproduction taken or made shall be sold or offered for sale except by or with the consent of the owner of the object of which the photograph, copy or the reproduction has been taken or made.

Where substantial damage is caused to any property as a result of the inspection, the Director shall pay to the owner thereof reasonable compensation for the damage in consultation with the Advisory Committee.

If the Director after conducting an inquiry, has reasonable grounds to believe that any land contains any antiquity, he may approach the Government to direct the Revenue Department to acquire such land or any part thereof and the Revenue Department shall thereupon acquire such land or part as for a public purpose.

# **Annexure H**

## **Dust Management Plan**

## General

The purpose of this plan is to describe the measures that the project shall take to ensure that the risk of emissions from dust generated by site operations during construction are minimized and that best practice measures are implemented.

Dust emissions from construction can cause ill health effects to Contractor staff along with nuisance and annoyance to members of the local community. Dust will be controlled through:

- Elimination
- Reduction/Minimization
- Control

This dust management plan shall be implemented based on the measures already provided in the Environmental Management Plan (EMP) relating to controlling dust emissions.

## Methodology

The following methodology will be undertaken for each project section:

### Step 1 – Identify the dust generating activities

Construction activities that are likely to produce dust will be identified. The activities that will be taken into account are:

Haulage Routes, Vehicles and Asphalt/Concrete Batching Plant

Roads, surfaces and public highways

Static and mobile combustion plant emissions

Tarmac laying, bitumen surfacing and coating

Materials Handling, Storage, Spillage and Disposal

Storage of material

Stockpiles

Spillages

Storage of Waste

Site Preparation and Restoration after Completion

Earthworks, excavation and digging

Storage of spoil and topsoil

## Demolition

### Construction and Fabrication Processes

#### Step 2 – Identify Sensitive Receptors

Sensitive receptors have already been identified. The nature and location of the sensitive receptors will be taken into account when implementing control measures. Step 3 – Implement Best Practice Measures to Control

Based on the nature of the activity producing the dust, the likelihood of dust being produced and the possible consequence of dust based on the sensitive receptors, the most effective control measure will be identified and implemented.

#### Step 4 – Monitor effectiveness of control

Construction Supervision Staff (CSC) will have the responsibility to ensure that dust control measures are being implemented and are effective.

#### Step 5 – Record and report result of monitoring

All inspections, audits and results of monitoring will be recorded and kept as part of the site filing system.

### Method Statements and Risk Assessments

The Contractor's Risk Assessments and Method Statements will be required to be approved by the CSC prior to commencing work and will be required to contain environmental aspects of the task, including dust control measures where required.

Where dust has been identified within the risk assessment as a significant issue, the method statement will be required to cover the following:

Methods and materials that will be used to ensure that dust generation is minimized.

The use of pre-fabricated materials where possible.

Optimum site layout:

Dust generating activities to be conducted away from sensitive receptors

Supply of water for damping down.

Good housekeeping and management

All employees will be briefed on the Risk Assessment and Method Statement before starting work.

### Training

All Contractor staff will be required to attend training seminars as already mentioned in the EMP document. A site-specific induction will also be required before being allowed to work on site.

These will include site-specific sensitive receptors and details regarding dust control measures to be taken.

Toolbox talks on air pollution and minimizing dust emissions will be provided on a regular basis to Contractor staff.

### Identification of Dust Generating Sources and Control Methods

<b>Haulage Routes, Vehicles and Asphalt/Concrete Batching Plant</b>	
Dust Source	Dust Control Methods
Major haul roads and traffic routes	Haul roads will be dampened down via a mobile bowser, as required.
Public Roads	Road sweeper will be used to clean public roads as required.
Site traffic management	Site traffic will be restricted to constructed access roads as far as possible.  Site speed limit will be set at 10 mph as this will minimize the production of dust.
Road Cleaning	A mechanical road sweeper will be readily available and used.
<b>Handling, Storage, Stockpiling and Spillage of Dusty materials</b>	
Material handling operations	The number of times a material will have to be handled will be kept to a minimum to prevent double handling and ensure dusty materials are not handled unnecessarily.
Transport of fine dusty materials and aggregates.	Closed tankers will be used or sheeted vehicles.
Vehicle loading/unloading materials on to vehicles and conveyors.	Dusty materials will be dampened down  Drop heights will be kept to a minimum and enclosed where possible.
<b>Storage of Materials</b>	
Bulk cement, bentonite etc.	Bentonite will be delivered in tankers and stored in dedicated enclosed areas. Bulk cement will be transported through tractor trollies or trailers.
Fine dry materials	These will be protected from the weather and by storing in appropriate containers and indoors, where necessary.
Storage location	Material will be stored in dedicated lay-down areas.
<b>Storage of Stockpiles</b>	



Stockpile location	Stockpiles will be placed so as to minimize double handling and facilitate the site restoration.
Building stockpiles	Stockpiles, tips and mounds will not be stored at an angle greater than an angle of repose of the material.
Small and temporary stockpiles	Where possible, stockpiles will be placed under sheeting. Dusty material will be damped down. Wind barriers (protective fences) of a similar height to the stockpile will be erected, if required.
Large and long term stockpiles	Long-term stockpiles will be vegetated and stabilized as soon as possible. Stock piles will be dampened down until stabilized, where necessary. Wind barriers (protective fences) of a similar height to the stockpile will be erected, if required.
<b>Waste Material from Construction</b>	
Disposal method	A dedicated lay-down area will be available for waste. Waste will not be allowed to build up and will be disposed off at the designated locations as per EMP.
<b>Site Preparation and Restoration</b>	
Earthworks, excavation and digging	These activity areas will be kept damp where required and if possible, will be avoided during dry and windy periods.
Completed earthworks	Surfaces will be stabilized by re-vegetation as soon as possible, where applicable.
<b>Construction and Fabrication Process</b>	
Crushing of material for reuse, transportation and disposal	Authorization will be obtained from PMU and ADB before using any mobile plant on site for activities such as crushing and screening. Any crushing or screening activities will be located away from sensitive receptors.
Cutting, grinding, drilling, sawing, trimming, planning, sanding	These activities will be avoided wherever possible. Equipment and techniques that minimize dust will be implemented. Water will be used to minimize dust.
Cutting roadways, pavements, blocks	Water sprinkling to be used.

Angle grinders and disk cutters	Best practice measures will be used such as dust extraction.
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**Monitoring Arrangements**

Monitoring will be conducted at sensitive receptor locations in the project area as provided in the EMP. Furthermore, at locations where PM levels are exceeding applicable guidelines, additional stringent measures will be implemented at the respective location(s) in the project area to ensure dust levels are controlled as far as possible.

# **ANNEXURE I**

## **Site Specific EMP (SSEMP) Guide & Template for Guidance to Contractor**

## **Guide for Development of SSEMP**

Step 1: Define Boundaries

Step 2: Identify Sensitive Receptors

Step 3: Specify construction activities

Step 4: Conduct Risk Assessment

Step 5: Assign Environment Management measures

Step 6: Prepare Site Plans

Step 7: Prepare Environment Work Plans (if required)

Step 8: Monitoring

**Step 1:** The project area needs to be clearly defined.

**Step 2:** The mapping of sensitive receptors has already been conducted and needs to be presented clearly in a map.

**Step 3:** The tentative construction activities to be conducted are as follows:

Site Surveying and Vegetation (Trees and plants) Clearance

Establishment of Work Camp, Batching and Asphalt plant and access roads

Dismantling of Asphalt and existing structures including Utilities

Preparation of ground for Asphaltting

Asphaltting

Landscaping

**Step 4:** The Risk Assessment matrix template is provided in the table below.

Risk is assessed as the likelihood that the activity will have an effect on the environment as well as the consequence of the effect occurring. It is often described like this:

**Risk = Likelihood × Consequence**

### **Likelihood Scale**

<b>Likelihood</b>	<b>Definition</b>	<b>Scale</b>
Certain	Will certainly occur during the activity at a frequency greater than every week if preventative measures are not applied	5
Likely	Will occur more than once or twice during the activity but less than weekly if preventative measures are not applied	3
Unlikely	May occur once or twice during the activity if preventative measures are not applied	2
Rare	Unlikely to occur during the project	1

### **Consequence Scale**

<b>Consequence</b>	<b>Definition</b>	<b>Score</b>
Catastrophic	The action will cause unprecedented damage or impacts on the environment or surrounding community e.g. extreme loss of soil and water resources and quality from storm water runoff extreme pollution of soil and water resources including major contamination from hazardous materials widespread effects on ecosystems with deaths of fauna/flora widespread community impacts resulting in illness, injury or inconvenience loss or destruction of archaeological or historical sites Occurrence will almost certainly result in the work being halted and a significant fine.	5
Major	<p>The action will cause major adverse damage on the environment or surrounding communities e.g.</p> <p>major loss of soil and water resources and quality from storm water runoff</p> <p>major pollution of soil and water resources including contamination from hazardous materials</p> <p>significant effects on ecosystems with isolated deaths of non-vulnerable flora and fauna</p> <p>significant annoyance or nuisance to communities</p>	3

Consequence	Definition	Score
	major damage to or movement required to archaeological or historical sites  Occurrence may result in work being halted and a fine	
Moderate	No or minimal adverse environmental or social impacts e.g.  no measurable or noticeable changes in storm water quality. Water quality remains within tolerable limits  little noticeable effect on ecosystems  no or isolated community complaints  no or unlikely damage to archaeological or historical sites  no likelihood of being fined	2
Minor	No or minimal adverse environmental or social impacts e.g.  no measurable or noticeable changes in storm water quality. Water quality remains within tolerable limits  little noticeable effect on ecosystems  no or isolated community complaints  no or unlikely damage to archaeological or historical sites  no likelihood of being fined	1

**Risk Score Table**

Likelihood	Consequence				
		Catastrophic	Major	Moderate	Minor
	Certain	25	15	10	5
	Likely	15	9	6	3
	Unlikely	10	6	4	2
	Rare	5	3	2	1

**Risk: Significant: 15-25**

**Medium: 6-10**

**Low 1-5**

Any Medium to Significant risk requires an environmental management measure to manage the potential environmental risk. Judgement will be required concerning the application of an environmental management measure to mitigate low risk situations.

The higher the risk the more intensive the required mitigation measure will need to be; e.g. where site sedimentation is deemed to be low risk, then silt fences may be needed but as the risk increases, then sediment traps may be required. The selection of the appropriate mitigation measure will require judgment based on the level of risk and the specific site parameters.

**Step 5:** The Environmental Management measures are to be extracted from the EIA study for the project and will be added in the last column of the table below.

<b>No .</b>	<b>Construction Activity</b>	<b>Hazards to Consider</b>	<b>Likelihood  That the site or sensitive receptors will be affected?</b>	<b>Consequence  of the site or sensitive receptors being affected?</b>	<b>Risk Score (consequence x likelihood)</b>	<b>Environmental Management Measures</b>
i	Site Surveying & vegetation clearance	Damage to vegetation beyond project footprint				These can be taken from the EMP provided in the IEE report  (If Risk Score is 6 or more)
		Erosion of exposed areas and sediment				
		Loss of topsoil				
		Dust generation				
		Noise				
ii	Establishment of Work Camp, Batching plant etc.	Soil deposited onto roads from tires				
		Stockpile erosion				
		Noise & Vibration				
		Traffic congestion				



No .	Construction Activity	Hazards to Consider	Likelihood That the site or sensitive receptors will be affected?	Consequence of the site or sensitive receptors being affected?	Risk Score (consequence x likelihood)	Environmental Management Measures
		Fuel spills				
iii	Dismantling of Asphalt and existing structures including Utilities	Noise and vibration				
		Dust generation				
		Community safety				
		Worker safety				
		Traffic Congestion				
iv	Preparation of Sub-Base	Noise and vibration				
		Dust generation				
		Traffic Congestion				
v	Asphalting	Noise and vibration				
		Dust generation				

No .	Construction Activity	Hazards to Consider	Likelihood That the site or sensitive receptors will be affected?	Consequence of the site or sensitive receptors being affected?	Risk Score (consequence x likelihood)	Environmental Management Measures
		Traffic Congestion				
		Community safety				
		Labor safety (PPEs)				
vi	Landscaping	Dust generation				
		Sediment runoff				
		Failure of vegetation to take root				
vii	<b>Implementation of COVID-19 SOPs</b>	Worker Health Risk				These can be taken from the EMP provided in the IEE report
		Public Health Risk				

**Step 6:** The Site plans are a critical part of the SSEMP and will need to be prepared, otherwise the ADB will consider the document as incomplete.

The site plan will need to provide the following:

Indication of North and scale

Existing and planned supporting infrastructure (e.g. access roads, water supplies and electricity supplies)

Location of planned work

Contours

Drainage systems

Locations of sensitive receptors

**Step 7 (if required)**<sup>23</sup>: The completed SSEMP provides details of all the environmental management requirements for all stages of the construction process. For individual work teams who are responsible for only a small part of the overall construction works it can be confusing as to what is required for their particular work component. For example, the work team responsible for stripping soil for the construction areas are not going to be interested in the requirements for pouring concrete for footings and foundations. However, it is essential that the soil stripping team knows exactly what to clear and what to leave and where to put stockpiles of soil for later use.

In situations where different work activities are required at different times or at different locations, environmental work plans can be prepared. These are similar to the work method statements that are often produced for major construction projects.

**Step 8:** A detailed monitoring plan will be provided along with frequency and responsibilities to ensure all key environmental parameters are monitored to ensure compliance with both national and ADB requirements.

Template for SSEMP

Introduction

Project Overview

Scope of SSEMP

Objectives of SSEMP

Map of Sensitive Receptors

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<sup>23</sup> ADB, Safeguards Unit for Central & West Asia Department, *Environmental Management for Construction Handbook*.

Construction Activities

Activities

Risk Assessment

Risk Assessment Matrix & Mitigation Measures

Site Plan(s)

Environmental Monitoring Plan

Instrumental Monitoring of Environmental Parameters by Contractor as per EMP

In-house monitoring

Third Party environmental monitoring

Visual monitoring of Environmental Parameters by Contractor as per EMP

Responsibilities

Organizational Responsibilities and Communication

Responsibility of EA

Responsibility of Construction Supervision Consultant (CSC)

Responsibility of Contractor

Responsibility of EPA

# **ANNEXURE J**

## **Traffic Management Plan**

## **J.1 Need for Plan**

The construction of the WTP and laying/replacement of distribution networks will take over 24 months and in this period, huge vehicular movement carrying large amount of material and machinery is expected. This will definitely interrupt the local traffic and is therefore important to manage the traffic to avoid the nuisance to local residents in terms of noise, dust, congestion and inconvenience.

## **J.2 The plan**

The Objective of Traffic Management Plan (TMP) is to define the requirements that will be implemented to mitigate any potential negative risks to the environment, workers or the community resulting from construction traffic.

The TMP will advise and inform site Contractors and external suppliers of equipment and materials of access and entry points along with other key information such tipping areas and wash-out areas. It is intended to compliment and work alongside relevant ESMMP. The TMP will be classed as “live” and therefore be subjected to updates as required.

Contractor, at the time of the execution of the project will prepare a comprehensive TMP in coordination with local traffic police department, PMU, emergency services and local administrative department. The PMU and CSC will review and approve contractors TMP. The contractor’s TMP shall include following mitigation measures during its preparation:

Undertake a road conditions assessment prior to and following the peak construction period, to assess any damage to road infrastructure that can be attributed to Project construction.

Repair damage as appropriate or enter into a voluntary agreement with the relevant roads authority to reimburse the cost of any repairs required to the public road network as a result of the Project.

Spoil dumpsites located close to Project site to minimize journey distance and limit movements to site access roads.

Concrete mixing plant located at Project site limiting traffic movements associated with concrete delivery to site access roads

Construction of worker accommodation on site to reduce light vehicle movements relating to travel to/ from the site

Provision of bus/minibus services for personnel living in nearby settlements

Movements of construction workers will be planned to avoid the busiest roads and times of day when traffic is at its greatest.

Schedule deliveries and road movements to avoid peak periods

Road maintenance fund to leave a useful asset for communities after the construction phase.

Driver training for HGV drivers and refresher course every six months for Project drivers

Speed restrictions for project traffic travelling through communities (to be agreed with Traffic Management Authority)

Run a safety campaign to improve the people's knowledge of the traffic hazard on their roads, public information and other activities to address the issues.

Run a pedestrian awareness programmer

Temporary signage

The traffic management plan is provided below.

### **J.3 Other Recommendations**

It is important to manage public access routes during construction because it can cause delay to local traffic and create a safety hazard both on and offsite. People working and living near the project site would be annoyed by the emissions, noise and visual intrusion of queuing vehicles. Some important factors involved in access routes and site traffic are as follows:

#### **J.3.1 Public Access Routes**

The use of public road for site access may be restricted in terms of:

Vehicle size, width and type of load

Time limits

Parking

Pedestrian conflicts

Contractor will have consultation with the local police or local authority to address these issues and to effectively manage them before the beginning of the construction.

#### **J.3.2 Site Workers Traffic**

Site personnel will not be permitted to park vehicles near the site boundary; this will lead to disruption in material deliveries. Designated parking area with appropriate parking space will be needed for this purpose; any plain area near construction site can be used for this purpose.

#### **J.3.3 Site Rules**

Access to and from the site must be only via the specified entrance.

On leaving the site, vehicles must be directed to follow the directions given.

Drivers must adhere to the site speed limits.

All material deliveries to site must keep allocated time limits.

No material or rubbish will be left in the loading-unloading area.

Develop a map for alternate routes showing material delivery services.

Assign designated personnel on site to receive deliveries and to direct the vehicles.

Monitor vehicle movement to reduce the likelihood of queuing or causing congestion in and around the area.

Project vehicles will have a unanimous badge or logo on windscreen displaying that they belong to the project.

#### **J.4 Contractor's Obligation**

The traffic management plan of the Contractor will be safe enough and widening of access roads and construction of the detours must be completed before start of project construction activities so that heavy vehicular transportation for construction activities do not hinder the normal course of traffic lanes. While widening the access roads, the safe movement of the vehicles, people, animals and wildlife must be ensured. It will be sole responsibility of Contractor. The roads widening will be designed on the basis of the traffic survey, summarized and estimated site traffic. Contractor must ensure that road closures are carried out by a competent person. The Contractor obligation must include the display of traffic signs according to the need to divert the traffic volume and to guide the road users in advance. The traffic sign, traffic light will be placed from any diverting route or road marking.

The Contractor will consider the environmental and social impacts of the traffic during construction. It will be sole responsibility of the Contractor to implement a plan which produces minimum nuisance to the local people and to the environment. Safety of the people will be given due importance. It will be under Contractor obligation to notify the traffic management plan and its later changes to CSC, PMU, emergency services and Traffic Police, and also publish weekly programmer in local newspapers.



# **ANNEXURE K**

## **NEQS Guidelines**

Parameter	Unit	Standards (maximum allowable limit)
Temperature increase	°C	<3
pH value (acidity / basicity)	pH	6-9
5-day biochemical oxygen demand (BOD) AT 20 °C	mg/l	80
Chemical oxygen demand (COD)	mg/l	150
Total dissolved solids	mg/l	200
Total dissolved solids	mg/l	3,500
Grease and oil	mg/l	10
Phenolic compounds (as phenol)	mg/l	0.1
Chloride (as Cl)	mg/l	1.0
Fluoride (as F)	mg/l	10
Sulfate (SO <sub>4</sub> )	mg/l	600
Ammonia (NH <sub>3</sub> )	mg/l	40
Cadmium	mg/l	0.1
Chromium (trivalent and hexavalent)	mg/l	1.0
Copper	mg/l	1.0
Lead	mg/l	0.5
Mercury	mg/l	0.01
Selenium	mg/l	0.5
Nickel	mg/l	1.0
Silver	mg/l	1.0
Total toxic metals	mg/l	2.0
Zinc	mg/l	5
Arsenic	mg/l	1.0
Barium	mg/l	1.5
Iron	mg/l	8.0
Manganese	mg/l	1.5
Boron	mg/l	6.0
Chlorine	mg/l	1.0

**Notes:**

1. The standard assumes that dilution of 1:10 on discharge is available. That is, for each cubic meter of treated effluent, the recipient water body should have 10 m<sup>3</sup> of water for dilution of this effluent.
2. Toxic metals include cadmium, chromium, copper, lead, mercury, selenium, nickel and silver. The effluent should meet the individual standards for these metals as well as the standard for total toxic metal concentration.

Source: Government of Pakistan (2000) (SRO 549(I)/2000).

Pollutants	Time-Weighted Average	Concentration in Ambient Air		Method of Measurement
		Effective from 1st July 2010	Effective from 1st January 2013	
Sulfur Dioxide (SO <sub>2</sub> )	Annual Average *	80 µg/m <sup>3</sup>	80 µg/m <sup>3</sup>	Ultraviolet Fluorescence
	24 hours**	120 µg/m <sup>3</sup>	120 µg/m <sup>3</sup>	
Oxides of Nitrogen as (NO)	Annual Average*	40 µg/m <sup>3</sup>	40 µg/m <sup>3</sup>	Gas Phase Chemiluminescence
	24 hours**	80 µg/m <sup>3</sup>	80 µg/m <sup>3</sup>	
Ozone (O <sub>3</sub> )	1 hour	180 µg/m <sup>3</sup>	130 µg/m <sup>3</sup>	Non dispersive UV absorption
Suspended Particulate Matter (SPM)	Annual Average*	400 µg/m <sup>3</sup>	360 µg/m <sup>3</sup>	High Volume Sampling, (Average flow rate not less than 1.1 m <sup>3</sup> /minute).
	1 hour	180 µg/m <sup>3</sup>	130 µg/m <sup>3</sup>	
Respirable Particulate Matter. PM <sub>10</sub>	Annual Average*	200 µg/m <sup>3</sup>	120 µg/m <sup>3</sup>	β Ray absorption
	24 hours**	250 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	
Respirable Particulate Matter. PM <sub>2.5</sub>	Annual Average*	25 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	β Ray absorption
	24 hours**	40 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	
	1 hour	25 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	
Lead (Pb)	Annual Average*	1.5 µg/m <sup>3</sup>	1.0 µg/m <sup>3</sup>	ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	2.0 µg/m <sup>3</sup>	1.5 µg/m <sup>3</sup>	
Carbon Monoxide (CO)	8 hours**	5 µg/m <sup>3</sup>	5 µg/m <sup>3</sup>	Non dispersive Infra-Red (NDIR)
	1 hour	10 µg/m <sup>3</sup>	10 µg/m <sup>3</sup>	

\* Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.

24 hourly / 8 hourly values should be met 98% of the in a year. 20% of the time, it may exceed but not on two consecutive days.

Source: Government of Pakistan (2010) (SRO 1062 (I)/ 2010).

National Environmental Quality Standards for Noise<sup>1</sup>

S/No.	Category of Area/Zone	Limit in dB(A) Lea	
		Day Time	Night Time
1	Residential area (A)	55	45
2	Commercial area (B)	65	55
3	Industrial area (C)	75	65
4	Silence zone (D)	50	45

1: Effective from 1<sup>st</sup> July, 2012.

Note: 1. Day time hours: 6 am to 10 pm

2. Night time hours: 10 pm to 6 am

3. Silence zone: Zones that are declared as such by the competent authority. An area comprising not less than 100 meters around hospitals, educational institutions and courts.

4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

## National Environmental Quality Standards for Motor Vehicle Exhaust and Noise

**(A) For In-use Vehicles**

Sr. No.	Parameter	Standard (Maximum permissible Limit)	Measuring Method	Applicability
1	Smoke	40% or 2 on the Ringlemann Scale during engine acceleration mode	To be compared with Ringlemann Chart at a distance 6 or more.	Immediate effect
2	Carbon Monoxide	6%	Under idling conditions: Non-dispersive infrared detection through gas analyzer.	
3	Noise	85 db (A).	Sound meter at 7.5 meters from the source.	

**(B) For New Vehicles****(i) Emission Standards for Diesel Vehicles****(a) For Passenger Cars and Light Commercial Vehicles (g/Km)**

Type of Vehicle	Category/Class	Tiers	CO	HC+ NOX	PM	Measuring Method	Applicability		
Passenger Cars	M 1: with reference mass (RW) upto 2500 kg. Cars with RW over 2500 kg to meets NI category standards.	Pak-II IDI	1.00	0.70	0.08	NEDC (ECE 15+ EUDCL)	All imported and local manufactured diesel vehicles with effect from 01-07-2012		
		Pak-II DI	1.00	0.90	0.10				
Light Commercial Vehicles	NI-I (RW<1250 kg)	Pak-II IDI	1.00	0.70	0.08				
		Pak-II DI	1.00	0.90	0.10				
	NI-I (1250 kg< RW< 1700 kg)	Pak-II IDI	1.25	1.00	0.12				
		Pak-II DI	1.25	1.30	0.14				
	NI-III (RW>1700 kg)	Pak-II IDI	1.50	1.20	0.17				
		Pak-II DI	1.50	1.60	0.20				
Parameter	Standard (maximum permissible limit				Measuring Method				
Noise	85 db (A)				Sound meter at 7.5 meters from the source.				

## (ii) Emission Standards for Petrol Vehicles (g/km)

Type of Vehicle	Category/Class	Tiers	CO	HC+ NOX	Measuring Method	Applicability	
Passenger	M 1: with reference mass (RW) upto 2500 kg. Cars with RW over 2500 kg to meets NI category standards.	Pak-II	2.20	0.50	NEDC (ECE 15+ EUDCL)	All imported and new models* locally manufactured petrol vehicles with effect from 1st July, 2009**	
Light Commercial Vehicles	NI-I (RW<1250 kg)	Pak-II	2.20	0.50			
	NI-I (1250 kg> RW< 1700 kg)	Pak-II	4.00	0.65			
	NI-III (RW>1700 kg)	Pak-II	5.00	0.80			
Motor Rickshaws and motor Cycles	2.4 strokes < 150 cc	Pak-II	5.50	1.50	ECER 40		
	2.4 strokes < 150 cc	Pak-II	5.50	1.30			
Parameter	Standard (maximum permissible limit				Measuring Method		
Noise	85 db (A)				Sound meter at 7.5 meters from the source.		

**Explantations:**

DI: Direct Injection

IDI: Indirect Injection

EUDCL: Extra Urban Driving Cycle

NEDC: New Urban Driving Cycle

M: Vehicles designed and constructed for the carriage of passengers and comprising no more than eight seats in addition to the driver's seat.

N: Motor vehicles with at least four wheels designed and constructed for the carriages of goods.

\* New model means both model and engine type change

\*\* The existing models of petrol driven vehicles locally manufactured will immediately switch over to Pak-II emission standards but not later than 30<sup>th</sup> June, 2012.

Source: Government of Pakistan (2009) (SRO 72 (KE)/ 2009).

## National Standards for Drinking Water Quality

Properties/Parameters	Standard Values for Pakistan
<b>Bacterial</b>	
All water intended for drinking (E.Coli or Thermo tolerant Coliform bacteria)	Must not be detectable in any 100 ml samples
Treated water entering the distribution system (E.Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml samples
Treated water in the distribution system (E.Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml samples In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.
<b>Physical</b>	
Color	< 15 TCU
Taste	Non objectionable/ Accept able
Odor	Non objectionable/Accept able
Turbidity	< 5 NTU
Total hardness as CaCO <sub>3</sub>	< 500 mg/l
TDS	< 1000
pH	6.5-8.5
<b>Chemical</b>	
<b>Essential Inorganic</b>	<b>mg/Litre</b>
Aluminum (Al)	≤ 0.005(P)
Antimony	≤ 0.05(P)
Arsenic (As)	≤ 0.05(P)
Barium (Ba)	0.7
Boron (B)	0.3
Cadmium (Cd)	0.01
Chloride (Cl)	<250
Chromium (Cr)	≤ 0.05
Copper (Cu)	2
<b>Toxic Inorganic</b>	<b>Mg/Litre</b>
Cyanide (Cn)	< 0.05
Fluoride (F)*	≤ 1.5
Lead (Pb)	≤ 0.05
Manganese (Mn)	< 0.5
Mercury (Hg)	≤ 0.001
Nickel (Ni)	≤ 0.02
Nitrate (NO <sub>3</sub> )*	≤ 50
Nitrate (NO <sub>2</sub> )*	< 3 (P)
Selenium (Se)	0.01 (P)
Residual chlorine	0.2-0.5 at consumer end; 0.5-1.5 at source
Zinc (Zn)	5.0
<b>Organic</b>	
Pesticides mg/l	PSQCA No. 4639-2004, Page No. 4 Table No. 3 Serial No. 20-58 may be consulted.**
Phenolic compound (as phenols) mg/l	WHO standards: < 0.002
Polynuclear Aromatic hydrocarbon (as PAH) g/L	WHO standards: ≤ 0.01v (by GC/MS method)
<b>Radioactive</b>	
Alpha Emitters bq/L or pCi	0.1
Beta Emitters	1

\* Indicates priority health related inorganic constituents which need regular monitoring.

\*\* PSQCA: Pakistan Standards Quality Control Authority.

Source: Government of Pakistan (2010) (SRO 1063(I)/2010).

## **ANNEXURE L**

### **WHO/GoP advice on Use of Masks for the COVID-19 Virus**



## Advice on the use of masks in the context of COVID-19: interim guidance

masks away from those in health care who need them most, especially when masks are in short supply.

**Persons with symptoms should:**

- wear a medical mask, self-isolate, and seek medical advice as soon as they start to feel unwell. Symptoms can include fever, fatigue, cough, sore throat, and difficulty breathing. It is important to note that early symptoms for some people infected with COVID-19 may be very mild;
- follow instructions on how to put on, take off, and dispose of medical masks;
- follow all additional preventive measures, in particular, hand hygiene and maintaining physical distance from other persons.

**All persons should:**

- avoid groups of people and enclosed, crowded spaces;
- maintain physical distance of at least 1 m from other persons, in particular from those with respiratory symptoms (e.g., coughing, sneezing);
- perform hand hygiene frequently, using an alcohol-based hand rub if hands are not visibly dirty or soap and water when hands are visibly dirty;
- cover their nose and mouth with a bent elbow or paper tissue when coughing or sneezing, dispose of the tissue immediately after use, and perform hand hygiene;
- refrain from touching their mouth, nose, and eyes.

In some countries masks are worn in accordance with local customs or in accordance with advice by national authorities in the context of COVID-19. In these situations, best practices should be followed about how to wear, remove, and dispose of them, and for hand hygiene after removal.

**Advice to decision makers on the use of masks for healthy people in community settings**

As described above, the wide use of masks by healthy people in the community setting is not supported by current evidence and carries uncertainties and critical risks. WHO offers the following advice to decision makers so they apply a risk-based approach.

Decision makers should consider the following:

1. **Purpose** of mask use: the rationale and reason for mask use should be clear— whether it is to be used for source control (used by infected persons) or prevention of COVID-19 (used by healthy persons)
2. Risk of **exposure** to the COVID-19 virus in the local context:
  - The population: current epidemiology about how widely the virus is circulating (e.g., clusters of cases versus community transmission), as well as local surveillance and testing capacity (e.g., contact tracing and follow up, ability to carry out testing).
  - The individual: working in close contact with public (e.g., community health worker, cashier)
3. **Vulnerability** of the person/population to develop severe disease or be at higher risk of death, e.g. people with comorbidities, such as cardiovascular disease or diabetes mellitus, and older people

4. **Setting** in which the population lives in terms of population density, the ability to carry out physical distancing (e.g. on a crowded bus), and risk of rapid spread (e.g. closed settings, slums, camps/camp-like settings).
5. **Feasibility**: availability and costs of the mask, and tolerability by individuals
6. **Type** of mask: medical mask versus nonmedical mask (see below)

In addition to these factors, potential advantages of the use of mask by healthy people in the community setting include reducing potential exposure risk from infected person during the “pre-symptomatic” period and stigmatization of individuals wearing mask for source control.

However, the following potential risks should be carefully taken into account in any decision-making process:

- self-contamination that can occur by touching and reusing contaminated mask
- depending on type of mask used, potential breathing difficulties
- false sense of security, leading to potentially less adherence to other preventive measures such as physical distancing and hand hygiene
- diversion of mask supplies and consequent shortage of mask for health care workers
- diversion of resources from effective public health measures, such as hand hygiene

Whatever approach is taken, it is important to develop a strong communication strategy to explain to the population the circumstances, criteria, and reasons for decisions. The population should receive clear instructions on what masks to wear, when and how (see mask management section), and on the importance of continuing to strictly follow all other IPC measures (e.g., hand hygiene, physical distancing, and others).

**Type of Mask****WHO stresses that it is critical that medical masks and respirators be prioritized for health care workers.**

The use of masks made of other materials (e.g., cotton fabric), also known as nonmedical masks, in the community setting has not been well evaluated. There is no current evidence to make a recommendation for or against their use in this setting.

WHO is collaborating with research and development partners to better understand the effectiveness and efficiency of nonmedical masks. WHO is also strongly encouraging countries that issue recommendations for the use of masks in healthy people in the community to conduct research on this critical topic. WHO will update its guidance when new evidence becomes available.

Advice on the use of masks in the context of COVID-19: interim guidance

In the interim, decision makers may be moving ahead with advising the use of nonmedical masks. Where this is the case, the following features related to nonmedical masks should be taken into consideration:

- Numbers of layers of fabric/tissue
- Breathability of material used
- Water repellence/hydrophobic qualities
- Shape of mask
- Fit of mask

## Home care

For COVID-19 patients with mild illness, hospitalization may not be required. All patients cared for outside hospital (i.e. at home or non-traditional settings) should be instructed to follow local/regional public health protocols for home isolation and return to designated COVID-19 hospital if they develop any worsening of illness.<sup>7</sup>

Home care may also be considered when inpatient care is unavailable or unsafe (e.g. capacity is limited, and resources are unable to meet the demand for health care services). Specific IPC guidance for home care should be followed.<sup>3</sup>

### Persons with suspected COVID-19 or mild symptoms should:

- Self-isolate if isolation in a medical facility is not indicated or not possible
- Perform hand hygiene frequently, using an alcohol-based hand rub if hands are not visibly dirty or soap and water when hands are visibly dirty;
- Keep a distance of at least 1 m from other people;
- Wear a medical mask as much as possible; the mask should be changed at least once daily. Persons who cannot tolerate a medical mask should rigorously apply respiratory hygiene (i.e. cover mouth and nose with a disposable paper tissue when coughing or sneezing and dispose of it immediately after use or use a bent elbow procedure and then perform hand hygiene.)
- Avoid contaminating surfaces with saliva, phlegm, or respiratory secretions.
- Improve airflow and ventilation in their living space by opening windows and doors as much as possible.

### Caregivers or those sharing living space with persons suspected of COVID-19 or with mild symptoms should:

- Perform hand hygiene frequently, using an alcohol-based hand rub if hands are not visibly dirty or soap and water when hands are visibly dirty;
- Keep a distance of at least 1 meter from the affected person when possible;
- Wear a medical mask when in the same room as the affected person;
- Dispose of any material contaminated with respiratory secretions (disposable tissues) immediately after use and then perform hand hygiene.
- Improve airflow and ventilation in the living space by opening windows as much as possible.

## Health care settings

WHO provides guidance for the use of PPE, including masks, by health care workers in the guidance document: Rational use of PPE in the context of COVID-19.<sup>24</sup> Here we provide advice for people visiting a health care setting:

### Symptomatic people visiting a health care setting should:

- Wear a medical mask while waiting in triage or other areas and during transportation within the facility;
- Not wear a medical mask when isolated in a single room, but cover their mouth and nose when coughing or sneezing with disposable paper tissues. Tissues must be disposed of appropriately, and hand hygiene should be performed immediately afterwards.

### Health care workers should:

- Wear a medical mask when entering a room where patients with suspected or confirmed COVID-19 are admitted.
- Use a particulate respirator at least as protective as a US National Institute for Occupational Safety and Health-certified N95, European Union standard FFP2, or equivalent, when performing or working in settings where aerosol-generating procedures, such as tracheal intubation, non-invasive ventilation, tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation, and bronchoscopy are performed.
- Full infection prevention and control guidance for health care workers is provided [here](#).

One study that evaluated the use of cloth masks in a health care facility found that health care workers using cotton cloth masks were at increased risk of infection compared with those who wore medical masks.<sup>25</sup> Therefore, cotton cloth masks are not considered appropriate for health care workers. As for other PPE items, if production of cloth masks for use in health care settings is proposed locally in situations of shortage or stock out, a local authority should assess the proposed PPE according to specific minimum standards and technical specifications.

## Mask management

For any type of mask, appropriate use and disposal are essential to ensure that they are effective and to avoid any increase in transmission.

The following information on the correct use of masks is derived from practices in health care settings:

- Place the mask carefully, ensuring it covers the mouth and nose, and tie it securely to minimize any gaps between the face and the mask.
- Avoid touching the mask while wearing it.
- Remove the mask using the appropriate technique: do not touch the front of the mask but untie it from behind.
- After removal or whenever a used mask is inadvertently touched, clean hands using an alcohol-based hand rub or soap and water if hands are visibly dirty.
- Replace masks as soon as they become damp with a new clean, dry mask.
- Do not re-use single-use masks.
- Discard single-use masks after each use and dispose of them immediately upon removal.



WHO continues to monitor the situation closely for any changes that may affect this interim guidance. Should any factors change, WHO will issue a further update. Otherwise, this interim guidance document will expire 2 years after the date of publication.

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## Guidelines

### Health & Safety of Building & Construction Workers during COVID-19 Outbreak

#### Objective

To provide guidelines for the workers involved in building and construction work during the current epidemic of COVID-19.

#### Rationale

Construction processes are dynamic with significantly varying number of workers on a construction project site from day to day. The workers coming from diverse environments and working closely together increases the risk of exposure to COVID 19.

Building construction involves earth work, procurement of materials and supplies and their storage, construction work done by masons, blacksmiths, electricians, carpenters, plumbers, painters, supervisors, managers and security personnel. These guidelines provide the safety measure to be implemented at the construction site having a dusty environment, continuous flow of different materials and make-shift type of arrangements for storage, food and sanitation calls for implementation of safety precautions at the very basic level of personal hygiene only.

#### Advice for Site Managers:

Without prejudice to the following, all possible and prescribed actions shall be taken at the project site, as should facilitate the health of all life present at the site.

- Every construction project shall make proper arrangements for uninterrupted building services including but not restricted to, electricity, fuel, water supply, water disposal and sanitation, communication links, washrooms with hand hygiene and shower facility and with proper and adequate supply of soaps and disinfectants.
- Workers should not use biometric attendance machines or crowd during attendance, entry or exit to the premises of the construction site
- Ensure the availability of the thermal gun at the entry and exit of the construction site and no worker should be allowed without getting his/her temperature checked.
- Site manager must maintain a register of all contact details with NID number and addresses of all present at the site in case a follow up or tracing and tracking of contacts is required at a later stage.
- Develop the employee roster to decrease the number of people on the site very day. Split the shifts of the workers in morning and evening with limit of each shift to 8 working hours.



- Every worker must change into standard working attire at the time of commencement of duty and change back to their regular dress after taking shower when their duty hours end.
- In addition to all other internationally recognized safety precaution for construction workers and other staff, every individual must be provided with a face mask. It must be ensured that everyone during his or her presence at the site continues to wear the mask. Face mask shall be replaced as and when soiled or otherwise removed. Outer surface of face mask must not be touched with hands.
- Non-essential work trainings must be postponed avoiding gathering of people.
- Ensure the physical distance by creating more than one route of entry and exit to the site.
- Instruct the workers to inform the construction manager (or authorities) if
  - They develop any symptoms of cough, flu or fever.
  - They have been exposed to someone suspected or confirmed with COVID 19.
  - They have met someone who has a travel history of COVID 19 endemic country
  - They have travelled in last couple of days or plan to travel soon
- All incidences of appearance of the symptoms of COVID-19 shall be immediately documented and maintained at the site and information regarding which shall be immediately communicated through e-mail or else, to the designated health facility, and the sick worker shall be transported to the health facility for further advice and action. The site manager must establish a link with a nearby healthcare facility with arrangements for quick transportation of workers in case of an emergency.
- Persuade the workers to inform the authorities for their safety and of other if they observe any signs and symptoms in a colleague
- Do not allow any worker at the construction site who has the symptoms
- Display the awareness banners about hand hygiene and physical distancing, where you can, around the work site.
- Everyone on the construction site must observe sneezing and coughing etiquettes.
- Workers shall be requested and required to wash their hands as frequently as practicable and shall also be advised not to touch their face with their hands during work.
- Workers must maintain no less than two arm lengths between them before, during after work at all the times. They shall not make physical contact and shall be required to maintain separate personal gears and assets which must be clearly labelled and stored without intermix.
- Only sanitize-able dinning surfaces shall be used, which must be cleaned before each service. Food must be heated to a temperature to no less than 70° C before consumption and shall preferably be served in disposable utensils. If reusable utensils are used, these must be washed with soap and water immediately after use and stored at a safe place.
- The lunch breaks and stretch breaks of the workers must be staggered to avoid the clustering of workers. Workers must not sit at less than 2 meters distance while having meals and while any other activity requiring interpersonal communications.
- In the wake of current restrictions on transportations site managers will ensure safe transport arrangements for worker which should not be crowded and should have social distancing in place during the entire process from pickups till drops at destination

- In case of workers sleeping in at the site of construction, a safe distance of 2 meters must be ensured in the sleeping rooms.
- A supply of safe drinking water must be made available at the project site and maintained.

### **Advice for Construction Workers:**

- All possible and prescribed measures shall be taken to ensure your and others health
- Enter your contact details in the register maintained at the site, in case a follow up or tracing and tracking of contacts is required at a later stage.
- Follow hygiene practices at washrooms and shower facility with proper and adequate use of soaps and disinfectants.
- Every worker must change into standard working attire at the time of commencement of duty and change back to their regular dress after taking shower when their duty hours end.
- In addition to all other internationally recognized safety precaution for construction workers and other staff, every individual must use face mask. Face mask shall be replaced as and when soiled or otherwise removed. Outer surface of face mask must not be touched with hands.
- Workers should wash their hands as frequently as practicable and shall not to touch their face with their hands during work.
- Everyone on the construction site must observe sneezing and coughing etiquettes.
- Workers must maintain no less than two arm lengths between them before, during after work at all the times. They shall not make physical contact and shall be required to maintain separate personal gears and assets which must be clearly labelled and stored without intermix.
- Sick worker should immediately inform the site manager and must get medical advice from nearby health centre.
- Only sanitize able dinning surfaces shall be used. Food must be heated to a temperature to no less than 70° C before consumption and shall preferably be in disposable utensils. If reusable utensils are used, these must be washed with soap and water immediately after use and stored at a safe place.
- Do not sit at less than 2 meters distance while having meals and while any other activity requiring interpersonal communications.
- Do not use biometric attendance machines or crowd during attendance, entry or exit to the premises of the construction site.
- Use safe transport arrangements which should not be crowded and should have social distancing in place during the entire process from pickups till drops at destination.
- In case sleeping in at the site of construction, a safe distance of 2 meters must be ensured in the sleeping rooms.

### **Deliveries or Other Contractors Visiting the Site**

- Non-essential visits to the construction sites should be cancelled or postponed.



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Regulations & Coordination

- Delivery workers or other contractors who need to visit the construction site must go through temperature check before entering and should be given clear instructions for precautions to be taken while on site.
- Designate the workers, with protective gears or at least gloved and mask, to attend to the deliveries and contractors.
- Make alcohol-based hand sanitizer (at least 70%) available for the workers handling deliveries.
- Instruct the visiting truck drivers to remain in their vehicles and whenever possible make use of contactless methods, such as mobile phones, to communicate with your workers.

*Note: The above recommendations are being regularly reviewed by the Ministry of National Health Services, Regulations & Coordination and will be updated based on the international & national recommendations and best practices.*

*The Ministry acknowledges the contribution of Irfan Mirza, Syeda Shehribano Akhtar and HSA/ HPSIU/ NIH team to compile these guidelines.*

**For more information, please contact:**

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<http://covid.gov.pk/>

<http://nhsre.gov.pk/>

<http://www.hsa.edu.pk/>

<https://www.nih.org.pk/>

<https://www.facebook.com/NHSRCOfficial>

<https://twitter.com/nhsreofficial>

[https://www.youtube.com/channel/UCdYuzeSP4Ug1f\\_ZZKJ](https://www.youtube.com/channel/UCdYuzeSP4Ug1f_ZZKJ)

# **ANNEXURE M**

## **Solid Waste Management Framework**



# Framework for Solid Waste Management

## 1. INTRODUCTION

Framework Solid Waste Management Plan for the development of Peshawar Water Supply Project and associated distribution network is provided. Construction contractors may use this framework as guiding document for preparation of site specific solid waste management plan. The purpose of this Framework Solid Waste Management Plan is to ensure that wastes arising from the proposed construction works are managed, reused, recovered or disposed of by a method that ensures the provisions of the KP EPA Act, 2014 and Pakistan Environmental Protection, 1997 and ADB SPS, 2009. It also ensures that the optimum levels of waste reduction, re-use and recycling are achieved.

Waste management priorities for project are based on following waste management hierarchy.

- Prevent material wastage
- Minimize the quantity of waste
- Reuse of site materials
- Recycling of waste
- Energy recovery
- Disposal

## 2. WASTE MANAGEMENT AT ABBOTABAD WTP and SUPPLY NETWORK

### 2.1 National Level

Waste management of the project will be carried as per national rules including:

- Solid Waste Management Policy, 2000
- Requirements of KP EPA, 2014
- Draft Guidelines on Solid Waste Management, 2005.
- Section 11 of PEPA, 1997 prohibits discharge of waste in amount that violates the NEQS.
- Draft Hazardous Substances rule of 1999
- Section 132 of Cantonment Act, 1942
- Provision Contains in the Local Government Ordinance, 2001

### 2.2 Regional Level

- Asian Development Bank (ADB) SPS, 2009
- IFC guidelines for Solid Waste Management
- Best practices of waste management on construction sites

## 3. DESCRIPTION OF THE PROJECT

The proposed project will be developed within Peshawar city.

The proposed project aims to fulfill water supply requirements of Peshawar city for the projected planning horizon population through utilization of groundwater pumping to meet the city's water needs.

### 3.1 Details of the wastes to be produced

During construction/civil works potential sources of waste will include spoils generated during excavation, concrete and construction waste, domestic wastes (solid & wastewater), fuel or oil

leakages or spills, onsite effluents from vehicle wash & cleaning, and cement spills. It is the responsibility of all personnel on site including Contractors, Sub-Contractors and their Employees to ensure compliance with this Waste Management Plan.

### **3.2 Main Waste Categories**

Contractors are required to develop inventory of main waste categories that will be generated during construction phase of the project. Anticipated main waste categories include construction debris, concrete waste, scrap wood, bricks, concrete, asphalt, plumbing fixtures, piping, insulation (asbestos and non-asbestos), metal scraps, oil, electrical wiring and components, chemicals, paints, solvents.

### **3.3 Anticipated Hazardous Waste Arising**

Fuels stored on site that will be used during the construction phase are classed as hazardous. There will be fuel stored on site for machinery and construction vehicles. All fuel tanks and draw off points will be banded. If the fuel is correctly contained and banded, it is not expected that there will be any fuel wastage at the site. Other sources of hazardous waste include used paints, used oil/lubricants, electrical waste and chemicals. Project contractors are required to develop SOPs for handling, storage and disposal of hazardous waste arising from the project.

## **4. ESTIMATED WASTE GENERATION**

### **4.1 Construction Waste Generation**

Project contractors are required to develop and maintain waste inventory clearly showing the type, amount and location of waste generated from different activities at the site. Waste record keeping is key to successful implementation of waste management plan.

### **4.2 Proposed Waste Management Options**

Waste will be segregated on site. Contractor will ensure that sufficient number of waste drums are placed at site with appropriate color coding. All recyclable waste will be handed over to recycling contractor. The appointed waste contractor will collect and transfer the recyclable wastes as receptacles are filled. The non-recyclable waste will be transferred by an authorized waste collector to an appropriate facility. Project contractors will identify both recycling and non-recycling contractor working in the project area. Contractors through bidding documents will be bound to hire such waste contractors for efficient waste management at project sites. A successful Waste Management Plan is largely dependent on how readily it can be integrated in to normal site operations by the person responsible. It is recognized that the plan will not be obstructive to site operations and the construction program by placing the responsibility of construction waste management with the Manager, all reuse, recycling, wastage and necessary disposal can be monitored as close to the source as possible. An Environmental Representative from each Works Sub-Contractor will also be nominated responsible for all waste management in their own operations. In this way, it is possible to identify where the greatest material wastage occurs, with a view to implementing better management.

The site Construction Manager will be designated as the Responsible Person and have overall responsibility for the implementation of the on-site Waste Management Plan. The Responsible Person will be assigned the authority to instruct all site personnel to comply with the specific provisions of the plan. At the operational level, a nominated Environmental Representative from each sub-contractor company on the site shall be assigned the direct responsibility to ensure that

the discrete operations stated in this framework for solid waste management are performed on an on-going basis.

#### **4.3 Tracking and documentation procedures for off-site waste**

The site construction Manager will maintain a copy of all waste collection permits. If waste (soil & stone) is being accepted on-site, a waste docket must be issued to the collector. If the waste is being transported to another site, a copy of the waste permit for that site must be provided to the manager. Record of waste collection docket, a receipt from the final destination of the material will be kept as part of the on-site waste management records. All information will be entered in a waste management system to be maintained on-site.

#### **4.4 Disposal Waste**

Contractors are required to develop SOP for disposal of recyclable, non-recyclable and hazardous waste generated at site. Surplus excavated soil will be disposed off at designated sites. Food waste will be disposed at food waste pit which will be fenced. Recycling waste will be handed over to recycling waste contractor. Hazardous waste will be disposed through incineration facility available in close proximity of the project area. Workers on the site will be encouraged to recycle as much municipal waste as possible i.e. cardboard, plastic, metals and glass. Prior to removal, the municipal waste will be examined to determine if recyclable materials have been placed in other containers. If this is the case, effort will be made to determine the cause of the waste not being segregated correctly.

### **5. ESTIMATED COST OF WASTE MANAGEMENT**

Contractors are required to estimate and budget cost for waste management through BOQ items. Such waste management cost will include cost of waste drums, cost of waste handling crew, cost of waste transportation, cost of EPA approved waste contractor services and associated incineration costs if any. By reusing materials on site, there will be reduction in transport and disposal costs for a waste contractor taking the material away.

### **6. TRAINING PROVISIONS FOR WASTE MANAGER AND SITE CREW**

A waste manager will be appointed or designated by construction contractors to ensure commitment, operational efficiency and accountability during the project execution.

#### **6.1 Site Manager Training and Responsibility**

The waste manager will be given responsibility and authority to select a waste team if required i.e. members of the site crew that will aid him in the organization, operation and recording the waste management system implemented on-site. The waste manager will have overall responsibility to oversee record and provide feedback to the CSC on everyday waste management at the site. Authority will be given to the waste manager to delegate responsibility to sub-contractors where necessary and to co-ordinate with suppliers, service providers and sub-contractors to prioritize waste prevention and salvage. The waste manager will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on-site. He will also be trained in the best method for segregation and storage of recyclable materials, have information on the materials that can be reused on-site and know how to implement this Framework for Solid Waste Management.

## **6.2 Site Crew Waste Management Training**

Training of the site crew is the responsibility of the waste manager and as such, a waste training program will be organized. A basic awareness course will be held for all crew to outline the construction waste management plan and to detail the segregation of waste at source. This may be incorporated with other training needs (e.g. general site induction, safety training etc.). This basic course will describe the materials to be segregated, the storage methods and the location of the waste storage areas. A subsection on hazardous wastes will be incorporated and the particular dangers of each hazardous waste will be explained.

## **7. RECORD KEEPING**

Records will be kept for each waste material which leaves the site, either for reuse on another site, recovery, recycling or disposal. A system will be put in place to record the construction waste arising on-site. The waste manager or delegate will record the following:

- Waste taken off-site for reuse
- Waste taken off-site for recovery
- Waste taken off-site for recycling
- Waste taken off-site for disposal
- Waste (soil & stone) accepted on-site for recovery

For each movement of waste off-site, a signed waste collection docket will be obtained by the waste manager (or delegate) from the contractor. This will be carried out for each material type. This system will also be linked with the delivery records. A signed waste acceptance docket will be issued for each movement of waste on-site.

## **8. OUTLINE WASTE AUDIT PROCEDURE**

Contractors are required to develop SOP for waste auditing at the construction sites. Such SOP will reflect frequency and types of waste audits, audit criteria and way forward to close non-compliances.

### **8.1 Responsibility for Waste Audit**

The appointed waste manager will be responsible for conducting a waste audit at the site during project execution.

### **8.2 Review of Records and Identification of Corrective Actions**

A review of all the records for the waste generated and transported off-site, as well as waste accepted, will be undertaken. If waste movements are not accounted for, the reasons for this will be established in order to see if and why the record keeping system has not been maintained. Each material type will be examined in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved. Waste management costs will also be reviewed. Upon completion of the construction phase a final report will be prepared summarizing the outcomes of waste management processes adopted and the total recycling/reuse/recovery figures for the development.

## **9. CONSULTATION WITH RELEVANT BODIES**

### **9.1 Local Authority**

Project contractors are required to maintain close coordination with PMU, WSSC Peshawar and KP EPA to ensure that all available waste reduction, re-use and recycling opportunities are identified and utilized.

## **9.2 EPA Approved Waste Contractors**

Companies that specialize waste management will be contacted to determine their suitability for engagement. If used, each company will be audited in order to ensure that relevant and up-to-date waste collection permits and/or license are held. In addition, information regarding individual materials will be obtained including the feasibility of recycling each material, the costs of recycling/reclamation and the means by which the wastes will be collected and transported off-site, and the recycling/reclamation process each material will undergo off-site.