Draft Initial Environmental Examination

Project Number: 42267-026
May 2016

IND: Rajasthan Urban Sector Development Program – Bulk Water System for Pali

Prepared by Rajasthan Urban Infrastructure Development Project, Government of Rajasthan for the Asian Development Bank.

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CURRENCY EQUIVALENTS
(as of 26 April 2016)

Currency unit	–	rupee (INR)
INR1.00	=	$0.01484
$1.00	=	INR 67.393

ABBREVIATIONS

ADB	–	Asian Development Bank
AC	–	Asbestos Cement
AE	–	Assistant Engineer
ADB	–	Asian Development Bank
ASI	–	Archeological Survey of India
ASO	–	Assistant Safeguards Officer
CFE	–	Consent for Establishment
CFO	–	Consent for Operation
CETP	–	Common Effluent Treatment Plant
CPCB	–	Central Pollution Control Board
EA	–	Executing Agency
EAC	–	Expert Appraisal Committee
EC	–	Environmental Clearance
EHS	–	Environmental Health & Safety
EIA	–	Environmental Impact Assessment
SEIAA	–	State Environmental Impact Assessment Authority
EMP	–	Environmental Management Plan;
GOI	–	Government of India
GOR	–	Government of Rajasthan
IA	–	Implementing Agency
IEE	–	Initial Environmental Examination;
PIU	–	Project Implementation Unit;
PMU	–	Project Management Unit
LSGD	–	Local Self Government Department
MOEF	–	Ministry of Environment and Forest
MLD	–	Million Liters per Day
LPCD	–	Liters per Capita per Day ELSR–Elevated Service Reservoir
PE	–	Polyethylene
DWC	–	Double Corrugated Duct
NHAI	–	National Highways Authority of India
NOC	–	No Objection Certificate
PHED	–	Public Health Engineering Department
PO	–	Project Officer
PMDSC	–	Project Management, Design and Supervision Consultant
PNP	–	Pali Nagar Parishad
PPTA	–	Project Preparatory Technical Assistance
PWD	–	Public Works Department

REA	–	Rapid Environmental Assessment Checklist
SBR	–	Sequential Batch Reactor
RoW	–	Right of Way
RPCB	–	Rajasthan Pollution Control Board
RUIDP	–	Rajasthan Urban Infrastructure Development Project
RUSDP	–	Rajasthan Urban Sector Development Program
SPS	–	Safeguard Policy Statement, 2009
STP	–	Sewage Treatment Plant
ULB	–	Urban Local Body
WTP	–	Water Treatment Plant

WEIGHTS AND MEASURES

°C	degree celsius
km	kilometre
lpcd	litres per capita per day
mm	millimeter
m	metre
MLD	million litres per day
mm	millimetre
Nos	numbers
Sq.km	square kilometer

NOTE{S}

In this report, "$" refers to US dollars. “INR” and “₹” refer to Indian rupees

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EXECUTIVE SUMMARY

1. The proposed Rajasthan Urban Sector Development Program (RUSDP) will complement the past and ongoing efforts of Government of Rajasthan (GoR) to improve water supply and wastewater services to the residents of the state of Rajasthan. The program component of the RUSDP will support policy reforms and consolidate institutional development and governance improvement in the urban sector in the state, while the investment component of the RUSDP will invest in water distribution network improvements and sewerage systems in the six project cities each having a population of more than 100,000, and identified considering the lack of basic services at present and willingness to undertake reforms and institutional restructuring.

2. Bulk Water System for Pali subproject is one of the subprojects proposed under the RUSDP. Water supply at present in Pali is intermittent, unreliable and suffers with huge losses and quality issues. ADB requires consideration of environmental issues in all aspects of the Bank's operations, and the requirements for Environmental Assessment are described in ADB's SPS (2009). This Initial Environmental Examination (IEE) addresses the infrastructure components proposed under Pali water supply improvement subproject.

3. **Categorization.** Bulk Water System for Pali subproject is classified as Environmental Category B as per the ADB's SPS 2009 as no significant impacts are envisaged. Accordingly, this Initial Environmental Examination (IEE) assesses the environmental impacts and provides mitigation and monitoring measures to ensure that there are no significant impacts as a result of the project.

4. **Project Scope.** This subproject is formulated to address gaps in water treatment and distribution infrastructure in a holistic and integrated manner. The main objective of the RUSDP is to improve water efficiency, security, and provide safe sewage collection, treatment and disposal system and will have an important effect on public health and environment. Proposed works under this subproject include mainly- (i) Pipe laying of various diameters (150mm -700mm) of total length of 18567m from Manpura Bhakhri TWPS to SRs (ii) Pipe laying of various diameters (150mm -500mm) of total length of 12692m for treated water transmission from TWPS at PHED Campus (iii) Pipe laying of 250mm of total length of 5950m for transmission system from Mandli TWPS to Mandiya SR (iv) Construction of 7 nos. of OHSRs of various capacities at various locations of town (v) construction of a new WTP of capacity 30 MLD at Manpura Bhakhri (v) Refurbishment of 3 nos. existing WTPs (vi) Refurbishment of 19 nos. of existing OHSRs.

5. **Implementation Arrangements.** The Local Self Government Department (LSGD) of Government of Rajasthan will be the Executing Agency (EA) and RUIDP will be the Implementing Agency (IA). The LSGD will be responsible for overall strategic planning, guidance and management of the RUSDP, and for ensuring compliance with tranche release conditions and loan covenants. A policy support unit will be established in the LSGD to support the government for implementation of the tranche release policy actions under the program loan. The RUIDP will be responsible for planning, implementation, monitoring and supervision, and coordination of all activities under the RUSDP. The RUIDP has recruited two consulting firms – (i) project management, design and supervision consultant (PMDSC), and (ii) community awareness and participation consultant (CAPC) to provide support in implementation of RUSDP. Six Project Implementation Units (PIUs), one each in six project towns, shall be set up directly to assist in implementation. PMU will support PIUs in implementation, management and monitoring of the project. PMU and PIUs will be assisted by PMDSC and CAPC. PIUs will appoint construction contractors to build infrastructure. Once the infrastructure is built and commissioned, the Urban Local Bodies will operate and maintain the infrastructure

through O&M contractors. Project Officer (Environment) at PMU and Assistant Safeguard Officer (ASO) at each of the PIUs will be responsible for environment management and monitoring activities, and will be supported by Environment Safeguard Specialist of PMDSC Team. Contractor personnel will include an Environment, Health and Safety (EHS) supervisor.

6. **Description of the Environment.** Subproject components are located in Pali Town in its immediate surroundings which were converted into urban use for many years ago, and there is no natural habitat left at these sites. The project sites are located in existing road right of way (RoW) and government-owned lands. There are no protected areas, wetlands, mangroves, or estuaries in or near the project locations. Soils are deep, and do not require cutting of rocks for pipe laying. A reserved forest is located within the municipal area in the northern part of the town. Most of this forest is under the possession of Central Arid Zone Research Institute, and is used for agricultural research purposes. Rest of the forest, which is under the Rajasthan Forest Department, is mostly covered with local shrubs and bushes and has very poor wildlife due to dry and harsh weather conditions. The entire forest area is protected by a compound wall. None of the subproject components are located in the forest area, and no proposed pipe lines will enter the forest area from the proposed facilities. Therefore there will be no potential influence to the forest area due to proposed construction works.

7. **Environmental Management.** An environmental management plan (EMP) is included as part of this IEE, which includes-

- mitigation measures for environmental impacts during implementation;
- an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting;
- public consultation and information disclosure; and
- a grievance redress mechanism.

8. A number of impacts and their significance have already been reduced by amending the designs. The construction phase EMP will be included in civil work bidding and contract documents.

9. Locations and siting of the proposed infrastructures were considered to further reduce impacts. These include-

- locating facilities on government-owned land to avoid the need for land acquisition and relocation of people; and
- Laying of pipes in RoW alongside main/access roads, to reduce acquisition of land and impacts on livelihoods specifically in densely populated areas of the town.

10. Potential impacts were identified in relation to location, design, construction and operation of the improved infrastructure. During the construction phase, impacts mainly arise from the need to dispose of moderate quantities of waste soil and disturbance of residents, businesses, and traffic. These are common temporary impacts of construction in urban areas, and there are well developed methods for their mitigation. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. Resettlement Plan prepared for the Pali Subproject addresses temporary resettlement/livelihood issues resulting mainly from laying of sewer/pipelines in busy commercial areas.

11. Measures such as appropriate scheduling of works (non-monsoon season, low traffic hours, etc.,) and minimizing inconvenience by best construction methods will be employed. Traffic management plan will be prepared for pipe laying on busy roads. In

the operational phase, all facilities and infrastructure will operate with routine maintenance, which should not affect the environment. Facilities will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only.

12. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. Mitigation will be assured by a program of environmental monitoring to be conducted during construction. The environmental monitoring program will ensure that all measures are implemented, and will determine whether the environment is protected as intended. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. Any requirements for corrective action will be reported to the ADB.

13. The stakeholders were involved in developing the IEE through discussions on-site and public consultation including a town level stakeholder consultation meeting, after which views expressed were incorporated into the IEE and in the planning and development of the project. The IEE will be made available at public locations in the city and will be disclosed to a wider audience via the ADB and RUIDP websites. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.

14. The citizens of the Pali town will be the major beneficiaries of this subproject. With the improved water supply, they will be provided with a constant supply of better quality water, delivered at their homes with adequate pressure. The project will improve the over-all health condition of the people of the town as they will get good quality water and also people would spend less on healthcare and lose fewer working days due to illness, so their economic status should also improve, as well as their overall health.

15. **Consultation, Disclosure and Grievance Redress.** Public consultations were done in the preparation of the project and IEE. Consultations will continue throughout the project implementation period with the assistance of the project consultants. A grievance redress mechanism is described within the IEE to ensure any public grievances are addressed quickly.

16. **Monitoring and Reporting.** The PMU and PMDS consultants will be responsible for monitoring. The PMDSC will submit quarterly/semi-annual monitoring reports to PMU, and the PMU will review and send the semi-annual monitoring reports to ADB. ADB will post the environmental monitoring reports on its website.

17. **Conclusions and Recommendations.** The proposed project is therefore unlikely to cause significant adverse impacts. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures.

I. INTRODUCTION

A. Background

1. Project **background and context**. The proposed Rajasthan Urban Sector Development Program (RUSDP) will complement the past and ongoing efforts of Government of Rajasthan (GoR) to improve water supply and wastewater services to the residents of the state of Rajasthan. The program component of the RUSDP will support policy reforms and consolidate institutional development and governance improvement in the urban sector in the state, while the investment component of the RUSDP will invest in water distribution network improvements and sewerage systems in the six project cities, each having a population of more than 100,000, and identified considering the lack of basic services at present and willingness to undertake reforms and institutional restructuring. The expected impact of the RUSDP will be sustainable urban development in Rajasthan. The expected outcome will be improved urban service delivery in Rajasthan.

2. The focus of the RUSDP investment will be on water supply and sewerage infrastructure. A series of subprojects will be implemented under the Project, with each subproject providing improvements to water supply or sewerage or both in a project town.

B. Background of IEE

3. Bulk Water Supply for Pali subproject is one of the subprojects proposed under the RUSDP. Water supply is currently intermittent, and suffers with huge losses and quality issues. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for environmental assessment are described in ADB's Safeguards Policy Statement (2009). Accordingly, this Initial Environmental Examination (IEE) has been conducted to assess the environmental impacts and provide mitigation and monitoring measures to ensure that there are no significant impacts as a result of the subproject.

C. Environmental Regulatory Compliance

4. **Table 1** presents a summary of environmental regulations and mandatory requirements, which were considered for Pali Town water supply phase-2 subproject.

Table 1: Applicable Environmental Regulations

Law	Description	Requirement
EIA Notification	The EIA Notification of 2006 set out the requirement for environmental assessment in India. Environmental Clearance is required for certain defined activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are categorized as A or B depending on the scale of the project and the nature of its impacts. Category A projects require Environmental Clearance from the Ministry of Environment and Forest (MoEF). Category B projects require Environmental Clearance from the State Environmental Impact Assessment Authority (SEIAA).impacts.	Project is not a listed activity in Schedule I of this notification and hence environmental clearance is not required.
Water (Prevention and Control of Pollution) Act of 1974, Rules of	Act was enacted to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, by Central and State Pollution Control Boards and for	Water treatment plant (WTP) requires CFE and CFO from RPCB. Construction of a new WTP (30 MLD) and refurbishment of 3 existing WTPs

Law	Description	Requirement
1975, and amendments	conferring on and assigning to CPCB/SPCBs powers and functions relating to water pollution control. Control of water pollution is achieved through administering conditions imposed in consent issued under provision of the Water (Prevention and Control of Pollution) Act of 1974. These conditions regulate the quantity and quantity of effluent, the location of discharge and the frequency of monitoring of effluents. Any component of the subproject having the potential to generate sewage or trade effluent will come under its purview. Such projects have to obtain Consent For Establish (CFE) under Section 25 of the Act from Rajasthan Pollution Control Board (RPCB) before starting implementation and Consent For Operate (CFO) before commissioning.	will require CFE before construction and CFO before operation All relevant forms, prescribed fees and procedures to obtain the CFE and CFO can be found in the RPCB website (www.rpcb.gov.in).
Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.	This Act was enacted to achieve prevention, control and abatement of air pollution activities by assigning regulatory powers to Central and State boards for all such functions. The Act also establishes ambient air quality standards The projects having potential to emit air pollutants into the atmosphere have to obtain CFE and CFO under Section 21 of the Act from RPCB The occupier of the project/facility has the responsibility to adopt necessary air pollution control measures for abating air pollution.	WTP does not require CFE and CFO under the Air Act. The following will require CFE and CFO from RPCB: (i) diesel generators; (ii) hot mix plants; (iii) batching plant (iii) stone crushers, if installed for construction. All relevant forms, prescribed fees and procedures to obtain the CFE and CFO can be found in the RPCB website (www.rpcb.gov.in).
Environment (Protection) Act, 1986 and CPCB Environmental Standards.	Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards	**Appendix 2** provides applicable standards for ambient air quality.
Noise Pollution (Regulation and Control) Rules, 2000 amended up to 2010.	Rule 3 of the Act specifies ambient air quality standards in respect of noise for different areas/zones.	**Appendix 3** provides applicable noise standards.
Ancient Monuments and Archaeological Sites and Remains Act, 1958 and Ancient Monuments and Archaeological Sites and Remains	The Act designates areas within 100 meters (m) of the “protected monument/area” as “prohibited area” and beyond that up to 200 m as “regulated area” respectively. No “construction” is permitted in the “prohibited area” and any construction activity in the “regulated area” requires prior permission of the Archaeological Survey of India (ASI).	There are no ASI protected monuments/sites in Pali. However, in case of chance finds, the contractors/PIU will be required to follow a protocol as defined in the Environmental Management Plan (EMP).

Law	Description	Requirement
(Amendment and Validation) Act, 2010		
Rajasthan State Environment Policy, 2010 and Rajasthan Environment Mission and Climate Change Agenda for Rajasthan (2010-14)	Follows the National Environment Policy, 2006 and core objectives and policies are: - Conserve and enhance environmental resources; assure environmental sustainability of key economic sectors; and, improve environmental governance and capacity building - it recommends specific strategies and actions to address the key environmental issues: water resources, desertification and land degradation, forest and biodiversity, air quality, climate change: adoption and mitigation, mining, industry, tourism, energy, urban development, etc. - Establishment of Environment Mission under the chairpersonship of the Chief Minister and a Steering Committee under the chairpersonship of Chief Secretary, Government of Rajasthan Tasks force set up for six key areas	- Project implementation should adhere to the policy aims of: conservation & enhancement of environmental resources, integration of environmental concerns into projects/plans, and capacity building in environmental management - under water sector, major concerns, as the policy notes, are: huge water losses & wastage, declining water availability, pollution - Relevant recommendations for the project include: control of losses, integrated water resources management, control of raw water pollution, reuse and recycling -avoid/minimize use of forest lands With reference to Climate change adoption & mitigation following should be considered in the project: - diminishing flows in surface water bodies, and groundwater depletion, and revival traditional water bodies as water sources (lakes/tanks) - equal stress on demand side management in water -minimize energy use - design energy efficiency systems-
The Rajasthan Monuments, Archaeological Sites and Antiquities Act, 1961; the Rajasthan Monuments, Archaeological Sites and Antiquities (amendment) Act 2007	Any construction/excavation work in the 'protected area' (as declared by GoR under the Act) requires prior permission of Department of Archeology& Museums -Application under the Rules shall be submitted to Director, State Archeological Department, at least 3 months prior to the work. Department provides conditional permission, including time for completion, procedures to be followed during the work and for chance finds etc.	There are no any State or Central government protected monuments in Pali, which are coming under influence of the proposed subproject. However, in case of chance finds, the contractor/PIU will be required to follow a protocol as defined in the Environmental Management Plan (EMP).
The Right to fair compensation and transparency in land acquisition, rehabilitation and resettlement act, 2013	Private land acquisition is guided by the provisions and procedures of this Act.	Not applicable to this subproject as there is no private land acquisition or resettlement
Labor Laws	The contractor shall not make employment decisions based upon personal characteristics unrelated to job requirements. The contractor shall base the	**Appendix 8** provides applicable labor laws including amendments issued from time to time applicable to establishments engaged in

Law	Description	Requirement
	employment relationship upon equal opportunity and fair treatment, and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment or retirement, and discipline. The contractor shall provide equal wages and benefits to men and women for work of equal value or type.	construction of civil works.
Biodiversity Act of 2002	The Biodiversity Act 2002 primarily addresses access to genetic resources and associated knowledge by foreign individuals, institutions or companies, to ensure equitable sharing of benefits arising out of the use of these resources and knowledge to the country and the people.	Not applicable to Pali water supply subproject
Ramsar Convention, 1971	The Ramsar Convention is an intergovernmental treaty that provides the framework for national action and international co-operation for the conservation and wise use of wetlands and their resources. India is one of the signatories to the treaty. The Ramsar convention made it mandatory for the signatory countries to include wetland conservation in their national land use plans.	There are no Ramsar sites in Pali. Not applicable to Pali water supply subproject
Wildlife Protection Act, 1972	This overarching Act provides protection to wild animals, birds, plants and matters connected with habitat protection, processes to declare protected areas, regulation of wildlife trade, constitution of state and national board for wildlife, zoo authority, tiger conservation authority, penalty clauses and other important regulations.	Not applicable to Pali water supply subproject
Forest (Conservation) Act, 1980	The Forest (Conservation) Act prohibits the use of forest land for non-forest purposes without the approval of Ministry of Environment and Forests (MoEF), Government of India	Not applicable to Pali water supply subproject unless water pipe lines do not traverse through forest land
Rajasthan Forest Act, 1953 and Rajasthan Forest Rules, 1962	This Act makes the basis for declaration of Reserved Forests, constitution of village forest committees, management of reserved forests and penalties and procedures.	Not applicable to Pali water supply subproject unless water pipe lines do not traverse through forest land
The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act,	- Applicable to any building or other construction work and employ 10 or more workers - Cess should be paid at rate not exceeding 2% of the cost of construction as may be notified - The employer is required to provide safety	Contractor have to fully comply all the provisions of this Act specially workers' registration, payment of cess, safety, health, welfare, wages and compensation etc.

Law	Description	Requirement
(BOCW Act) 1996 and the Cess Act of 1996	measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for workers near the workplace etc. -The employer has to obtain a registration certificate from the Registering Officer	
Gas Cylinder Rules 2004	These rules deal with Filling, possession, import and transport of cylinders, Safety relief devices, Marking on cylinders, Markings on valve, Identification colours, Labelling of cylinders, Restriction on delivery or despatch of cylinders, repairing of cylinders, Prohibition of employment of children and intoxicated persons, Prohibition of smoking, fires, lights and dangerous substances, General precautions, Special precautions against accidents, Competent person to be incharge of operations, Handling and use, Restrictions on filling, Loading, unloading and transport of cylinders, Storage of cylinders, ownership and record keeping etc.	All the safety in storage, transportation, handling, usage, maintenance, repairing of gas cylinders and other precautions should be taken and record should be kept maintained.
Solid Waste Management Rules, 2015 (Draft stage)	Every waste generator shall prima-facie be responsible for collection, segregation of concrete, soil and others and storage of construction and demolition waste generated, as directed/notified by the concerned local body in consonance with these rules.	Prior to the construction or demolition work as per these rules, the generator shall obtain permission from local body and shall submit the waste management plan of Construction & Demolition waste and follow during implementation

5. The ADB guidelines stipulate addressing environmental concerns, if any, of a proposed activity in the initial stages of project preparation. For this, the ADB SPS categorizes the proposed projects into various categories (A, B or C) to determine the level of environmental assessment required to address the potential impacts. Level of environmental assessment required for each category is presented below.

I. Category A: Projects with potential for significant adverse environmental impacts. An Environmental Impact Assessment (EIA) is required to address significant impacts.

II. Category B: Projects likely to have some adverse environmental impacts, but of lesser degree and/or significance than those for Category A. An initial environmental examination (IEE) is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

III. Category C: Projects unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are still reviewed.

6. The environmental impacts of Pali water supply subproject have been identified and assessed during the planning and design process. An environmental assessment using ADB's Rapid Environmental Assessment Checklist for Water Supply and Sewerage (**Appendix 1**) was conducted, and results of the assessment show that the subproject is unlikely to cause significant adverse impacts. Thus, this IEE has been prepared in accordance with ADB SPS's requirements for environment category B projects.

D. Scope of IEE

7. This draft IEE is based mainly on secondary sources of information and field reconnaissance surveys; no field monitoring (environmental) survey was conducted. Stakeholder consultation was done as an integral part of the IEE.

E. Report Structure

8. This Report contains the following nine (9) sections:

- Executive summary;
- Introduction and regulatory framework
- Description of the project
- Description of the environment;
- Anticipated environmental impacts and mitigation measures;
- Public consultation and information disclosure;
- Grievance redress mechanism;
- Environmental management plan, and,
- Conclusion and recommendation.

II. DESCRIPTION OF THE PROJECT

9. Pali Town is the headquarters of Pali District, and is situated in the south central part of Rajasthan State. It is located at about 300 km southwest of State Capital, Jaipur. Pali is one of the six project towns selected for implementation of the ADB funded Rajasthan Urban Sector Development Program (RUSDP).

A. Present Situation

10. **Water Supply**. Jawai Dam, about 90 km from Pali, is the main source of water supply to Pali Town. Water from dam is supplied, by gravity, through Jawai-Pali Pipeline serving several villages and towns in Pali District. Originally water from the dam was supplied by an open channel, which was replaced with this pipeline. For Pali Town, 81.70 MLD of water is allocated. Water is provided through an off-take near the town, and conveyed by gravity raw water pipelines to the existing water treatment plants (WTPs) at Mandli, Nayagaon, Gandhinagar and PHED campus. Treated water is collected in clear water reservoirs (CWRs) at WTPs and pumped to zonal elevated service reservoirs (ELSRs) for distribution by gravity. Prior to implementation of Jawai-Pali Pipeline Project, Pali faced extreme water shortages, and water was supplied by train wagons from Jodhpur, about 40 km from Pali. Hemawas Dam, which is near the town, also provides water supply to Pali. At present, about 32.35 MLD of water is drawn from Jawai-Pali Pipeline and 2 MLD from Hemawas Dam. Water is conveyed to WTP at Mandli. Surplus water from these sources is stored in Lakhotia Tank in town, and pumped to Mandli WTP when required.

11. Water supply system in Pali consists of (i) 12 WTPs with a total capacity of 52.88 MLD; 24 service reservoirs of total capacity 18.36 ML (consisting of 22 elevated and 2 ground level reservoirs); (iii) 173 km of raw and clear water transmission mains; and (iv)

553 km of distribution network. At present, 74% of the total town area is covered with the piped water supply system. About 72% of the households are serviced through individual water service connections. Water supply is intermittent 1.5 – 2 hours of supply on alternative days. Water is also supplied through public stand-posts (mainly in urban poor areas), and mobile tankers (areas facing low water supply). House service connections are metered; however, presently most of the meters are non-functional. The newly developing outer areas of the town do not have water supply system.

12. While gross water supply rate is over 140 litres per capita per day (LPCD), the water provided at consumer end is 75 LPCD, which is less than standard of 135 LPCD. This is due to heavy losses in the existing distribution network – a rough estimate during the project preparation indicates water losses (physical leakage) in the range of 20-26%, while total non- revenue water is 37%. The water transmission and distribution network is old, profusely leaking and is badly in need of rehabilitation and replacement.

13. **Sewerage.** Pali town has partial underground sewerage system. Under the centrally sponsored Urban Infrastructure Development in Small and Medium Towns (UIDSMT) scheme, a sewerage system with partial coverage is currently under implementation. This includes laying of around 98 Km sewer network, which is under progress in core area of the city out of which around 40 Km sewer network and construction of 7.5MLD STP is already completed. Laying of sewer in remaining approx. 57 Km length (in Zone 4) is in progress. This system is partially started operational as STP is started in operation taking the raw sewage from open drains but the sewerage network is not started yet.

14. But the ongoing sewerage system is inadequate to take care of sewage flow from various areas within the city. The municipal drains are mostly open causing problems in rainy season. Presently sewage from the city flows into the Bandi River through 3 major and several small drains, while the industrial effluent[1] is being treated separately in five Common Effluent Treatment Plants (CETPs) located at Mandia road and Punayata road, on bank of river Bandi

15. Most of the households in the town have individual toilets. Open defecation is also prevalent. Due to lack of sewerage system, people depend on septic tanks for disposal of sewage. Since there is no soak pit arrangement, effluents from septic tanks is directly let into open drains. Due to poor maintenance, septic tanks do not function properly and often overflow into drains, which ultimately joins River Bandi, creating unsanitary conditions and water/land pollution.

B. Infrastructure Improvements Proposed in Bulk Water Supply for Pali under RUSDP

16. In the earlier subproject, package no. RUSDP/Pali/01 some of the components were taken for water supply improvement in the town. But the components in the scheme were not sufficient to cover the water demand of entire town. In this report, the water supply scheme components to be developed under package RUSDP/Pali/02 have been identified and sized in order to bring completeness to the scheme. This part of planning, designing and execution of the water treatment-transmission-storage-bulk supply is called Bulk Water Supply for Pali (Pali Water Supply Scheme Phase-II) and is described herein under.

[1] Pali is an industrial town with a several industrial units with problematic wastewater discharges in the municipal area. No industrial wastewater is allowed to dispose into municipal sewers, and as a precautionary measure even domestic wastewater from industrial premises will not be allowed into sewers. There are 5 common effluent treatment plants (CEPT) in Pali that are catering to industrial effluent

17. Under water supply phase-2 of the Pali Subproject, works proposed are mainly- (i) New Raw Water Transmission Pipeline of Length 3752m, Diameter 700mm Material DI K-9 (ii) Pipe laying of various diameters (150mm -700mm) of total length of 18567m from Manpura Bhakhri TWPS to SRs (iii) Pipe laying of various diameters (150mm -500mm) of total length of 12692m for treated water transmission from TWPS at PHED Campus (iv) Pipe laying of 250mm of total length of 5950m for transmission system from Mandli TWPS to Mandiya SR (v) Construction of 7 nos. of OHSRs of various capacities at various locations of town (vi) construction of a new WTP of capacity 30 MLD at Manpura Bhakhri (v) Refurbishment of 3 nos. existing WTPs (vii) Refurbishment of 19 nos. of existing OHSRs. The sub project components are described in **Table-2** below-

Table 2: Proposed Components of Bulk Water Supply for Pali sub project

<table>
<tr><th>S.N.</th><th>Project component</th><th>Description</th><th>location</th></tr>
<tr><td>1.</td><td>Construction of new WTP</td><td>Construction of WTP of 30 MLD capacity (for year 2031) and clear water pumping station, (Detail design and layout of 41 MLD for year 2046)</td><td>Manpura Bhakhri, Pali</td></tr>
<tr><td rowspan="3">2.</td><td rowspan="3">Construction of OHSRs</td><td>Construction of 7 nos. OHSRs as following-</td><td></td></tr>
<tr><td>3 nos. OHSRs of 1000 m^3 capacity</td><td>Labour Colony, Raiko Ki Dhani, Mandiya Village</td></tr>
<tr><td>4 nos. OHSRs of 500 m^3 capacity</td><td>Housing Board, Industrial area, Shantinath (Mandiya road OHSR location) and Jodhpur Road</td></tr>
<tr><td>3.</td><td>Pipe laying</td><td>New Raw Water Transmission Pipeline of Length 3752m, Diameter 700mm, Material- DI K-9
Pipe laying of various dia for transmission of treated water to different location as follows-
<table>
<tr><th>Pipeline Diameter (mm)</th><th>Length(m)</th></tr>
<tr><td>150</td><td>490</td></tr>
<tr><td>200</td><td>3996</td></tr>
<tr><td>250</td><td>13483</td></tr>
<tr><td>300</td><td>611</td></tr>
<tr><td>350</td><td>5603</td></tr>
<tr><td>400</td><td>2646</td></tr>
<tr><td>450</td><td>1444</td></tr>
<tr><td>500</td><td>1920</td></tr>
<tr><td>700</td><td>7964</td></tr>
<tr><td>Total</td><td>38157</td></tr>
</table></td><td>Through existing ROW in Various location in town</td></tr>
<tr><td>4.</td><td>Refurbishments of existing WTPs</td><td>Refurbishment of 3 WTPs as following-
City Campus-IV (19.40 MLD)
Mandli Head Works (7.35MLD)
Mandli Head Works (3.7MLD)</td><td>Existing PHED headwroks at City Campus and Mandli</td></tr>
</table>

S.N.	Project component	Description	location
5.	Refurbishments of existing OHSRs	Out of existing 22 OHSRs in Pali, total 3 are recommended to abandoned and 19 are recommended for refurbishment	Various locations in the Pali city
6.	Raw Water Pump Station	Construction of 2Nos. Working + 1No. Standby, New Raw Water Pump Station (Electro-Mechanical Works and minor Civil Works) at Mandli	Mandli Head Works
7.	Clear Water Pump Stations	Construction of New Clear Water Pump Station with 2Working + 1Standby, Clear Water Pumps Construction of New Clear Water Pump Station at Mandli WTP Head Works	PHED campus Mandli WTP Head works
8.	Electrical and Instrumentation works	Bulk meters, pressure sensors, Level sensors for ESRs and CWR, Water Quality Monitoring sensors at WTPs, communication RTUs through GPRS, SCADA and complete system for automation.	At various Head Works
9.	GIS works	Integration of proposed system of GIS of Phase II compatible with Pali Phase I including Preparation of GIS base map and GIS development of water supply infrastructure containing all water supply components under Pali Phase 2	All sites in Pali

18. This subproject complies with the environmental subproject selection criteria agreed between the government and the ADB (Compliance checklist is at **Appendix 7**). Above **Table 2** shows the nature and size of the various components of the subproject. Conceptual layout plans are shown in **Figure 1 to Figure 6**.

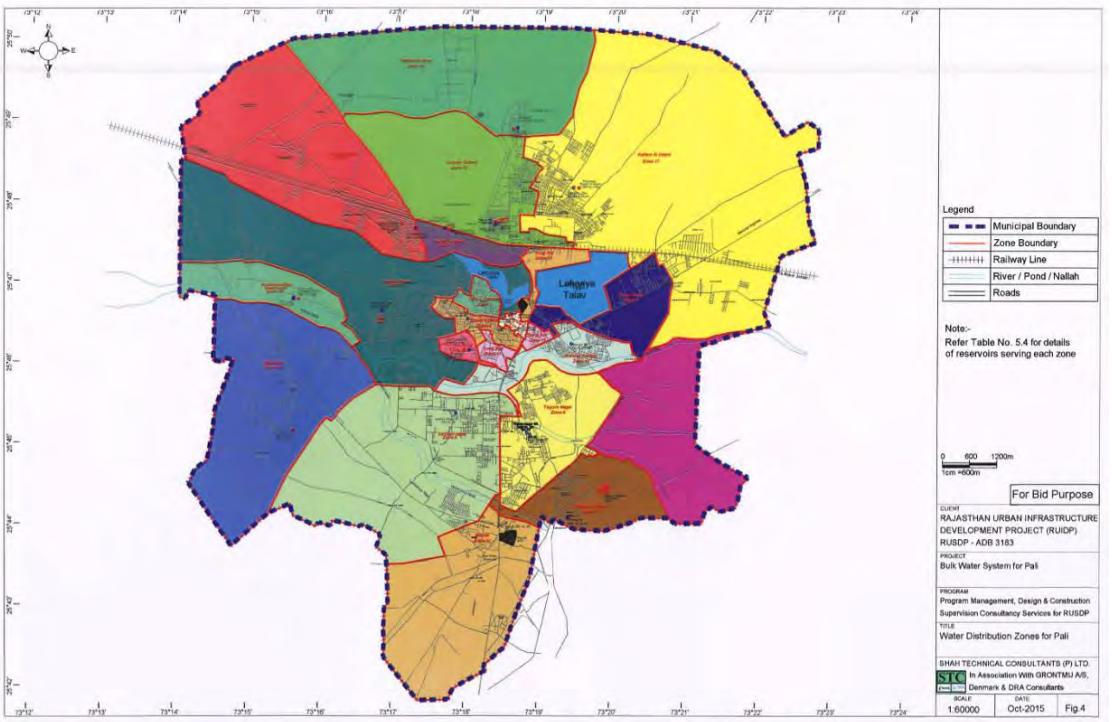


Figure 1: Water Distribution Zones of Pali

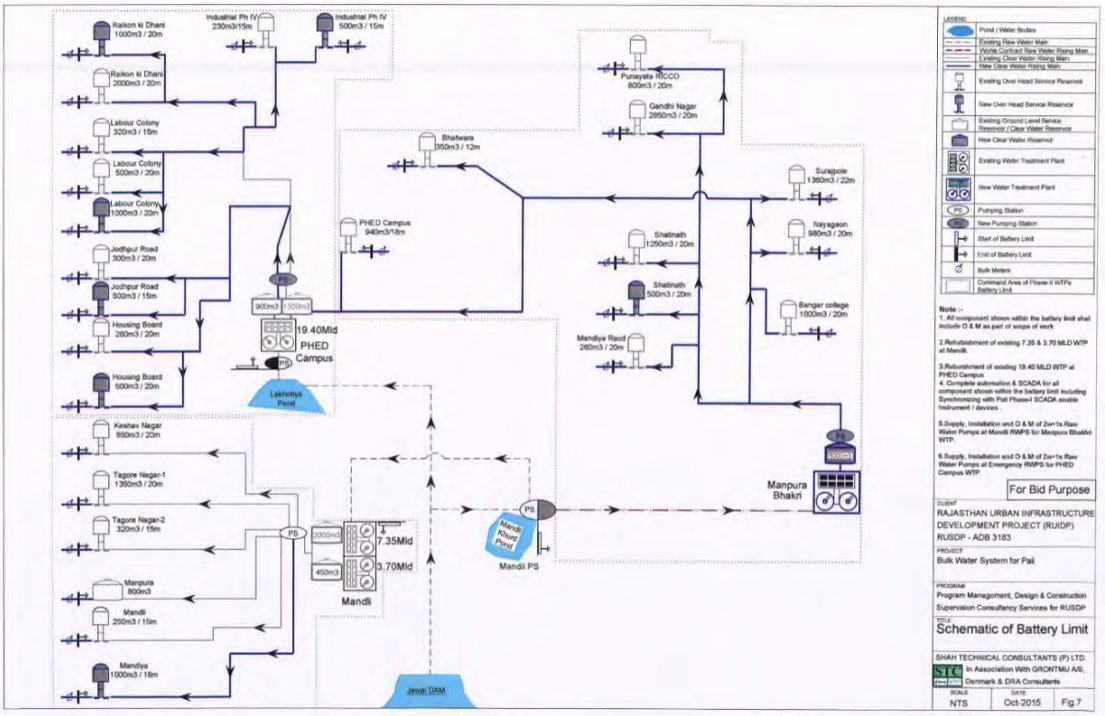


Figure 2: Schematic of Battery limit of proposed works

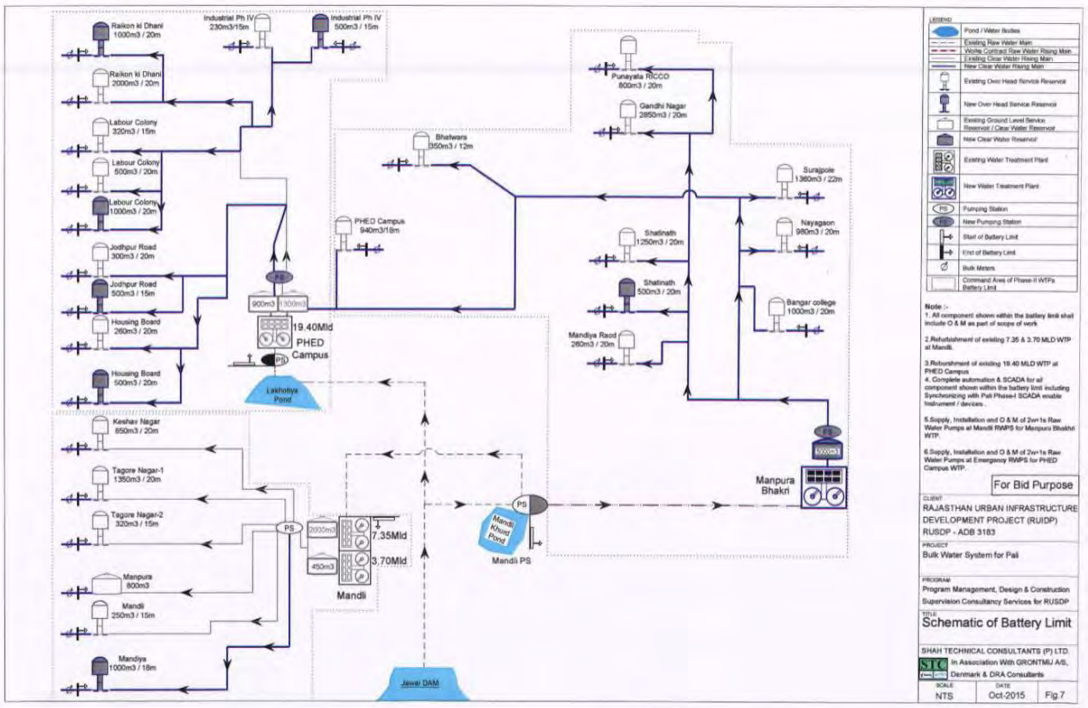


Figure 3: Proposed Schematic of Bulk Water System of Pali

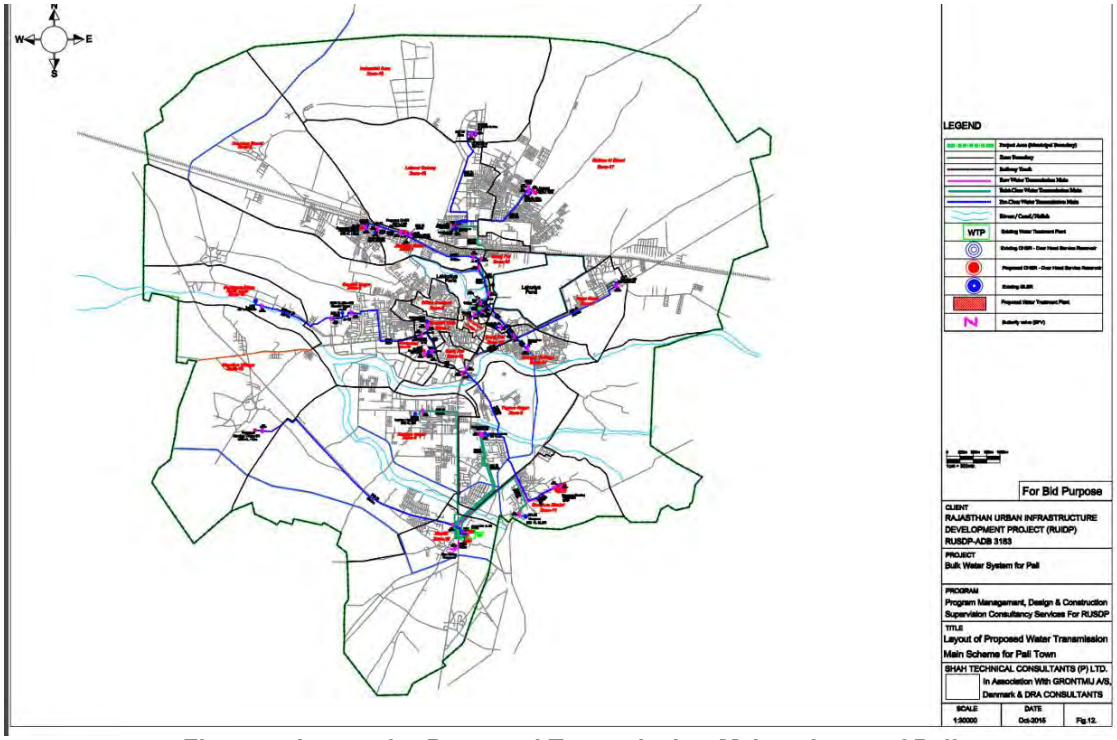


Figure 4: Layout for Proposed Transmission Main scheme of Pali

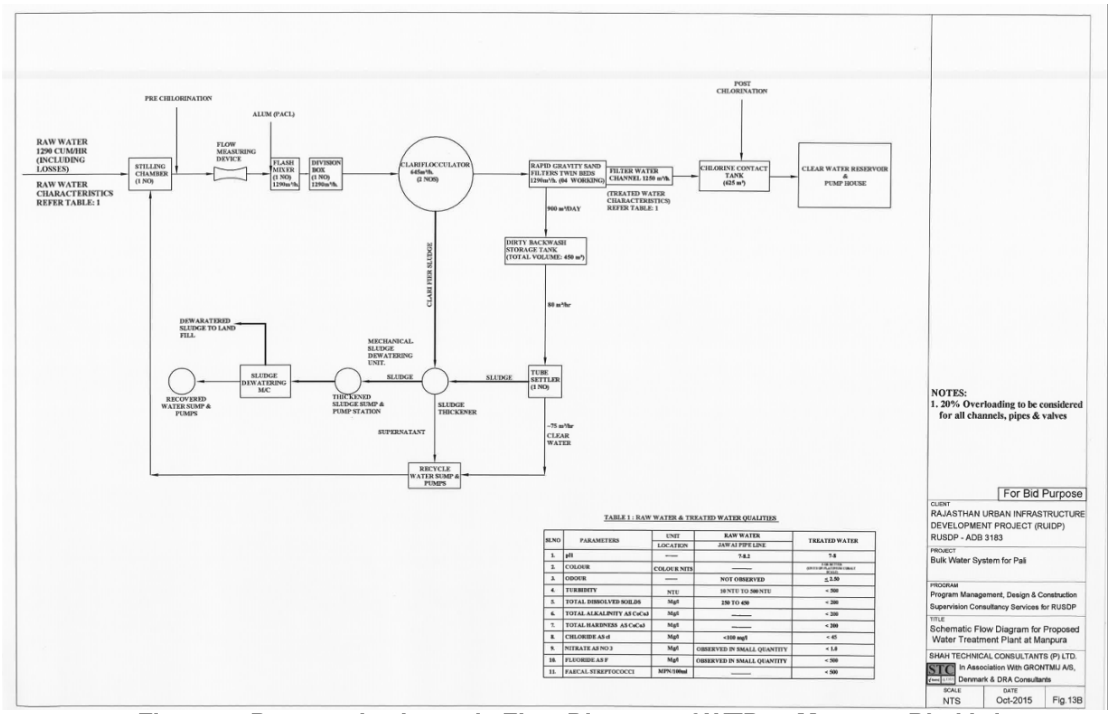


TABLE 1 : RAW WATER & TREATED WATER QUALITIES

SI.NO	PARAMETERS	UNIT LOCATION	RAW WATER JAWAI PIPE LINE	TREATED WATER
1.	pH	----	7-8.2	7-8
2.	COLOUR	COLOUR NTS	----	≤ 5.00
3.	ODOUR	----	NOT OBSERVED	≤ 5.00
4.	TURBIDITY	NTU	30 NTU TO 500 NTU	< 500
5.	TOTAL DISSOLVED SOILDS	Mg/l	250 TO 450	< 200
6.	TOTAL ALKALINITY AS CaCo3	Mg/l	------	< 200
7.	TOTAL HARDNESS AS CaCo3	Mg/l	------	< 200
8.	CHLORIDE AS cl	Mg/l	<100 mg/l	< 45
9.	NITRATE AS NO3	Mg/l	OBSERVED IN SMALL QUANTITY	< 1.0
10.	FLUORIDE AS F	Mg/l	OBSERVED IN SMALL QUANTITY	< 500
11.	FAECAL STREPTOCOCCI	MPN/100ml	------	< 500

Figure 5: Proposed schematic Flow Diagram of WTP at Manpura Bhakhri

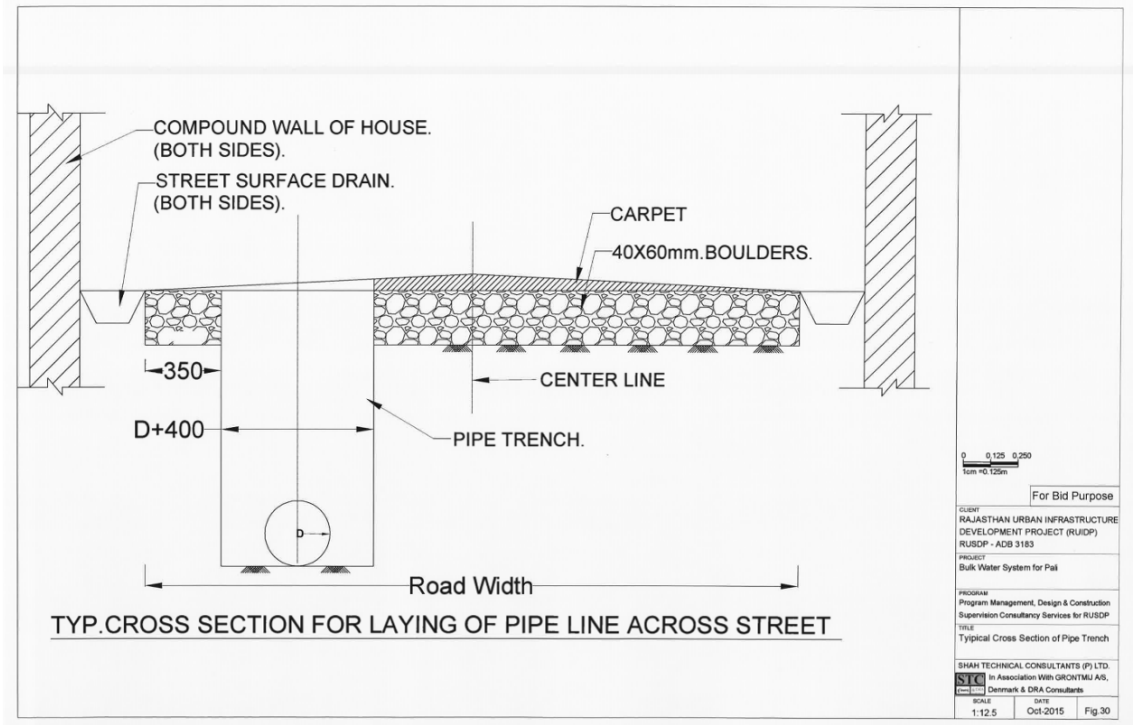


Figure 6: Typical Cross Section of Pipe Trench

19. Excavation for the pipe laying works will be undertaken through open trenching, which will be maximum width of 1 m only on one side of the road ROW with maximum length, an average100-150 m per day. Excavation, laying of pipes and backfilling will be completed within the day in that reach. Subsequent to completion of works, road reinstatement will be undertaken by the contractor as part of the civil works. The same shall be mentioned in the bid document to make it binding on the contractor.

20. The subproject is primarily designed to improve health and living conditions of people of Pali through provision of improved water supply. The benefits arising from this subproject include:

21. increased availability of potable water at appropriate pressure to all households including urban poor;

- reduced time and costs in accessing alternative sources of water.
- better public health particularly reduction in waterborne and infectious diseases;
- reduced risk of contamination of treated water supplies; and,

C. Energy Efficiency Measures included in the subproject

22. Water supply network in Pali are designed with utmost consideration to energy efficiency. In existing water supply system, water losses (UFW) are very high, reducing the losses and improving the efficiency of the system is identified as the most important component under RUSDP. This is considered as an alternative for source development/augmentation. It is proposed to use high efficiency pumps and motors within the WTP and Pumping stations to reduce the energy loads. Also energy efficient lightings and fixtures are proposed to reduce energy consumptions.

23. To make the project energy efficient, "Guidelines for Adopting Eco- Friendly and Energy Efficient Equipment and Facilities in the Design of the Sub-Projects" prepared by PPTA, is being followed in the design of the projects. According to Manual for the Development of Municipal Energy Efficiency Projects, 2008, energy savings, at minimum, of 25% to 40% is possible with appropriate measures. The following measures are being considered and incorporated into the subproject designs:

- Installation of Energy Efficient Motors
- Efficient Pumping system operation
- Installation of energy efficient lightings, fixtures and equipments
- Installation of Variable Frequency Drives (VFDs)

D. Investment Program Implementation Schedule

24. The detailed design of this subproject is completed by September 2015. After the approval, bids were prepared and tenders invited in October 2015. Financial bids are now under evaluation and contract is expected to be awarded in May 2016. Contract period is 3 years for construction of the proposed works.

III. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

1. Location, Area & Connectivity

25. Pali Town, popularly known as "Pali Marwar" and also as Industrial City, is situated in the southwestern part of Rajasthan State at $25^0$47' latitude and $73^0$20' longitude. Town is developed on the right bank of Bandi River, with an average altitude of 212 m above the mean sea level. Pali is the administrative headquarters of Pali District and is at about 70 km south of Jodhpur City and 300 km southwest of the state capital, Jaipur, extending to an area of 159 sq.km under the jurisdiction of Pali Nagar Parishad (Municipal Council), the population of the town is 230,075 (2011 Census). The town is divided into 45 municipal wards.

26. Pali is well connected by road network with major cities, neighboring towns and its hinterland. Two important highways - National Highway 14 (NH 14, connecting Beawar in Rajasthan with Radhanpur in Gujarat), and NH 65 (connecting Ambala in Rajasthan with Pali, and NH 14) passes through the town. NH 14 in turn connects to NH 8 (connecting national capital Delhi with financial capital Mumbai) near Beawar, about 112 km from Pali. A state highway connects Jodhpur, and the state capital Jaipur is connected via NH 14 and NH

27. Pali also has railway network and a station; however connectivity is limited Nearest railhead is at Marwar Junction, about 35 km from the town, which connects to Jaipur, Delhi, Ahmedabad, Mumbai, etc. Nearest airport is at Jodhpur.

2. Topography, Soils and Geology

28. Topography of Pali urban area is mostly plain with some isolated hilly areas in southern parts. The town is situated on mound with comparatively higher elevation between River Bandi in south and shallow depression in the north and east. General slope is towards east/southeast, and most of the town drains into River Bundi. Lohria Talav (LakhotiaTank) is located in the middle of the town; some of the areas drain into this tank.

29. Pali District geology is characterized by different sedimentary metamorphic and igneous rocks. Pali Town and surrounding region is mainly composed of Post-Delhi intrusive (Jalore granite, Malani rhyolite) and metamorphic rocks of Udaipur Group of Aravali Super group, followed by thin alluvial cover of sub-Recent to Recent period of Quaternary Era. The thickness of alluvium cover increases from east to west. In Pali town, the top soil of upto a depth of about 4 m is characterized by loose sand, followed by hard soil mixed with boulders from 4 to 10 m below the ground.

3. Seismology

30. As per the seismic zoning map of India, Pali falls under the Zone II, which is the lowest earthquake risk zone in India. This zone is termed as “low damage risk zone”.

4. Climatic Conditions

31. Pali is located in the transitional zone of arid climatic zone of western desert region and the semi-arid climate of rest of the state. Aravali mountain region, which extends into Pali District, is one of the main reasons for a comparative mild climate than the desert region. The climate of Pali is dry and hot through most part of the year. The summers (March/April to June/July)are hot with average daily maximum temperature of 39.5oC and average daily minimum temperature of 27oC; maximum temperatures can reach up to 47-48oC. Monsoon season is from July to September, during which it experiences rains, and temperature comes down and humidity increases. Pali receives low and unreliable rainfall during the monsoon, with an average of 412 mm per year. On an average, there are 26 rainy days in a year.

32. Winters are cold with average maximum temperature of 25oC and minimum of 10oC. The lowest temperature is in the range of 2- 3oC. Humidity varies with the temperature and rainfall. In summers, the humidity is around 30 to 40%, in rainy season it is 70 to 80% and in winter it is 50 to 60%.

5. Surface Water

33. Pali is situated in Luni River basin. Luni River is one of the important west flowing rivers in India. The town is developed on the bank of River Bandi, a tributary of Luni River. Luni and other tributaries Jawai, Mithadi, Sukadi and Guhibala flow through Pali District. Bandi River is formed by two rivers – Khari and Mithari. River Khari is formed by the confluence of small streams, Somesar and Khari Kherwa. River Somesar originates in the western slopes of the Aravali range near village Somesar in Pali District. A stream Umrawas Ka Nalla, originating in the western slopes of the Aravali, near village Kanklawas, joins Sumer Nadi. Kotki Nadi, originating from Dewair Reserved Forest Bhakar also joins Sumer Nadi after flowing for about 30 km. After joining of all these small streams, the river is called Khari. Mithari originates in the south-western slopes of the Aravali range in Pali District by confluence of local streams. Khari and Mithari rivers join near Bombadra pickup weir and form Bandi River. It joins Luni near village Lakhar, in Pali District, after flowing for about 45 km. Bandi River catchment is entirely situated in Pali District.

34. River is seasonal, and due to scanty rainfall in the region, flow in the river is limited only to short duration during monsoon, that too if it is good monsoon, water flow in the river throughout the year. Except during the monsoon in good rainfall years, it carries consists of industrial effluents discharged from the Common Effluent Treatment Plants (CETP), and wastewater from residential and other areas. Discharge of untreated / partially treated wastewater from textile units in the town in the last 2-3 decades has led to severe water and land pollution in the area. In 1998, Pali and surrounded area has been identified as one of the critically polluted areas in the country by Central Pollution Control Board (CPCB). Subsequent, various measures were initiated including banning new high pollution potential industries; plan to move the industries outside the town by developing an industrial area, improving treatment facilities, and enhancing the monitoring and enforcement of pollution control. Despite these efforts, pollution situation in Pali remain still a big concern. Indiscriminate disposal of industrial and municipal solid waste along the river bed is prevalent, which is further adding to the pollution load of the river.

35. First common effluent treatment plant (CETP) started operation in Pali in 1982, and additional CEPTs were added in 1997, 1998, 2010 and 2014. At present there are total 6 CETPs, 4 in operation (total capacity 34.68 MLD), and 2 under construction (28 MLD). CETPs are constructed and operated by Pali Pollution Control Research Foundation Trust, a cooperative trust established by the industries.

36. Water quality of River Bandi is shown in the following Table. Due to lack of natural flow, the dilution in the river is negligible, and the water quality represents the effluent disposed into the river. In comparison with the Class E water use quality (irrigation, industrial cooling or controlled waste disposal), Bandi water quality parameters show significantly higher values indicating highly polluted nature of water. Baseline study for Bandi River water quality was conducted under RUSDP in January 2016 and results are shown in **Table 3** below-

Table 3: Bandi River Water Quality (2009 & 2016)

Parameter	Bandi River Water/Effluent Quality* (2009)	Bandi River water quality (near STP)** Dtd. 12.01.2016	Tolerance Limits for Inland Surface Water (Class E)
Colour (Hazen unit)	-	22	Not specified
Odour	-	Present	Not specified
Taste	-	Not agreeable	Not specified
Electrical conductivity (µs/cm)	5625	-	2250

Parameter	Bandi River Water/Effluent Quality* (2009)	Bandi River water quality (near STP)** Dtd. 12.01.2016	Tolerance Limits for Inland Surface Water (Class E)
Turbidity (NTU)	-	42.1	
Total dissolved solids (mg/l)	3320	3516	2100
Total suspended solids (mg/l)	-	354	Not specified
Total Hardness as $CaCO_3$(mg/l)	-	220	Not specified
pH	8.8	7.97	6-5 – 8.5
Sodium (mg/l)	750	-	Not specified
Potassium (mg/l)	7	-	Not specified
Calcium (mg/l)	210	48	Not specified
Magnesium (mg/l)	157	24	Not specified
Chlorides (mg/l)	910	1070	600
Sulphates (mg/l)	265	404	1000
Carbonates (mg/l)	22	-	Not specified
Hydro carbonates (mg/l)	1305	1250	Not specified
Fluoride	2.33	-	Not specified
Iron as Fe (mg/l)	-	1.51	
Dissolved Oxygen as O_2 (mg/l)	-	2.9	Not specified
Manganese as Mn (mg/l)	-	BDL	Not specified
Copper as Cu (mg/)	-	BDL	Not specified
Residual Free Chlorine (mg/l)	-	BDL	Not specified

Source: *Impact of industrial effluents on groundwater around Pali City, Rajasthan using field and satellite data, Journal Geological Survey of India, Vol 82, Dec 2013.
**Water quality analysis in 2016 under RUSDP project
BDL: Below Detectible Limit

37. Lohriya Talav (Lakhotia Tank) is situated in the central part of the town, and is presently used as a raw water storage tank. Surplus water from Jawai-Pali pipeline and Hemawas is diverted to this tank, and water is supplied as and when required.

6. Groundwater

38. In and around Pali, groundwater mainly occurs in the alluvium and voids and fissures of hard rocks (granites, phyllites and schists). Granite water bearing formation covers major portion of the Pali urban area, in which there are weathered and fractured zones (joints and fractures) through which the ground water moves. Groundwater circulation is mainly controlled by the extent, degree of weathering, number of fractures and their intensity per unit area. Thickness of weathered and fractured zone varies considerably. Depth of water varies from 1.80 m to 24.0 m with an average depth of 9.40 m. Another water bearing formation consists of Slate, Phyllite and Schist. This formation is mostly dark brown to gray in colour and is composed of purple slates, thin bands of quartzites and some subordinate phyllites and schists. Depth of water ranges from 3.04m to 24.25m.

39. Groundwater quality within the sub-basin is generally poor to very poor. The only fresh water pockets available earlier were along Bandi River course, which has now become fully polluted by industrial wastewater. Groundwater quality at various locations in Pali was tested under RUSDP project and is presented in the following **Table 4**. Water shows very high values of electrical conductivity, indicating saline nature of groundwater. No data on parameters to indicate the industrial pollution is unavailable. Water shows high values of TDS, calcium, magnesium and fluoride. Heavy metals are present in the water, but within the desirable limits.

Table 4: Groundwater Quality in Pali (2016)

Parameter	Gandhi Nagar near STP	Navlakha road, near Surajpole	Drinking Water Standards@ IS:10500
Colour (Hazen)	Nil	Nil	unobjectionable
Odour	No odour	No odour	unobjectionable
Taste	Not Agreeable	Not agreeable	agreeable
Turbidity (NTU)	BDL	0.7	5
Electrical conductivity (µs/cm)			750# – 2000*
Total dissolved solids (mg/l)	2881	1135	500-2000
Total Suspended Solids (mg/l)	2	5	Not specified
Total Hardness as $CaCO_3$ (mg/l)	220	350	300
Total alkanity as $CaCO_3$ (mg/l)	720	380	200
pH	7.98	7.69	6.5 - 8.5
Sodium (mg/l)			-
Potassium (mg/l)			-
Calcium as Ca (mg/l)	48	104	75 – 200
Magnesium as Mg (mg/l)	24	22	30 - 100
Chlorides (mg/l)	759	187	250 – 1000
Sulphates as SO_4(mg/l)	563	176	200 – 400
Dissolved Oxygen as O_2(mg/l)	6.8	7.1	Not specified
Copper as Cu (mg/l)	BDL	BDL	0.05– 1.5
Iron as Fe (mg/l)	0.12	0.21	0.3 – 1.0
Mangenese as Mn (mg/l)	BDL	BDL	0.01
Residual free chlorine (mg/l)	BDL	BDL	0.20 – 1.5

Source: Impact of industrial effluents on groundwater around Pali City, Rajasthan using field and satellite data, Journal Geological Survey of India, Vol 82, Dec 2013

@ standards prescribe lower and higher values for parameters, except pH; lower value is the 'desirable limit' while higher value is the 'permissible limit in the absence of alternate source'; there is only lower value for parameters which have no relaxation.

BDL: Below Detectible Limit

7. Air Quality

40. Pali is an industrial town with several units with problematic air emissions. Town has mainly textile industries engaged in processing, dying and printing activities. Besides water pollution, textile units emit air pollutants predominantly from boilers and ovens, and usually generate oxides of nitrogen (NOx) and oxides of sulphur (Sox). Besides, Pali is located in the dry arid zone close to Thar Desert. Due to dry weather and bad road conditions, particulate matter is likely to be high, particularly during summer dust storms driven by relatively strong north-west to south-west winds.

41. Ambient air quality monitoring was done in Pali under RUSDP project near to proposed project sites. Results of ambient air quality monitoring is shown in **Table 5** below-

Table 5: Ambient Air Quality Monitoring results in Pali (2016)

Parameters	Unit	SPCB Limits	Values observed in different locations	
			Suraj Pole (near Post Office)	Mandiya Industrial area
PM_{10}	µg/M^3	100	50.8	48.2

$PM_{2.5}$		60	24.1	22.1
Sulphur Dioxide (SO_2)		80	6.3	6.8
Oxides of Nitrogen (NO_X)		80	13.9	12.2
Carbon Mono Oxide (CO)		2000	<0.1	<0.1

Source: RUSDP project
Date of sampling: 12/13.01.2016

42. Results show that all the parameters measured are well within the prescribed limits. Traffic, bad roads coupled with dry weather, and industry is the significant polluting activities, which can increase levels of particulate matter (PM) and oxides of sulphur and nitrogen.

B. Ecological Resources

43. Of the total town area of 159. Sq. km, about 9 percent of the land is under forests, mostly situated in the north of the town. Most of this forest area (designated as reserved forest) is in the possession of Central Arid Zone Research Institute (CAZRI) of Government of India for the research purposes, and the rest is under the Forest Department. The forest is devoid of any notable tree cover or wildlife. Due to poor rainfall and harsh dry weather conditions, vegetation is very limited, and consists of mainly sparse, scattered shrubs and grasses. Existence of Wildlife is very poor. Small animals such as fox, jungle cat, jackal, monkeys, squirrel and reptiles like lizard and snakes are common animals. The common birds are blue rock pigeon, partridge, sand grouse quails, jungle fowls, pea fowls, sparrows etc.

44. There are no ecological resources near to proposed sub project sites except Manpura Bhakhri (proposed WTP 30 MLD site), which is near to hills which is under the forest area.

C. Economic Development

8. Land use

45. The total area under the jurisdiction of Pali Nagar Parishad is 159 sq. km. However existing land use data (2011) is available, as per the Master Plan 2010-2031, is for 65.65 sq. km. According to this, 59% of total area is classified as developed area, and the rest is undeveloped area. Within the developed area, predominant land use is residential (48%), followed by industrial area covering 23% of the area. About 54% of the undeveloped area is under forests, and 24% is covered with water bodies.

46. River Bandi acts as natural barrier for urban expansion in the south, and in the East areas around Lohriya Tank are low lying. The predominant development in the town is towards northeast and southeast. The industrial area lies in between Mandiya road and Bandi River in south-west and in north across railway line.

9. Industry & Agriculture

47. Economic base of the city is dominated by tertiary sector followed by secondary and primary sectors. Pali is referred to as Industrial City in Rajasthan. There are four industrial areas in the town (Pali Phase I, II, Punaita Road and Mandia Road industrial areas). Though the primary occupation of people has been agriculture and dairy, due to rich tradition of art and crafts, Pali is developed into an industrial town, with a number of textile industries established in the town. Pali was best known for weaving of coarse cotton and woolen cloth, made mostly from locally produced fiber, and subsequently dyeing and printing

of cotton fibers also developed. A large scale industry (Shri Ummaid Mills), which is the biggest textile mill in Rajasthan, is in Pali and produces synthetic blended yarn. Besides there are several, medium, small and cottage industries. In all there are 615 industrial units (except cottage industries), of which over 90% are engaged in textile cotton yarn, synthetic, dying, printing, etc. activities, and the rest are various types like steel, mineral based, chemical, agro-based, etc. Pali district is famous for rural artisans in wooden and leather handicrafts, embroidery works, carpet making, and handloom weaving.

48. As per the land use data about 5% of the total land area within the municipal limits is under agricultural use. Due to predominant dry weather and unreliable rainfall, agricultural activity is very limited and undependable. As per the census 2011, about 4% of total workers are engaged in primary agricultural related activities. Pali is in the transitional zone of Luni basin zone part of the western dry region. The main seasons are Kharif (April-September: millet, groundnut, cotton, etc.) and Rabi (October-March: wheat, barley, mustard, etc.).

10. Infrastructure

49. **Water Supply.** PHED provides piped water supply in the town. At present 74% of the town area is covered with water supply network, and provides water supply to almost entire population either through individual water service connections, or through public stand posts, mobile tankers. Main water supply source is Jawai Dam; water is supplied through Jawai- Pali pipeline. Hemawas Dam also provides water supply, but water availability from this source is very limited. Raw water is treated at treatment facilities, and distributed via overhead service reservoirs to the consumers. Though raw water supply to the town is adequate, supply at consumer end is less than the prescribed per capita supply. This is mainly due to leakage/loss of water from the system due to old and damaged transmission and distribution network. Water supply is intermittent – supplied alternative day for about 1.5 hours.

50. **Sewerage.** Pali town has partial underground sewerage system. Under the centrally sponsored UIDSSMT scheme, a sewerage system with partial coverage is currently in implementation. This includes 98 km of sewers (covering 15% population), and 7.5 MLD sewage treatment plant. Till now, 40 km of sewers and STP construction is completed. Laying of sewer in remaining approx. 57 Km length (in Zone 4) is in progress. This system is yet to become fully operational as STP has started its operation by lifting raw sewage from open drains and sewer pipe laying is still not completed. Most of the households in the town have individual toilets although open defecation is also prevalent. Due to lack of sewerage system depend on septic tanks for disposal of sewage, since there is no soak pit arrangement, effluent from septic tanks is directly let into open drains. Wastewater from kitchen, bathrooms (sullage), and sewage from houses without septic tanks directly discharged into open drain that ultimately joins Bandi River.

51. **Solid Waste Management.** As per the City Development Plan of Pali, about 48 tons of solid waste is generated in the town daily. Pali Nagar Parsihad is responsible for collection, transportation and safe disposal of municipal solid waste generated in the town. Waste is collected from households through a door-to-door collection system, and waste bins are also placed at various locations in the town for depositing the waste. The collected waste is transported to various disposal sites in the outskirts of the town. There is no landfill facility in the town; the collected un-segregated waste is disposed by crude open dumping method. PNP has identified land for development of waste processing and sanitary landfill facility but construction is yet to be started.

52. **Storm Water Drainage.** Open drainage system is provided in town for collection and conveyance of rain water from the town. About 68% of the town roads are provided with open drains, which ultimately discharge water into River Bandi. Due to lack of sewerage

system, the drains are presently carrying wastewater including sewage. Since rains are confined only to a short duration in monsoon, the drains mostly carry wastewater. Indiscriminate disposal of solid waste into drains is common, due to which drains are often chocked. Though most of the drains are of concrete.

53. **Power Supply.** Thermal power is the main source of energy in Rajasthan, contributing nearly 90% of the electricity, compared to hydropower, which produces the remainder. State-level companies (Rajya Vidyut Utpadan Nigam Ltd, RVUN; and Rajya Vidyut Prasaran Nigam Ltd, RVPN) are responsible for power generation and transmission respectively, and distribution is provided by a regional company, the Jaipur Vidyut Vitaran Nigyam Limited (JVVNL). Power is supplied from the central grid by overhead cables carried on metal and concrete poles, mainly located in public areas alongside roads. The power supply in the state is continuous and reliable, except in warmer months with periodic outages in warmer months, and large fluctuations in voltage.

54. **Transport.** The old city area is characterized by very narrow roads that are frequently congested with traffic and pedestrians. In contrast the remainder of the town has a relatively good road system, particularly in the outer areas, where streets are wide and not heavily used by traffic. The total road length in the town is 685 km, of which 35% are surfaced with bitumen/tar, 52% are with cement concrete and 13% are unpaved. Most of the roads are maintained by PNP and around 25% by the Public Works Department (PWD). Road condition is generally poor, with many roads in need of repairs and resurfacing. This plus the absence of parking spaces and pedestrian walkways leads to slow traffic and congestion. Transport in the city is mainly by personal vehicles (cars and motorcycles) and motor- and bicycle-rickshaws. The Rajasthan State Road Transport Corporation (RSRTC) runs public buses to neighboring villages and towns and to bigger towns, such as Jodhpur, and Jaipur, with which there are good road connections.

D. Socio Cultural Resources

11. Demography

55. Pali population, as per 2011 census, is 230,075, grown from 187,641 in 2001, registering a compounded annual growth rate of 2.1% (decadal growth of 22.6%), which is lower than the state urban population growth rate of 2.58% during the same decade. The rate of growth over the last three decades has shown a decreasing trend. Gross population density of the town is 14 persons/ha. Population density varies widely across the town – the central, old areas of the town have high density, and the outer areas are sparsely developed. Highest population density is in ward no. 24 (1848 person/ha) and the lowest is in wards 16, 17 and 18 (3 persons/ha). Average household size of Pali is 5.25.

56. Sex ratio of the town is 918 females per 1000 males. This is lower than Pali district's sex ratio (934), and the state-level figure of 928. Literacy rate is 68.2% (Census 2011), which is slight higher than the state literacy rate of 66.11%. In Pali, male and female literacy rate is recorded as 77.24% and 59% respectively. Scheduled Caste (SC) and Scheduled Tribe (ST) population comprises 15 percent and 2 percent of the total population respectively. Workforce participation rate in Pali is 32 percent, which is higher the State level WPR of 29.6%.

57. Largest proportion of population comprises Hindus followed by Jains, Muslims and Christians. Main languages spoken are Marwari and Hindi.

12. History, Culture and Tourism

58. Pali is famously known as Pali-Marwar and is the important town of Marwar region. Marwar name is synonyms with business community in India, and Marwari's are present in all parts of India engaged in various business activities. Pali was also known in history as Pallika / Palli. Geologists trace the existence of Pali to pre-historic age, and legends say that in the Vedic age, Maharshi Javali lived and stayed in this area for meditation and interpretation of Vedas.

59. Pali was originally inhabited by Paliwal Brahmins, from whom the place gets its name. It is said that the land in and around Pali was leased to the Paliwals by the then chief of Mandore (the former capital of Jodhpur district) for agriculture. This has led to all-round development of the area. As per the historical references, Pali was part of Marwar kingdom ruled by various successive rules belonging to different clans – Gulihas, Chauhas, Rathores and Pratiharas. From Pratiharas, Rao Chanda, wrested control of Marwar. His son and successor, Rao Jodha, moved the capital to the city of Jodhpur, which he founded in 1459.

60. Pali played an important role in India's freedom struggle. During British Raj by pioneering the freedom struggle in Marwar. Various Thakurs of Pali under the stewardship of powerful Thakur of Auwa confronted the British. Maharana Pratap, a famous ruler of 16th century, was born in Pali. His birthplace, Juni Kacheri, is in the town and in 2011 his statue was installed at the place.

61. Post-independence, Pali has developed into an important industrial town in Rajasthan, and it is known in the state as 'Industrial City'. It has strong base of textile industries. One the largest textile mills in India, Sri Ummed Mills, is located in the town.

62. **Tourism.** Marwar region is famous for Jain temples and other religious places. Ranakapur Jain Temple, about 100 km from Pali, dates back to 15th century, and is known for its unique architecture and beautifully carved structures. Parushuram Mahadev Temple is situated on a hill top in Aravali range in Desuri, 110 km from Pali. Other important tourist places in Pali district include Nimbo ka Nath, Jadan Ashram and Jawai Dam. Following are located within the town, and attract tourists/pilgrims from the region. There are no protected (state or central) monuments in Pali. There are no historical important sites with or near to proposed subproject sites, which may be affected by proposed construction activities. Some of the historical/tourist sites in Pali are as under-

i. **Somnath Temple**. Situated in the old town, Somnath temple was constructed in 12th century by the then king of Gujarat, Kumarpal Solanki.

ii. **Lakhotia Tank and Garden**. Situated in the centre of the town, with an old temple in the premises, the tank and garden have become an attraction for locals, and many people from surrounding villages and towns visit this place.

iii. **Bangur Museum.** Department of Archeology and Museums, Government of Rajasthan, established this museum. It has collection of various utensils, arms & ammunition, antic coins, ethnic costumes, etc. collected from Marwar region and other parts of the state.

E. Environmental Settings of Investment Program Component Sites

63. The subprojects include laying of water supply pipes in the municipal area of Pali, and construction of a water Treatment Plant (30 MLD at Manpura Bhakhri). Pipes for water

supply will be laid along the roads/streets in the town within the road right of way (ROW). In wider roads pipes will be laid in the road shoulder beside the tarmac, and in narrow roads, where there is no space, pipes will be laid in the road carriage way by break opening the tarmac. Roads are lined both sides with open drains. There are no trees along the roads, except in some new colonies in the outer areas. Bigger diameter strategic water will be laid along the main roads, which are wide and have adequate space. No tree cutting is anticipated as there is adequate space to lay the pipelines in those roads, nevertheless in the progress of works if any tree needs to cut, mitigation measures and compensatory plantations will be practiced.

64. Forest areas in the north of the town are devoid any notable tree cover or wildlife. None of the subproject components are located in the forest area. Whereas the proposed site of WTP at Manpura Bhakri is adjacent to the forest area which is demarcated by firm boundary wall.

65. One proposed WTP will be constructed in available Government land in Manpura Bhakri area. This site was earlier occupied by Department of Groundwater, which is now handed over to PHED. This WTP site is ideally located away from residential areas and on the elevated location from the town. Works proposed for rehabilitation of existing WTPs and OHSRs are within the existing campus of PHED and no tree cutting or any other environmental and social impact will be envisaged. Need of any tree cutting will again accessed before start of construction works and if tree cutting is identified, IEE will be updated accordingly and mitigation measures will be followed.

66. Photographs of proposed sites with nearby features are attached in **Appendix 16**.

IV. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Introduction

67. Potential environmental impacts of the proposed infrastructure components are presented in this section. Mitigation measures to minimize/mitigate negative impacts, if any, are recommended along with the agency responsible for implementation. Monitoring actions to be conducted during the implementation phase is also recommended to reduce the impact.

68. Screening of potential environmental impacts are categorized into four categories considering subproject phases: location impacts and design impacts (pre-construction phase), construction phase impacts and operations and maintenance phase impacts.

i. **Location impacts** include impacts associated with site selection and include loss of on-site biophysical array and encroachment either directly or indirectly on adjacent environments. It also includes impacts on people who will lose their livelihood or any other structures by the development of that site.

ii. **Design impacts** include impacts arising from Investment Program design, including technology used, scale of operation/throughput, waste production, discharge specifications, pollution sources and ancillary services.

iii. **Construction impacts** include impacts caused by site clearing, earthworks, machinery, vehicles and workers. Construction site impacts include erosion, dust, noise, traffic congestion and waste production.

iv. **O&M impacts** include impacts arising from the operation and maintenance activities of the infrastructure facility. These include routine management of operational waste streams, and occupational health and safety issues.

69. Screening of environmental impacts has been based on the impact magnitude (negligible/moderate/severe – in the order of increasing degree) and impact duration (temporary/permanent).

70. This section of the IEE reviews possible project-related impacts, in order to identify issues requiring further attention and screen out issues of no relevance. ADB SPS (2009) require that impacts and risks will be analyzed during pre-construction, construction, and operational stages in the context of the project's area of influence.

71. The ADB Rapid Environmental Assessment Checklist in http://www.adb.org/documents/guidelines/environmental_assessment/eaguidelines002.asp has been used to screen the project for environmental impacts and to determine the scope of the IEE.

72. In the case of this project (i) most of the individual elements are relatively small and involve straightforward construction and operation, so impacts will be mainly localized and not greatly significant; (ii) most of the predicted impacts are associated with the construction process, and are produced because that process is invasive, involving excavation and earth movements; and (iii) being located in an urban area, will not cause direct impact on biodiversity values. The project will be in properties held by the local

government and access to the project location is through public rights-of-way and existing roads hence, land acquisition and encroachment on private property will not occur.

B. Pre-Construction Impacts

73. **Design of the Proposed Components.** The Central Public Health and Environmental Engineering Organization (CPHEEO) manual suggests a design period of 15/30 years[2] in general while designing the systems for water supply and sewerage components. It is proposed to consider 2046 as the design year for all the components in order to maintain unanimity in the design period and design population. Accordingly, 2016 shall be the base year and 2031 the intermediate year to cross check the designs pertaining to intermediate demand. The rate of water supply has been taken as 135 lpcd for 100% population.

74. **Locations of Water Treatment Plant and OHSRs.** One WTP of capacity of 30MLD is proposed to be constructed in Pali, in Manpura Bhakri village about 5 KMs from PHED campus. Proposed site is a government land which was under the Department of Ground Water, which is now handed over to PHED and will be allotted for RUSDP works. Being a government land there will be no location impacts of this site. The three existing WTPs which are proposed to be refurbished are within the existing PHED campus. Therefore there will be no location impacts of these WTPs. Likewise for the construction of 7 new OHSRs land is available with PHED and for refurbishment of 19 existing OHSRs, there will also no issues as these OHSRs are already in possession of PHED.

75. **Consents, Permits etc.** Consent for establishment (CFE) is required before construction for 30 MLD WTP at Manpura Bhakhri. CFE is also required for proposed refurbishment works in another two WTPs. Consent for operation (CFO) is also required before start of operation of WTPs.

76. **Utilities.** Telephone lines, electric poles and wires, water lines within the proposed project locations may require to be shifted in few cases. To mitigate the adverse impacts due to relocation of the utilities, the contractor, in collaboration with ULB will (i) identify the locations and operators of these utilities to prevent unnecessary disruption of services during construction phase; and (ii) contractor will be required to prepare a contingency plan to include actions to be done in case of unintentional interruption of services.

77. **Social and Cultural Resources.** Though there are no protected monuments in Pali but any work involving ground disturbance can uncover and damage archaeological and historical remains. For this project, excavation will occur in project sites within existing ROW, so it could make medium risk of such impacts if the site contains any archeological and historical remains. Nevertheless, PIU will:

- consult Department of Archaeology and Museums to obtain an expert assessment of the archaeological potential of the site;
- consider alternatives if the site is found to be of high risk;
- include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available; and
- develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.

[2] As per CPHEEO, pumps, motors, STP, storage reservoirs are to be designed for a life of 15 years

78. **Site selection of construction work camps, stockpile areas, storage areas, and disposal areas.** Priority is to locate these near the project location. However, if it is deemed necessary to locate elsewhere, sites to be considered will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems. Residential areas will not be considered for setting up construction camps to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). Extreme care will be taken to avoid disposals near forest areas, water bodies, swamps, or in areas which will inconvenience the community.

79. **Site selection of sources of materials.** Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution. To mitigate the potential environmental impacts, locations of quarry site/s and borrow pit/s (for loose material other than stones) would be assessed by PIU. Priority would be sites already permitted by Mines and Geology Department. If new sites are necessary, these would be located away from population centers, drinking water intakes and streams, cultivable lands, and natural drainage systems; and in structurally stable areas. It will be the construction contractor's responsibility to verify the suitability of all material sources and to obtain the approval of Department of Mines & Geology and local revenue administration. If additional quarries will be required after construction is started, then the construction contractor shall use the mentioned criteria to select new quarry sites, with written approval of PIU.

C. Construction Impacts

80. The subproject include earth work excavation for pipeline trenches, pipe laying, installing valves, flow meters and data loggers, shifting of public utilities and providing house service connections. Earth work excavation will be undertaken by machine (backhoe excavator) and include danger lighting and using sight rails and barricades at every 100 m., while pipe laying works will include laying pipes at required gradient, fixing collars, elbows, tees, bends and other fittings including conveying the material to work spot and testing for water tightness. Construction works will also include construction of buildings and other structures for WTPs and pump houses etc. A good amount of concrete will be required for these works, which shall be prepared in either contractors own batching plant or shall be purchased from other batching plants if available in nearby areas.

81. The excavation is done in such a way that there will be a minimum depth of 1.2 m above the pipe line. Sufficient care will be taken while excavation for laying, so that existing utilities and cables are not damaged and pipes are not thrown into the trenches or dragged, but carefully laid in the trenches. Trenches deeper than 1.5 m will be protected by strutting or timbering to avoid collapse of trenches, and also to avoid any risk to surrounding buildings. Once they are laid, pipes will be joined as per specification and then tested for any cracks of leakages. The minimum working hours will be 8 hours daily, the total duration of each stage depends on the soil condition and other local features. The excavation of trenches for water pipes is estimated to generate huge quantity of soil, about 90% of this soil will be used for refilling the trench after placing the pipe and therefore residual soil after pipe laying and refilling is required to be disposed. This soil shall be used for filling low lying area or stored/ dumped in approved debris disposal sites.

82. Although construction of these project components involves quite simple techniques of civil work, the invasive nature of excavation and the project locations in the built-up areas of the town where there are a variety of human activities, will result in impacts to the environment and sensitive receptors such as schools, hospitals, places of

worships, residents, businesses, and the community in general. These anticipated impacts are temporary and for short duration.

83. Physical impacts will be reduced by the method of working and scheduling of work, where by the project components will be (i) constructed by small teams working at a time; (ii) any excavation done near sensitive area like school, religious places and house will be protected as per standard norms etc.

84. **Sources of Materials.** Significant amount of gravel, sand, coarse aggregate, and cement will be required for this project. The construction contractor will be required to:

- Use material sources permitted by government;
- Verify suitability of all material sources and obtain approval of PIU; and
- Submit to PIU on a monthly basis documentation of sources of materials.

85. **Air Quality**. Emissions from construction vehicles, equipment, and machinery used for excavation and construction will induce impacts on the air quality in the construction sites. Anticipated impacts include increase in dusts and concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons. These however will be temporary limiting to construction activities only. To mitigate the impacts, construction contractors will be required to:

- Consult with PIU/on the designated areas for stockpiling of, soils, gravel, and other construction materials;
- Damp down exposed soil and any stockpiled material on site by water sprinkling;
- Use tarpaulins to cover sand and other loose material when transported by trucks;
- Clean wheels and undercarriage of haul trucks prior to leaving construction site
- Don't allow access in the work area except workers to limit soil disturbance and prevent access by barricading and security personnel
- Fit all heavy equipment and machinery with air pollution control devices which are operating correctly and take pollution under control (PUC) certificates for all vehicles used in construction works
- Do regular water sprinkling in dusty areas to reduce dust emission during works
- Damp down the structures before demolishing to reduce dust emission
- Damp down on regular basis all the access ways
- Maintain all the equipments and vehicles to reduce emission of smoke and keep pollution under control and keep records of periodic maintenance
- Carry out regular ambient air quality monitoring and keep records

86. **Surface Water Quality**. Run-off from stockpiled materials and chemical contamination from fuels and lubricants during construction works can contaminate downstream surface water quality of the streams. These potential impacts are temporary and short-term duration only. However, to ensure that these are mitigated, construction contractor will be required to:

- Prepare and implement a spoils management plan (Appendix 9);
- Avoid to construct any construction camps and labour camps near to any water body and do not allow to dispose any waste or sullage in to any water body

- Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
- Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with PIU on designated disposal areas;
- Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- Place storage areas for fuels and lubricants away from any drainage leading to water bodies and provide impermeable lining under the storage yard of fuels and lubricants
- Dispose any wastes generated by construction activities in designated sites; and
- Conduct surface quality inspection according to the Environmental Management Plan (EMP).

87. **Noise and Vibration Levels**. Construction works will be conducted along the roads in Pali urban area, where there are houses, schools and hospitals, religious places and small-scale businesses. The sensitive receptors are the schools, hospitals and religious places in these areas. Increase in noise level may be caused by excavation, particularly breaking of cement concrete or bitumen roads, operation of construction equipment like concrete mixers, and the transportation of equipment, materials, and people. Vibration generated from construction activity, for instance from the use of pneumatic drills, will have impact on nearby buildings. This impact is negative but short-term, and reversible by mitigation measures. The construction contractor will be required to:

- Plan activities in consultation with PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
- Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
- Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimize sound impact to surrounding sensitive receptor; and
- Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s.
- Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
- Consult the custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.
- Provide all workers appropriate PPEs like ear plug/muff, working in high noise conditions
- Keep all vehicles and equipments in good conditions to avoid excessive noise generation
- Provide noise barriers near sensitive receptors like schools, hospitals, temples, courts etc and consult in advance with sensitive receptors about the working hours (specially schools, offices, courts etc) and avoid noisy works in those hours
- Avoid noisy works in nights in inhabited areas to avoid any disturbance to habitants
- Consult in advance with habitants and inform them about the nature and duration of works

88. **Landscape and Aesthetics**. As per detailed design the construction works does not envisage any cutting of trees, it shall be reassessed by contractor during confirmatory survey, before start of construction works and if tree cutting is extremely required, mitigation measures shall be taken. Construction works will produce excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. Haphazard disposal of these will have negative impacts on landscape and overall aesthetics. These impacts are negative but are of short-term and reversible by mitigation measures. The construction contractor will be required to:

- Prepare and implement spoils management plan;
- Avoid stockpiling of excess excavated soils;
- Coordinate with ULB for beneficial uses of excess excavated soils or immediately dispose to designated areas;
- Recover used oil and lubricants and reuse or remove from the sites;
- Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- Remove all wreckage, rubbish, or temporary structures which are no longer required; and
- Request PIU to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.

89. **Surface and Groundwater Quality**. Another physical impact that is often associated with excavation is the effect on drainage and the local water table if groundwater and surface water collect in the voids. In Pali groundwater is much deeper than the proposed trenching depth, and rains are scarce and limited to very short duration during monsoon. However, to ensure that water will not pond in pits and voids near project location, the construction contractor will be required to conduct excavation works in non-monsoon season to the maximum extent possible and during mansoon period ensure that no water logging occur at sites.

90. **Accessibility**. Excavation along the roads, hauling of construction materials and operation of equipment on-site can cause traffic problems. Potential impact is negative but short term and reversible by mitigation measures. The construction contractor will be required to:

- Prepare and implement a Traffic Management Plan (Appendix 10)
- Start works in one stretch and after laying pipes and filling the trench, restore the road at motorable stage before proceeding to the next stretch, remove the excess material regularly from sites
- Provide access for entrance to houses, offices or other establishments during the trench works and if providing access is not possible, consult in advance with affected parties for most suitable duration of works
- Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;
- Schedule transport and hauling activities during non-peak hours;
- Locate entry and exit points in areas where there is low potential for traffic congestion;
- Keep the site free from all unnecessary obstructions;
- Drive vehicles in a considerate manner;
- Coordinate with Traffic Police for temporary road diversions and for provision of traffic aids if transportation activities cannot be avoided during peak hours; and

- Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

- Wherever road width is minimal, there will be temporary loss of access to pedestrians and vehicular traffic including two wheelers during the laying of pipes. Under those circumstances, contractor shall adopt following measures:
- Inform the affected local population 1-week in advance about the work schedule
- Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum.
- Provide pedestrian access in all the locations until normalcy is restored. Provide wooden/metal planks over the open trenches at each house to maintain the access.

91. **Socio-Economic – Income**. The project components will be located in government land and there is no requirement for land acquisition or any resettlement. Construction works will impede the access of residents to specific site in limited cases. The potential impacts are negative and moderate but short-term and temporary. The construction contractor will be required to:

- Prepare and implement spoils management plan (**Appendix 9**); and remove the waste/unusable materials regularly from site
- Leave spaces between mounds of soil for access to houses, shops and other establishments;
- Provide walkways and metal sheets where required to maintain access across for people and vehicles;
- Increase workforce in the areas with predominantly institutions, place of worship, business establishment, hospitals, and schools;
- Consult businesses and institutions regarding operating hours and factoring this in work schedules; and
- Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.
- Notify community/ water users in advance about likely interruptions in water supply.
- Provide alternate sources of clean water until water supply is restored.

92. **Socio-Economic – Employment**. Manpower will be required during the 36-months construction stage. This can result in generation of temporary employment and increase in local revenue. Thus potential impact is positive and long-term. The construction contractor will be required to:

- Employ at least 50% of the labour force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available; and
- Secure construction materials from local market.

93. **Occupational Health and Safety**. Workers need to be mindful of the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures. The construction contractor will be required to:

- Comply with all national, state and local labour laws (see **Appendix 8**);
- Develop and implement site-specific occupational health and safety (OH&S) Plan which will include measures such as:

  (a) excluding public from the site;

(b) ensuring all workers are provided with and use personal protective equipment;

(c) OH&S Training[3] for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;

- Ensure that qualified first-aid is provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
- Provide medical insurance coverage for workers;
- Secure all installations from unauthorized intrusion and accident risks;
- The project area experiences extreme temperature during summer months of April and May, which may affect the health of workers engaged in construction work. Contractor should take necessary measures during summers including the following:
- Work schedule should be adjusted to avoid peak temperature hours (12 – 3 PM)
- Provide appropriate shade near the work place; allow periodic resting and provide adequate water
- Provide first aid, necessary medicine and facilities ready at site to take care of any issue of dehydration or heat stroke to workers
- Provide supplies of potable drinking water;
- Provide clean eating areas where workers are not exposed to hazardous or noxious substances;
- Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;
- Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;
- Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- Ensure moving equipment is outfitted with audible back-up alarms;
- Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and
- Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.
- Conduct regular health checkups for workers

[3] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

- Provide periodical awareness camps and special trainings for workers for health issues and risks in construction sites

94. **Night works.** Most of the construction works shall be undertaken only during day hours. Night works are required only in the extreme conditions such as road having heavy traffic in day time and/or no alternate access can be provided for that road users, extreme climatic conditions (extreme hot during summers), religious fairs/celebrations in day time etc. Contractors are required to take prior approval from PIU and concerned town authorities for night works. Contractors are required to adhere following conditions for night works-

(i) Contractors should have hand held noise level meter for measurement of noise during night hours

(ii) Contractors should have hand held lux meter for the measurement of illumination during night hours

(iii) Preferably electrical connections is available for running equipments otherwise sound proof/super silent Diesel Generator set should be available

(iv) Sound level should not increase as per following-

Type of area of work	Maximum noise level dB(A)
Industrial	70
Commercial	55
Residential	45
Silence zone	40

(v) Illumination should be as follows-

Minimum illumination (lx)	Areas to be illuminated	Type of work activity
54	Illumination throughout the work area	General work area lighting, and performance of visual tasks of large size, or medium contrast, or low require accuracy
108	Illumination of work area and areas adjacent to equipment	Performance of visual tasks of medium size, or low to medium contrast, or medium required accuracy
216	Illumination of task	Performance of visual tasks of small size, or low contrast or high required accuracy or fine finish

(vi) As far as possible ready mix concrete from batching plant to be used, otherwise the concrete should be prepared away from residential areas and brought to the site

(vii) All the noise activity like hammering, cutting, crushing, running of heavy equipments should be done in day time and avoided in night time

(viii) Workers engaged in night works should have adequate rest/sleep in day time before start of night works

(ix) Worker engaged for night works should have previous experience of night works and should be physically fit for such works including clear vision in night

(x) All the necessary provisions of traffic aids such as traffic signals, road signage, barricades, cautions boards, traffic diversion boards etc. should be available with fluorescent/retro-reflective arrangements

(xi) Workers should be trained before start of night works about risks and hazards of night works and their mitigation measures and should be provided all the protective aids (PPEs) including fluorescent/retro-reflective vests
(xii) Horns should not be permitted by equipments and vehicles
(xiii) Workers should not shout and create noise
(xiv) First aid and emergency vehicles should be available at site
(xv) Emergency preparedness plan should be operative during night works
(xvi) Old persons and pregnant women and women having small kids should not work in night time
(xvii) All the vehicles and equipments being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise
(xviii) All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works

95. Management Plan for night works is attached as **Appendix 15.**

96. **Asbestos Materials.** Existing water distribution network is mostly asbestos cement (AC) pipes, and because of the health risks these will be left in situ and replaced by new pipes. Details will be obtained from the PHED of the nature and location of all water supply infrastructure, and planning pipeline alignments carefully to avoid any conflict or damage. Given the dangerous nature of this material for both workers and citizens, additional measure should be taken to protect the health of all parties in the event (however unlikely) that AC pipes are encountered. This is that, prior to start of construction works of water supply system, PIU will develop a protocol to be applied in any instance that AC pipes are encountered, to ensure that appropriate action is taken. This should be based on the approach recommended by the United States Environmental Protection Agency (USEPA),[4]and amongst other things, should involve:

(i) Training of all personnel (including manual labourers) to enable them to understand the dangers of AC pipes and to be able to recognize them in situ;
(ii) Reporting procedures to inform PIU immediately if AC pipes are encountered;
(iii) Development and application of a detailed H&S procedure to protect both workers and citizens. This should comply with national and international standards for dealing with asbestos, and should include: (a) removal of all persons to a safe distance; (b) usage of appropriate breathing apparatus and protective equipment by persons delegated to deal with the AC material; and (c) Procedures for the safe removal and long-term disposal of all asbestos-containing material encountered.

97. **Community Health and Safety**. Hazards posed to the public, specifically in high- pedestrian areas may include traffic accidents and vehicle collision with pedestrians. Potential impact is negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

(i) Plan routes to avoid times of peak-pedestrian activities.
(ii) Liaise with PIU in identifying risk areas on route cards/maps.

[4] In the USA, standards and approaches for handling asbestos are prescribed by the Occupational Health and Safety Administration (OHSA) and the Environmental Protection Agency (EPA) and can be found at http://www.osha.gov/SLTC/asbestos

(iii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.
(iv) Provide road signs and flag persons to warn of on-going trenching activities.
(v) Properly barricade the trench areas or other areas having accident risk for pedestrians/ vehicles and road users
(vi) Do not allow any stagnant water during rains at site to prevent mosquito breeding
(vii) Conduct noise activities in day time only and intermittently so that excessive noise may not cause health impact to people
(viii) Practice regular water sprinkling to reduce dust at site

98. Central part of the town is characterized by narrow roads and some of which are accessible only by foot. Besides impeding the access, the trench excavation and pipe laying will pose safety risks to pedestrians, and the people living in these areas. Though the width (<500 mm) and depth (<750 mm) of trench is minimal, it will pose safety risk, especially for children and elders. The construction contractor will be required to:

(i) Provide prior information to the local people about the nature and duration of work
(ii) Conduct awareness program on safety during the construction work
(iii) Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day
(iv) Provide barricades, and deploy security personnel to ensure safe movement of people and also to prevent unnecessary entry and to avoid accidental fall into open trenches

99. **Work Camps.** Operation of work camps can cause temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants. Potential impacts are negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

(i) Consult PIU before locating project offices, sheds, and construction plants;
(ii) Minimize removal of vegetation and disallow cutting of trees;
(iii) Provide drinking water, water for other uses, and sanitation facilities for employees;
(iv) Ensure conditions of livability at work camps are maintained at the highest standards possible at all times;
(v) Prohibit employees from poaching wildlife and cutting of trees for firewood;
(vi) Train employees in the storage and handling of materials which can potentially cause soil contamination;
(vii) Recover used oil and lubricants and reuse or remove from the site;
(viii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
(ix) Remove all wreckage, rubbish, or temporary structures which are no longer required; and
(x) Request PMU to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.

100. **Social and Cultural Resources**. For this project, excavation will occur at locations known not to have archaeological values, so it could be that there is a low risk of such impacts. Nevertheless, the construction contractor will be required to:

(i) Strictly follow the protocol for chance finds in any excavation work;
(ii) Request PIU or any authorized person with archaeological/historical field training to observe excavation;
(iii) Stop work immediately to allow further investigation if any finds are suspected;
(iv) Inform PIU/ACM if a find is suspected, and take any action they require ensuring its removal or protection in situ.
(v) Adjacent to religious/historic sites, undertake excavation and construction work in such a way that no structural damage is caused to the building.
(vi) Take all possible measures to reduce impact on religious and spiritual values of the areas and any religious place near the site

101. **Debris disposal.** Prior to the commencement of works, contractor shall identify a debris disposal site in consultation with the PIU and adhering to following criteria:

(i) The site shall be selected preferably from barren, infertile lands. In case agricultural land needs to be selected, top-soil stripping, stacking and preservation should be undertaken prior to initiation of any disposal activities.
(ii) Debris disposal site shall be at least 200 m away from surface water bodies[5].
(iii) No residential areas shall be located within 100 m downwind side of the site.
(iv) The site is minimum 250 m. away from sensitive locations like hospitals, religious places, ponds/lakes or other water bodies.
(v) The local governing body and community shall be consulted while selecting the site.

D. Operation and Maintenance Impacts

102. Operation and Maintenance of the water supply system will be carried out by PHED Pali directly or through an external operator. The system have a design life of 15/30 years, during which shall not require major repairs or refurbishments and should operate with little maintenance beyond routine actions required to keep the equipment in working order. The stability and integrity of the system will be monitored periodically to detect any problems and allow remedial action if required. Any repairs will be small-scale involving manual, temporary, and short-term works involving regular checking and recording of performance for signs of deterioration, servicing and replacement of parts.

103. Recurrence of pipe bursting and leakage problems can be managed by the leak detection and water auditing surveys. The PHED will be required to ensure that the leak detection and rectification time is minimized.

104. Improper disposal of silt and debris removed from trenches could cause inconvenience to public. Silt and debris shall be collected in trucks and transported to the approved disposal site and/or can be used as covering material for wastes being land filled.

[5] In the absence of site meeting the stipulated criteria, an alternate site can be selected specifying the reasons. In such a case, the construction camp management plan should incorporate additional measures specific to the site as suggested by the Construction Manager.

105. Repair works could cause some temporary disruption of activities at locations of social and cultural importance such as schools, hospitals, churches, tourist sites etc., so the same precautions as employed during the construction period should be adopted. ULB needs to:

(i) Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
(ii) Complete work in these areas quickly;
(iii) Consult the custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.

106. The citizens of the Pali Municipal Council will be the major beneficiaries of the improved water supply system, as they will be provided with a constant supply of better quality water, piped into their homes. In addition to improved environmental conditions, the project will improve the over-all health condition of the town as diseases related to unhealthy water consumption will be reduced. This should deliver major improvements in individual and community health and well-being, so people should spend less on healthcare and lose fewer working days due to illness, so their economic status should also improve, as well as their overall health.

V. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Overview

107. The active participation of stakeholders including local community, NGOs/CBOs, and the media in all stages of project preparation and implementation is essential for successful implementation and as well as operation of the project. It will ensure that the subprojects are designed, constructed, and operated with utmost consideration to local needs, ensures community acceptance, and will bring maximum benefits to the people. Public consultation and information disclosure is a must as per the ADB policy.

108. A three tier consultation process has been adopted for RUSDP: focus group discussions, primary household sample surveys and a town-level public consultation workshop. Most of the main stakeholders have already been identified and consulted during preparation of this IEE, and any others that are identified during project implementation will be brought into the process in the future. Primary stakeholders of the subproject are: residents, shopkeepers and businesspeople who live and work alongside the roads in which network improvements will be provided and near sites where facilities will be built (WTP), and Government and utility agencies, responsible for provision of services such as Pali Nagar Parishad, Public Health Engineering Department and Rajasthan Pollution Control Board. Secondary stakeholder are: NGOs and CBOs working in the area, community representatives, beneficiary community in general, government agencies, the executing and implementing agencies (LSGD and RUIDP), Government of India and the ADB.

B. Public Consultation

109. The public consultation and disclosure program is a continuous process throughout the project implementation, including project planning, design and construction. Primary stakeholders were consulted in preliminary stage of project planning in July 2015. A survey was conducted in July-August 2015 during transect walk through the project areas.

Socio economic surveys and Women group consultations will be conducted in the latter stages of project planning and IEE will be updated accordingly.

1. Consultation during Project Preparation

110. Institutional consultations were conducted with the Governmental Departments such as Local Self Government Department, Public Works Department, Pollution Control Board, Public Health Engineering Department, Pali Nagar Parishad, etc. The project proposal is formulated in consultation with PHED and Pali Nagar Parishad.

111. Focus-group discussions with affected persons and other stakeholders were conducted to learn their views and concerns. A socio economic household survey will be conducted in the town, covering sample households, to understand the household characteristics, health status, and the infrastructure service levels, and also the demand for infrastructure services. General public and the people residing along the project activity areas were also consulted during visits to the project sites.

112. It was observed that people are willing to extend their cooperation as the proposed activities are proposed to enhance the infrastructure service levels and the living standard of the public. The public expressed their concern regarding the nuisance and disturbance (dust, road closure and traffic management activities) during the construction stage which can have impact on their day to day activities. Public demanded for advance notice before construction and proper warning signs along the construction area to avoid accidents and inconvenience. Public opined that an appropriate operation and maintenance system should be in place, especially for water supply, for its best functioning and to have the maximum health and aesthetic benefits.

113. A stakeholder consultation meeting was conducted in Pali Town on April 28, 2014 to which representatives of primary and secondary stakeholders were invited. Participants were invited to understand the project and likely environment and social issues, benefits, and to express their views and concerns. Proceedings of the stakeholder consultation meeting is at **Appendix 11**. Stakeholders are supportive of the project, and opined that this project will improve the quality of life in the town, and will benefit them immensely.

114. Consultations with stakeholders including public and business owners were also conducted in July, August and December 2015, before start of the project to understand their views and requirements during construction works. Proceedings of the stakeholder consultation meeting and public consultations are reported in **Appendix 11**.

2. Consultation during construction

115. Prior to start of construction, ULB and PIU with the assistance of PMDSC and CAPC will conduct information dissemination sessions at major intersections and solicit the help of the local community leaders/prominent citizens to encourage the participation of the people to discuss various environmental issues. At each ward/neighborhood level, focus group meetings will be conducted to discuss and plan construction work with local communities to reduce disturbance and other impacts, and provide a mechanism through which stakeholders can participate in project monitoring and evaluation.

116. A constant communication will be established with the affected communities to redress the environmental issues likely to surface during construction and operational phases and also regarding the grievance redress mechanism. ULB/PIU alongwith CAPC and PMDSC will organize public meetings and individual pubic consultations and will appraise the communities about the progress on the implementation of EMP.

Meeting will also be organized at the potential hotspots/sensitive locations before and during the construction.

C. Information Disclosure

117. Executive summary of the IEE will be translated in the local language and made available at the offices of RUIDP, PMU and PIU. Copies of summary will be provided to participants of city level workshop to be organized in Pali. Hard copies of the IEE will be accessible to citizens as a means to disclose the document and at the same time creating wider public awareness. Electronic version of the IEE in English and Executive Summary in Hindi will be placed in the official website of the ULB/RUIDP/PMU after approval of the IEE by Government and ADB. Stakeholders will also be made aware of grievance register and redress mechanism.

118. Public information campaigns via newspaper/radio/TV, to explain the project details to a wider population will be conducted through the Community Action and Participation Consultants (CAPC). Public disclosure meetings will be conducted at key project stages to inform the public of progress and future plans. Prior to start of construction, the PIU will issue notification on the start date of implementation in local newspapers or disseminate information through public consultations with the help of CAPC. A board showing the details of the project will be displayed at the construction site for the information of general public.

119. Local communities will be continuously consulted regarding location of construction camps, access and hauling routes and other likely disturbances during construction. The road closure together with the proposed detours will be communicated via advertising, pamphlets, radio broadcasts, road signage, etc.

VI. GRIEVANCE REDRESS MECHANISM

A. Project Specific Grievance Redress Mechanism

120. A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate the resolution of AP's concerns, complaints, and grievances about the social and environmental performance at the level of the project. The GRM will aim to provide a time-bound and transparent mechanism to record and resolve social and environmental concerns linked to the project.

121. **Common GRM**. A common GRM will be in place for social, environmental, or any other grievances related to the project; the resettlement plans (RPs) and IEEs will follow the GRM described below. The GRM will provide an accessible and trusted platform for receiving and facilitating resolution of affected persons' grievances related to the project. The multi-tier GRM for the project is outlined below, each tier having time-bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required.

122. ULB-wide public awareness campaigns will ensure that awareness on grievance redress procedures is generated through the campaign. PIU Assistant Safeguards Officer (ASO) through Community Awareness and Participation Consultant (CAPC) will conduct ULB-wide awareness campaigns to ensure that poor and vulnerable households are made aware of grievance redress procedures and entitlements.

123. APs will have the flexibility of conveying grievances/suggestions by dropping grievance redress/suggestion forms in complaints/suggestion boxes (will be installed by project ULBs and PIU) or by e-mail, by post, or by writing in a complaints register in

ULB/PIU offices. **Appendix 14** has the sample grievance registration form. Careful documentation of the name of the complainant, date of receipt of the complaint, address/contact details of the person, location of the problem area, and how the problem was resolved will be undertaken. The PMU Project Officers (Environment & Social) will have the overall responsibility for timely grievance redress, respectively on environmental and social safeguards issues and for registration of grievances, related disclosure, and communication with the aggrieved party through the PIU ASO.

B. Grievance Redress Process

124. In case of grievances that are immediate and urgent in the perception of the complainant, the contractor, and supervision personnel from PIU and PMDSC on-site will provide the most easily accessible or first level of contact for quick resolution of grievances. Contact phone numbers and names of the concerned PIU Assistant Safeguards Officer, contractors, will be posted at all construction sites at visible locations.

i. **1st level grievance**. The contractors, PIU supervision personnel, PIU Assistant Safeguards Officer and implementing NGO/CAPC[6] can immediately resolve issues on-site in consultation with each other, and will be required to do so within 3 days of receipt of a complaint/grievance.

ii. **2nd level grievance**. All grievances that cannot be redressed within 3 days at field/ward level will be brought to the notice of respective Project Officers (POs, Environment/Social) of PMU. PMU POs will resolve the grievance within 7 days of receipt of compliance/grievance in discussion with the PIU, CAPC and the Contractor. PMDSC will assist POs in resolving the issue.

iii. **3rd level grievance**. All the grievances that are not addressed by PMU within 7 days of receipt will be brought to the notice of the Grievance Redressal Committee (GRC). The City Level Committee (CLC) that will be established in every project town will act as GRC[7]. GRC will meet twice a month and determine the merit of each grievance brought to the committee. The PIU ASO will be responsible to see through the process of redressal of each grievance. The GRC will resolve the grievance within 15 days of receiving the complaint.

iv. **4th level grievance**. Very major issues that are beyond the jurisdictional authority of the CLC or those that have the potential to cause social conflicts or environmental damage or those that remain unresolved at PMU/CLC level, will be referred to the Empowered Committee (EC)[8] All decisions taken by the GRC and CLC will be communicated to the APs by the PIU ASO.

125. The project GRM notwithstanding, an aggrieved person shall have access to the country's legal system at any stage, and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM. Alternatively, if the grievance is related to land acquisition, resettlement &

[6] Community Awareness and Public Participation (CAPC) will oversee the matters if there is no Resettlement Plan (RP) Implementing NGO

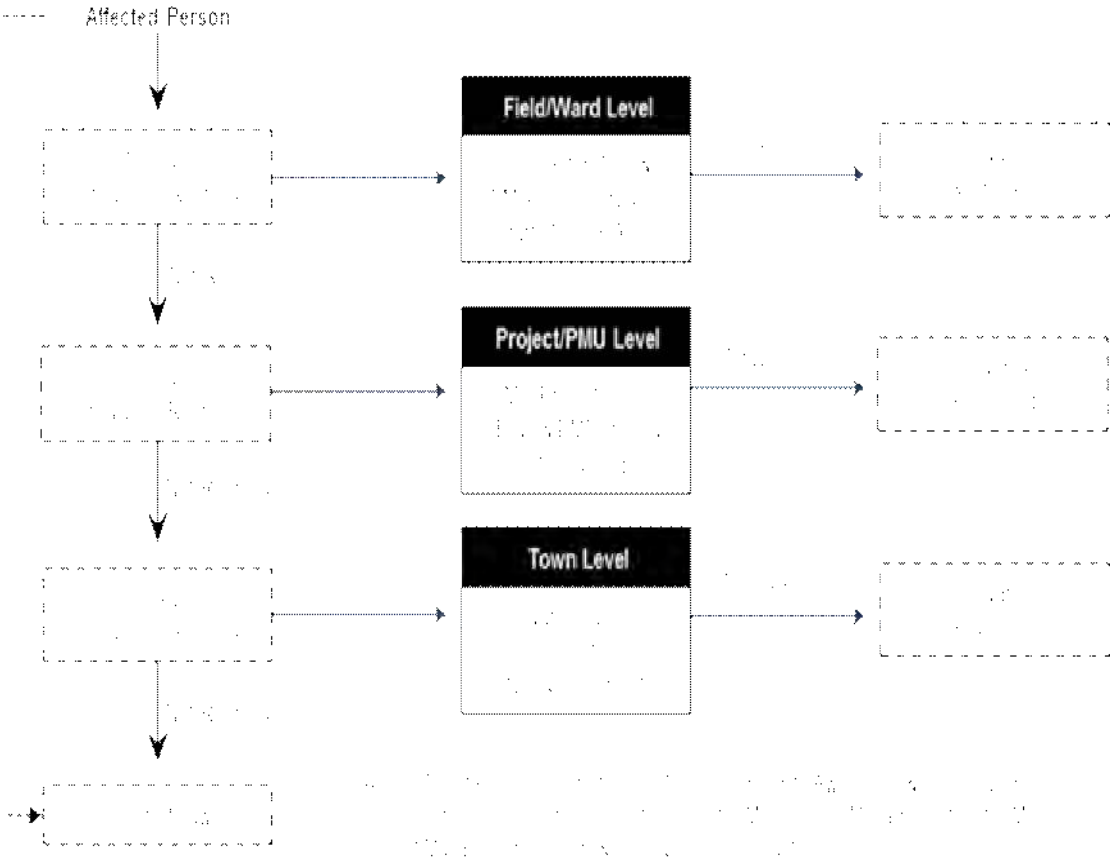
[7] City Level Committees (CLC) will be formed at town-level with members composed of: District Collector (DC) as Chairperson, and following as members: ULB Commissioner; Assistant Safeguards Officer PIU;
representative from RPCB regional office; and one representative each from relevant government departments as appropriate (PWD / PHED / DAM etc). All town-level GRCs will have at least one woman member/chairperson. In addition, for project-related grievances, representatives of APs, community-based organizations (CBOs), and eminent citizens will be invited as observers in GRC meetings

[8] The Empowered Committee (EC) will be chaired by the Minister of Urban Development and Housing, and members will include Ministers, Directors and/or representatives of other relevant Government Ministries and Departments

rehabilitation, the APs can approach the Land Acquisition, Rehabilitation and Resettlement Authority (LARRA). As per the latest Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation, and Resettlement Act, 2013, the state government will have to establish the LARRA to address grievances in implementation of LARRA.

126. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB India Resident Mission (INRM). The complaint can be submitted in any of the official languages of ADB's DMCs. The ADB Accountability Mechanism information will be included in the PID to be distributed to the affected communities, as part of the project GRM.

FIGURE 7: GRIEVANCE REDRESSAL PROCESS



VII. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management Plan

127. The following tables show the potential environmental impacts, proposed mitigation measures and responsible agencies for implementation and monitoring.

128. The purpose of the environmental management plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental

assessment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with.

129. A copy of the EMP must be kept at work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

130. For civil works, the contractor will be required to (i) establish an operational system for managing environmental impacts (ii) carry out all of the monitoring and mitigation measures set forth in the EMP; and (iii) implement any corrective or preventative actions set out in safeguards monitoring reports that the employer will prepare from time to time through PMDSC to monitor implementation of this IEE and EMP. The contractor shall allocate budget for compliance with these EMP measures, requirements and actions.

Table 7: Design Stage Environmental Management Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation/ Monitoring	Cost and Source of Funds
Design of Water Treatment Plant	Disposal of residues of water treatment (sludge) in to the receiving environment	Quantity of generation of sludge should be estimated during design phase and it should be ensured that there is proper arrangement of collection and disposal of sludge at appropriate place	PMU/PMDSC	Project Costs (PMU)
	Impairment of WTP treatment efficiency	(i) Ensure continuous uninterrupted power supply (ii) Provide back-up facility (such as generator) and make sure that adequate fuel supplies during operation for running of generator when required; (iii) Provide operating manual with all standard operating procedures (SOPs) for operation and maintenance of the facility; this should include guidance on the follow up actions in case of process disruptions, inferior quality of treated water; etc. Necessary training (hands-on and class room / exposure visits) shall be provided to the PHED staff dealing with WTP. (iv) The scope of work of facility contractor should include extended operation period (at least five years) to ensure smooth operation, training to the PHED staff and transfer of facility to PHED (v) Design should include efficient treatment technology meeting the standards of CPHEEO/PHED	PMU/PMDSC	Project Costs (PMU)
Design of water supply network	Disruption of utilities and inconvenience to public	It should be kept in mind that minimum disturbance may occur to public in terms of disruption of utilities like existing water supply, electrical, telecommunication and minimum disturbance in traffic movement and access to establishments and houses	PMU/PMDSC	Project Costs (PMU)

Table 8: Environmental Management Plan of Anticipated Impacts during Pre-Construction

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
Compliance with environmental subproject selection criteria	Environmental impacts due to subproject, compliance of criteria of RPCB for consent to establish of WTP	Compliance with environmental subproject selection criteria A compliance checklist is appended to this report (**Appendix 7**)	PIU and PHED, Pali	PMU	No costs required
Utilities	Telephone lines, electric poles and wires, water lines within proposed project area	(i) Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; and (ii) Require construction contractors to prepare a contingency plan to include actions to be taken in case of unintentional interruption of services. (iii) Require contractors to prepare spoils management plan (**Appendix 9**) and traffic management plan (**Appendix 10**)	Contractor in collaboration with PIU and with approval of PMU	(i) List of affected utilities and operators; (ii) Bid document to include requirement for a contingency plan for service interruptions (example provision of water if disruption is more than 24 hours), spoil management plan (**Appendix 9**), and traffic management plan (**Appendix 10**)	No costs required Mitigation measures will be part of BOQ
Social and Cultural Resources	Ground disturbance can uncover and damage archaeological and historical remains	(i) Consult Dept. of Archeology and museums, Government of Rajasthan to obtain an expert assessment of the archaeological potential of the site; (ii) Consider alternatives if the site is found to be of medium or high risk; Develop a protocol for	PIU	Chance Finds Protocol	No cost required.

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved.			
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	Disruption to traffic flow and sensitive receptors	(i) Prioritize areas within or nearest possible vacant space in the project location; (ii) If it is deemed necessary to locate elsewhere, consider sites that will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems; (iii) Do not consider residential areas; (iv) Take extreme care in selecting sites to avoid direct disposal to water body which will affect the environment and inconvenience the community. (v) For excess spoil disposal, ensure (a) site shall be selected preferably from barren, infertile lands. In case agricultural land needs to be selected, written consent from	Contractor to finalize locations in consultation and approval of PIU	(i) List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas. (ii) Written consent of land owner/s (not lessee/s) for reuse of excess spoils to agricultural/vacant land	No cost required. Mitigation measures are part of contractual terms

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		landowners (not lessees) will be obtained; (b) debris disposal site shall be at least 200 m away from surface water bodies; (c) no residential areas shall be located within 50 m downwind side of the site; and (d) site is minimum 250 m away from sensitive locations like settlements, ponds/lakes or other water bodies.			
Sources of Materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.	(i) Prioritize sites already permitted by the Department of Mines and Geology (ii) If other sites are necessary, inform construction contractor that it is their responsibility to verify the suitability of all material sources and to obtain the approval of PIU/PMU and (iii)(iii) If additional quarries will be required after construction is started, inform construction contractor to obtain a written approval from PIU.	Contractor to prepare list of approved quarry sites and sources of materials with the approval of PIU	(i) List of approved quarry sites and sources of materials; (ii) Bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary.	No cost required. Mitigation measures are part of contractual terms
Consents, permits, clearances, NOCs, etc.	Failure to obtain necessary consents, permits, NOCs, etc. can result to design revisions and/or	(i) Obtain all necessary consents, permits, clearance, NOCs, etc. prior to award of civil works.	PMU and PMDSC	Incorporated in final design and communicated to contractors.	Project costs. Cost of obtaining all consents, permits, clearance, NOCs, etc. prior to start of

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
	stoppage of works	(ii) Ensure that all necessary approvals for construction to be obtained by contractor are in place before start of construction (iii) Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. (iv) Include in detailed design drawings and documents all conditions and provisions if necessary			civil works will be responsibility of PMU.
Asbestos Cement Pipes	Health risk due to exposure to asbestos materials as asbestos is proven carcinogenic agent	(i) Obtain details from PHED on location of underground AC pipes (ii) Locate the new pipe/sewer carefully to avoid encountering AC pipes (ii) Leave the AC pipes undisturbed in the ground.	PIU and PMDSC	(i) Detailed construction drawings showing alignment of AC pipes	No cost required. Mitigation measures are part of TOR of PIU and PMDSC

Table 9: Environmental Management Plan of Anticipated Impacts during Construction

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
EMP Implementation Training	Irreversible impact to the environment, workers, and community	(i) Project manager and all key workers will be required to undergo training on EMP implementation including spoils management, Standard operating procedures (SOP) for construction works; occupational health and safety (OH&S), core labor laws, applicable environmental laws, etc.	Construction Contractor	(i) Certificate of Completion (Safeguards Compliance Orientation) (ii) Posting of Certification of Completion at worksites (iii) Posting of EMP at worksites	Cost of EMP Implementation Orientation Training to contractor is responsibility of PMU. Other costs responsibility of contractor.
Air Quality	Emissions from construction vehicles, equipment, and machinery used for installation of pipelines resulting to dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons.	(i) Consult with PIU/on the designated areas for stockpiling of soils, gravel, and other construction materials; (ii) Damp down exposed soil and any stockpiled material on site by water sprinkling; (iii) Use tarpaulins to cover sand and other loose material when transported by trucks; (iv) Clean wheels and undercarriage of haul trucks prior to leaving construction site (v) Don't allow access in the work area except workers to limit soil disturbance and prevent access by barricading and security personnel (vi) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly and take	Construction Contractor	(i) Location of stockpiles; (ii) Complaints from sensitive receptors; (iii) Heavy equipment and machinery with air pollution control devices; (iv) Certification that vehicles are compliant with Air Act	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		pollution under control (PUC) certificates for all vehicles used in construction works (vii) Do regular water sprinkling in dusty areas to reduce dust emission during works (viii) Damp down the structures before demolishing to reduce dust emission (ix) Damp down on regular basis all the access ways (x) Maintain all the equipments and vehicles to reduce emission of smoke and keep pollution under control and keep records of periodic maintenance (xi) Carry out regular ambient air quality monitoring and keep records			
Surface water quality	Mobilization of settled silt materials, and chemical contamination from fuels and lubricants during installation of pipelines can contaminate nearby surface water quality.	(i) Prepare and implement a spoils management plan (**Appendix 9**) (ii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets; (ii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies; (iii) Place storage areas for fuels and lubricants away from any drainage leading to water bodies; (iv) Dispose any wastes generated	Construction Contractor	(i) Areas for stockpiles, storage of fuels and lubricants and waste materials; (ii) Number of silt traps installed along trenches leading to water bodies; (iii) Records of surface water quality inspection; (iv) Effectivenes	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		by work in designated sites; and (v) Conduct surface quality inspection according to the Environmental Management Plan (EMP).		s of water management measures; (v) No visible degradation to nearby drainages, nallahs or water bodies due to civil works	
Noise Levels	Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, materials, and people	(i) Plan activities in consultation with PIU/PMDSC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; (ii) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach; (iii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; and (iv) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s. (v) Conduct noise monitoring as per IEE and submit reports to PIU/PMDSC and take corrective measures if noise level exceeds the prescribed limits	Construction Contractor	(i) Complaints from sensitive receptors; (ii) Use of silencers in noise-producing equipment and sound barriers; (iii) Equivalent day and night time noise levels (see **Appendix 3** of this IEE) in noise monitoring reports	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
Landscape and aesthetics	Impacts due to excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items.	(i) Prepare and implement spoils management plan (**Appendix 9**); (ii) Avoid stockpiling of excess excavated soils; (iii) Coordinate with ULB/PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas; (iv) Recover used oil and lubricants and reuse or remove from the sites; (v) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; (vi) Remove all wreckage, rubbish, or temporary structures which are no longer required; and (vii) Request PIU to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.	Construction Contractor	(i) Complaints from sensitive receptors; (ii) Worksite clear of hazardous wastes such as oil/fuel (iiv) Worksite clear of any excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers	Cost for implementation of mitigation measures responsibility of contractor.
Existing Infrastructure and Facilities	Disruption of service and damage to existing infrastructure at specified project location	(i) Obtain from PIU the list of affected utilities and operators if any; (ii) Shifting of utilities should be done well in advance prior to start construction works in liaison with line agencies (iii) Prepare a contingency plan to include actions to be done in case of unintentional interruption of service	Construction Contractor	Existing Utilities Contingency Plan	Cost for implementation of mitigation measures responsibility of
Ecological Resources	Loss of	(i) Minimize removal of vegetation and disallow cutting of trees;	Construction Contractor	PIU to report in writing the no of	Cost for implementation

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
– Terrestrial	vegetation and tree cover	(ii) If tree-removal will be required, obtain tree-cutting permit from the Revenue Department; and (iii) Plant three native trees for every one that is removed.		trees cut and planted.	of mitigation measures responsibility of contractor.
Land use	Environmental Issues due to land use change	The impact due to change in land use will be negligible due to this project.	Not applicable	Not applicable	Not applicable
Accessibility	Traffic problems and conflicts near project locations and haul road	(i) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites; (ii) Schedule transport and hauling activities during non-peak hours; (iii) Locate entry and exit points in areas where there is low potential for traffic congestion; (iv) Keep the site free from all unnecessary obstructions; (v) Drive vehicles in a considerate manner; (vi) Coordinate with Traffic Police for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; (vii) Notify affected sensitive receptors 1-week in advance by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints. (viii) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum.	Construction Contractor	(i) Traffic route during construction works including number of permanent signages, barricades and flagmen on worksite (**Appendix 10**); (ii) Complaints from sensitive receptors; (iii) Number of signages placed at project location.	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		(viii) Provide pedestrian access in all the locations until normalcy is restored. (ix) Nature and duration of construction works and contact numbers for concerns/complaints. (x) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum. (ix) Provide pedestrian access in all the locations until normalcy is restored.			
Socio-Economic – Income.	Impede the access of residents and customers to nearby shops	(i) Prepare and implement spoils management plan (**Appendix 9**) (ii) Leave spaces for access between mounds of soil; (ii) Provide walkways and metal sheets where required for people; (iii) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools; (iv) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and (v) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints. (vi) Comply with labor laws	Construction Contractor	(i) Complaints from sensitive receptors; (ii) Spoils management plan (iii) Number of walkways, signages, and metal sheets placed at project location.	Cost for implementation of mitigation measures responsibility of contractor.
Occupational Health and	Occupational hazards which	(i) Comply with all national, state and local core labor laws (see	Construction Contractor	(i) Site-specific OH&S Plan;	Cost for implementation

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
Safety	can arise during work	**Appendix 8** of this IEE) (ii) Develop and implement site-specific occupational health and safety (OH&S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment like helmet, gumboot, safety belt, gloves, nose mask and ear plugs; (c) OH&S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents; (ii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site; (iii) Provide medical insurance coverage for workers; (iv) Secure all installations from unauthorized intrusion and accident risks; (v) Provide supplies of potable drinking water; (vi) The project area experiences extreme temperature during summer months of April and May, which may affect the health of workers engaged in construction work. Contractor should take necessary measures during summers including the following:		(ii) Equipped first-aid stations; (iii) Medical insurance coverage for workers; (iv) Number of accidents; (v) Supplies of potable drinking water; (vi) Clean eating areas where workers are not exposed to hazardous or noxious substances; (vii) record of H&S orientation trainings (viii) personal protective equipment; (ix) % of moving equipment outfitted with audible back-up alarms; (xi) permanent sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and	of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		(a) work schedule should be adjusted to avoid peak temperature hours (12 – 3 PM); (b) provide appropriate shade near the work place; allow periodic resting and provide adequate water, and (c) provide necessary medicine and facilities to take care of dehydration related health issues (vii) Provide clean eating areas where workers are not exposed to hazardous or noxious substances; (viii) Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; (ix) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted; (x) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; (vii) Ensure moving equipment is outfitted with audible back-up alarms; (xii) Mark and provide sign boards for hazardous areas such as energized electrical devices and		disposal. (xii) Compliance to core labor laws (see **Appendix 8** of this IEE)	

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; (xiii) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively; and (viii) Provide proper slod and liquid waste management program in the workers campsites, separate from spoils and debris disposal, as their presence can add to existing volume at the project sites.			
Impacts due to night works (if required as per nature of works and feasibility at site)	Occupational hazards which can arise during work at night in extreme and unavoidable cases	(i) Contractors should have hand held noise level meter for measurement of noise during night hours (ii) Contractors should have hand held lux meter for the measurement of illumination during night hours (iii) Preferably electrical connections is available for running equipments otherwise sound proof/super silent Diesel Generator set should be available (iv) Sound level should not increase as per EMP (v) Illumination should be adequate as required according to nature of	Contractor	Management Plan for night works (As per **Annexure 15**)	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		works (vi) As far as possible ready mix concrete from batching plant to be used, otherwise the concrete should be prepared away from residential areas and brought to the site (vii) All the noise activity like hammering, cutting, crushing, running of heavy equipments should be done in day time and avoided in night time (viii) Workers engaged in night works should have adequate rest/sleep in day time before start of night works (ix) Worker engaged for night works should have previous experience of night works and should be physically fit for such works including clear vision in night (x) All the necessary provisions of traffic aids such as traffic signals, road signage, barricades, cautions boards, traffic diversion boards etc. should be available with fluorescent/retro-reflective arrangements (xi) Workers should be trained before start of night works about risks and hazards of night works and their mitigation measures and should be provided all the protective aids (PPEs) including fluorescent/retro-reflective vests (xii) Horns should not be permitted by equipments and vehicles			

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		(xiii) Workers should not shout and create noise (xiv) First aid and emergency vehicles should be available at site (xv) Emergency preparedness plan should be operative during night works (xvi) Old persons and pregnant women and women having small kids should not work in night time (xvii) All the vehicles and equipments being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise (xviii) All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works			
Asbestos Cement (AC) Materials	Health risks associated with AC pipes	(i) Left AC pipes in-situ. (ii) Training of all personnel (including manual labourers) to enable them to understand the dangers of AC pipes and to be able to recognize them in situ; (iii) Reporting procedures to inform management immediately if AC pipes are encountered; (iv) Development and application of a detailed OH&S procedure to protect both workers and citizens. This should comply with national and international standards for dealing with asbestos, and should include: (a) removal of all persons to a safe distance; (b) usage of	Construction Contractor	(i) Site-specific OH&S Plan including AC pipe protocol (iii) record of OH&S orientation on AC Cement Materials Protocol (iv) personal protective equipment for AC materials (v) sign boards for pipe alignment identified as AC	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		appropriate breathing apparatus and protective equipment by persons delegated to deal with the AC material; and (c) Procedures for the safe removal and long-term disposal of all asbestos- containing material encountered.		pipes.	
Community Health and Safety.	Traffic accidents and vehicle collision with pedestrians during material and waste transportation	(i) inform nearby community in advance about nature and duration of works before start of construction works in the area (ii) Plan routes to avoid times of peak-pedestrian activities. (iii) Liaise with PIU/ULB in identifying high-risk areas on route cards/maps. (iv) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. (v) Provide road signs and flag persons to warn of on-going trenching activities. (vi) Do not exercise noisy activities in night hours in residential areas	Construction Contractor	(i) Traffic Management Plan; (ii) Complaints from sensitive receptors	Cost for implementation of mitigation measures responsibility of contractor.
Safety of sensitive groups (children, elders etc.) and others pedestrians in narrow streets	Trench excavation in narrow streets will pose high risk to children and elders in the locality	(i) Provide prior information to the local people about the nature and duration of work (ii) Conduct awareness program on safety during the construction work (iii) Undertake the construction work stretch-wise;	Construction Contractor	Complaints from neighborhood and monitoring of accidents	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		(iv) excavation, pipe laying and trench refilling should be completed on the same day (v) Provide barricades, and deploy security personnel to ensure safe movement of people and also to prevent unnecessary entry and to avoid accidental fall into open trenches			
Work Camps and worksites	Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants Unsanitary and poor living conditions for workers	(i) Consult with PIU before locating project offices, sheds, and construction plants; (ii) Minimize removal of vegetation and disallow cutting of trees; (iii) Provide drinking water, water for other uses, and sanitation facilities for employees; (iv) Ensure conditions of livability at work camps are maintained at the highest standards possible at all times; (v) Prohibit employees from poaching wildlife and cutting of trees for firewood; (vi) Train employees in the storage and handling of materials which can potentially cause soil contamination; (vii) Recover used oil and lubricants and reuse or remove from the site; (viii) Manage solid waste according to the preference hierarchy: reuse, recycling and disposal to designated areas; (ix) Ensure unauthorized persons especially children are not	Construction Contractor	(i) Complaints from sensitive receptors; (ii) Drinking water and sanitation facilities for employees	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		allowed in any worksite at any given time.			
Social and Cultural Resources	Risk of archaeological chance finds	(i) Strictly follow the protocol for chance finds in any excavation work; (ii) Request PIU or any authorized person with archaeological field training to observe excavation; (iii) Stop work immediately to allow further investigation if any finds are suspected; (iv) Inform PIU if a find is suspected, and take any action they require ensuring its removal or protection in situ.	Construction Contractor	Records of chance finds	Cost for implementation of mitigation measures responsibility of contractor.
Submission of EMP implementation report	Unsatisfactory compliance to EMP	(i) Appointment of supervisor to ensure EMP implementation (ii) Timely submission of monitoring reports including pictures	Construction contractor	Availability and competency of appointed supervisor Monthly report	Cost for implementation of mitigation measures responsibility of contractor.
Post-construction clean-up	Damage due to debris, spoils, excess construction materials	(i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and (ii) All excavated roads shall be reinstated to original condition. (iii) All disrupted utilities restored (iv) All affected structures rehabilitated/compensated (v) The area that previously housed the construction camp is to be checked for spills of substances	Construction Contractor	PIU/PMDSC report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed;	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		such as oil, paint, etc. and these shall be cleaned up. (vi) All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be top soiled and regrassed using the guidelines set out in the revegetation specification that forms part of this document. (vii) The contractor must arrange the cancellation of all temporary services. (vi) Request PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.		and (iv) worksite clean-up is satisfactory.	

Table 10: Environmental Management Plan of Anticipated Impacts during Operation

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
Check for blockage and leakage problems reducing the water losses	It may affect the water supply system	(i) Effectiveness of leak detection and water auditing to reduce the water losses (ii) Implementation of regular O&M schedules	Pali Nagar Parishad/Operator	Pali Nagar Parishad (PNP)	PNP Cost
Check the leakages blockages, overflow problem in sewers	It may affect the sewer system, contaminate land, water and create public health issues	(i) Effective operation to avoid and/or immediate clearance of such leaks, blockages (ii) Implementation of regular O&M schedules	Pali Nagar Parishad/Operator	Pali Nagar Parishad	PNP Cost
Check the leakages blockages, overflow problem in sewers	Occupational health &safety: for personnel cleaning underground sewers there is a risk due to oxygen deficiency and harmful gaseous emissions (hydrogen sulphide, carbon monoxide, methane, etc.);	(i) Provide necessary health & safety training to the staff engaged sewer cleaning & maintenance (ii) provide appropriate personal protection equipment (including oxygen masks)	Pali Nagar Parishad/Operator	Pali Nagar Parishad	PNP Cost
STP operation	Improper operation due to power outage, malfunction, lakh of chemicals, may affect the treatment efficiency	(i) Ensure continuous uninterrupted power supply (ii) Provide back-up facility (such as generator) and make sure that adequate fuel supplies (iii) Provide operating manual with all standard operating procedures (SOPs) for operation and maintenance of the facility; this should include guidance on the follow up actions in case of process disruptions, inferior quality of treated water; etc. Necessary training (hands-on and class room / exposure visits) shall be provided to the ULB staff dealing with STP.	Pali Nagar Parishad/Operator	PNP/Rajasthan Pollution Control Board	PNP Cost
STP operation	Disposal industrial effluent into sewers will upset the STP process and efficiency	(i) No industrial wastewater shall be allowed to dispose into municipal sewers (ii) No domestic wastewater from industrial units shall be allowed into municipal sewers	Pali Nagar Parishad	PNP/Rajasthan Pollution Control Board	PNP Cost

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		(iii) Ensure that there is no illegal discharge through manholes or inspection chambers (iv) Conduct public awareness programs; in coordination with RPCB, issue notice to all industries for compliance (v) Conduct regular wastewater quality monitoring (at inlet and at outlet of STP) to ensure that the treated effluent quality complies with the standards			
Asset management	Reduction in NRW Increased efficiency of the system	Preparation of O & M Manual	Pali Nagar Parishad	Pali Nagar Parishad	PNP cost

Table 11: Environmental Monitoring Plan of Anticipated Impacts during Construction

Monitoring field	Monitoring Locations	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
Construction disturbances, nuisances, public & worker safety,	All work sites	Implementation of dust control, noise control, traffic management, & safety measures. Site inspection checklist to review implementation is appended at **Appendix 13**	Weekly during construction	Supervising staff and safeguards specialists	No costs required
Ambient air quality parameters	3 locations (WTP site, and centre of the town, and at construction)	PM10, PM2.5 NO2, SO2, CO	Once before start of construction and six monthly during construction	Contractor	Cost for implementation of monitoring measures responsibility of contractor
Ambient noise quality parameters	3 locations (WTP site, and centre of the town, and at construction)	Day time and night time noise levels	Once before start of construction and six monthly during construction	Contractor	Cost for implementation of monitoring measures responsibility of contractor
Surface water quality parameters	Bandi River (when work is carried out near River)	pH, Turbidity, Total Hardness, DO, BOD, COD, Chloride, Hg, Iron, TDS, TSS, Calcium, Zn, Cr+6, Magnesium, Copper, Manganese, Sulphate, Cyanide, Nitrate, Sodium, Potassium, Fluoride, Cadmium, Arsenic, Lead, Boron, Selenium, Aluminium, Total residual Chlorine	Once before start of construction and six monthly during construction near River Bandi (except mansoon season)	Contractor	Contractors cost
Erosion hazards	- Construction zone - storage areas		- daily visual inspection by contractor supervisor and/or environment	Contractor/PMDSC/PIU	No cost required

Monitoring field	Monitoring Locations	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
			specialist - weekly visual inspection by PMDSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC		
Impacts on water quality	Adjacent bodies of water including drainages, canals/nallahs, etc.	Whether water quality is being deteriorated/polluted due to any construction activity Storage of oil and grease near any surface water source Workers using areas nearby the water source for open defecation or any other use Water stream being obstructed/blocked due to any construction activity	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual inspection by PMDSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMDSC	Contractor/PMDSC/PIU	No cost required
Impacts on air quality	- Construction zone - Sensitive receptors site/s	- water spraying on stockpiles - excessive dust emissions - vehicles “pollution under control” certificate from Himachal Pradesh SPCB - CFE and CFO for hot mix plants, crushers, diesel generators, etc., if to be	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual inspection by PMDSC/PIU (more	Contractor/PMDSC/PIU	No cost required

Monitoring field	Monitoring Locations	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
		used in the project - complaints related to air quality	frequent during summer season and if corrective action is required) - random inspection by PMU, PIU, PMDSC		
Noise and vibrations impacts	- construction zone	- work schedule (limit to day time only in temple complexes and other important areas) - activities with the greatest potential to generate noise (conducted during periods of the day which will result in least disturbance) - vehicle silencers and noise-reducing mufflers - complaints related to noise and vibrations	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual inspection by PMDSC/PIU (more frequent during noisy works) - random inspection by PMU, PIU, PMDSC	Contractor/PMDSC/PIU	No cost required
Impacts on flora and fauna	Near Construction sites	- site induction and environmental awareness - number of trees cut - number of trees replanted - survival rate of trees planted	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual inspection by PMDSC/PIU - random inspection by PMU, PIU, PMDSC	Contractor/PMDSC/PIU	No cost required
Impacts on physical and cultural		- damage to structures/properties adjacent to construction	- daily visual inspection by contractor	Contractor/PMDSC/PIU	No cost required

Monitoring field	Monitoring Locations	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
resources		zone - sign boards to inform nature and duration of construction works and contact numbers for concerns/complaints - number of workforce near the school/s and other sensitive receptor/s - housekeeping practices, wastes around construction zones - toilet facilities for workers - transportation routes and schedule - chance find procedure	supervisor and/or environment specialist - weekly/monthly visual inspection by PMDSC/PIU - random inspection by PMU, PIU, PMDSC		
Impact due to waste generation	Construction sites, construction camps, disposal/storage areas, routes of transportation	- provisions of the waste management plan - quantity of excavated soils - quantity of used oil and lubricants - excess construction materials, and solid waste (removed concrete, wood, trees and plants, packaging materials, empty containers, oils, lubricants, and other similar items)	daily visual inspection by contractor supervisor and/or environment specialist - weekly/monthly visual inspection by PMDSC/PIU - random inspection by PMU, PIU, PMDSC	Contractor/PMDSC/PIU	No cost required
Impacts on occupational health and safety	Construction sites, workers camps, construction camps	As per IEE/EMP	daily visual inspection by contractor supervisor and/or environment specialist - weekly/monthly visual inspection by	Contractor/PMDSC/PIU	No cost required

Monitoring field	Monitoring Locations	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
			PMDSC/PIU - random inspection by PMU, PIU, PMDSC		
Impacts on socio-economic activities	Work sites, construction camps	- % of locals in labor force - complaints/ grievances	- random inspection by PMU, PIU, PMC and/or DSC - during complaints/ grievance redressal	Contractor/PMDSC/PIU	No cost required

Table 12: Environmental Monitoring Plan of Anticipated Impacts during Operation

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
Monitoring of quality of water supplied to consumers	Consumer end-random sampling in all zones	pH, Nitrite, Nitrate, Turbidity BOD, Total Alkalnity, Total coliform and Feacal coliform	Monthly once	Pali NP	O&M contractor
Pipeline network to sustain operational efficiency and avoid clogging and early occurrence of leakages	Pipeline network	to be included in O&M plan prepared under the project	as per O&M plan	Pali Nagar Parishad	O&M contractor
De-sludging of sludge beds to avoid sedimentation and ensure efficient collection and storage of wastewater	Sludge beds	to be included in O&M plan prepared under the project	as per O&M plan	Pali Nagar Parishad	O&M contractor
Disposal of sludge from WTP	WTPs	Sludge from WTP to be disposed as per RPCB permitted methods or conditions stipulated in consent to operate for WTPs	When sludge disposal is required as per O&M plan	Pali Nagar Parishad	O&M contractor

B. Institutional Requirements

131. **Government.** The Local Self Government Department (LSGD) of Government of Rajasthan will be the Executing Agency (EA) and existing RUIDP will be the Implementing Agency (IA). The LSGD will be responsible for overall strategic planning, guidance and management of the RUSDP, and for ensuring compliance with loan release conditions and loan covenants. A policy support unit will be established in the LSGD to support the government for implementation of the policy actions under the program loan. The RUIDP will be responsible for planning, implementation, monitoring and supervision, and coordination of all activities under the RUSDP. The RUIDP will recruit two consulting firms – (i) project management, design and supervision consultant (PMDSC), and (ii) community awareness and participation consultant (CAPC) to provide support in implementation of RUSDP. Six Project Implementation Units (PIUs), one each of in six project towns, shall be set up directly to assist in implementation. PMU will support PIUs in implementation, management and monitoring of the project. PMU and PIUs will be assisted by PMDSC and CAPC. PIUs will appoint construction contractors to build infrastructure. Once the infrastructure is built and commissioned, the Urban Local Bodies will operate and maintain the infrastructure.

132. Project Officer (Environment) at PMU and Assistant Safeguard Officer (ASO) at each of the PIUs will be responsible for environment management and monitoring activities, and will be supported by Environment Safeguard Specialist of PMDSC Team and Community Mobilization of Community Awareness and Participation Consultant (CAPC).

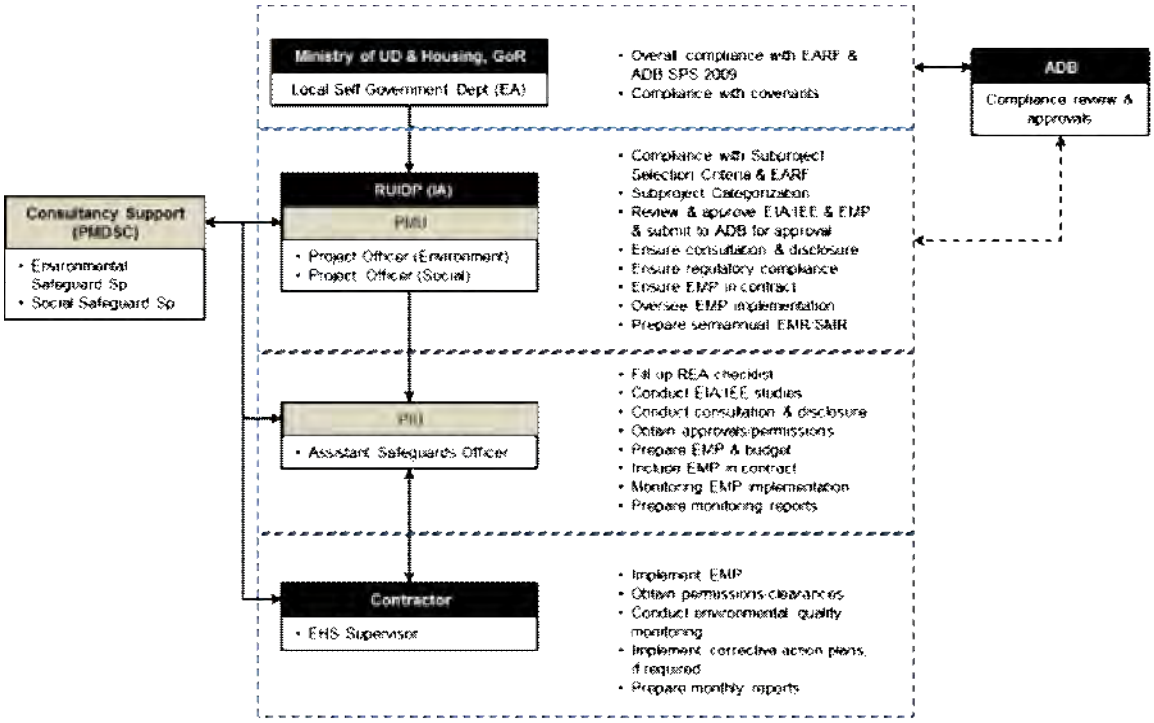
133. At state-level an inter-ministerial Empowered Committee (EC) will be established to provide overall policy direction EC will provide approval for the projects and recommend to Government for providing administrative sanction for the sub-projects. City Level Committees (CLCs) will be established in each town to oversee the implementation at town level.

134. **Consultants**. PMU and PIUs will be assisted by Project Management, Design and Supervision Consultants (PMDSC) in project planning, preparation of project and cost estimates, coordination, technical guidance and supervision, financial control, training and overall project management. Consultant Team includes an environmental safeguards specialist (ESS), who will support PO (Environment) at PMU and ASOs at PIUs in implementation, management and monitoring of all safeguard related activities. The consultant team also includes an Assistant Construction Manager at each PIU responsible for the construction supervision including environmental safeguards at subproject town level. CAPC will support PIU in construction facilitation, community consultation and grievance registration and redressal during the construction.

135. **Contractor.** The contractor shall appoint an Environment, Health and Safety (EHS) supervisor who will be responsible on a day-to-day basis for (i) ensuring implementation of EMP, (ii) coordinating with the ACM and environment safeguards specialists (all levels PO, ASO & ESS); (iii) community liaison, consultations with interested/affected parties, and grievance redressal; and (iv) reporting. Requirement of EHS Supervisor will be included in the bid documents.

136. The following figure and **Table 12** summarizes the institutional responsibility of environmental safeguards at all stages of the project.

FIGURE 8: ENVIRONMENTAL SAFEGUARDS IMPLEMENTATION ARRANGEMENT



ADB – Asian Development Bank, EARF – Environmental Assessment and Review Procedures, EHS – Environment, Health & Safety, EIA – Environmental Impact Assessment, EMP – Environmental Management Plan, GoR – Government of Rajasthan, IA – Implementing Agency, IEE – Initial Environmental Examination, PIU – Project Implementation Unit, PMU – Project Management Unit, PMDSC – Project Management, Design & Supervision Consultant, RUIDP – Rajasthan Urban Infrastructure Development Project, REA – Rapid Environmental Assessment, SPS – Safeguard Policy Statement, 2009

Table 13: Institutional Roles and Responsibilities

Responsible Agency	Responsibility		
	Pre-Construction Stage	**Construction Stage**	**Post-Construction**
Project Officer (Environment), RUIDP, PMU	(i) Review REA checklists and assign categorization based on ADB SPS 2009 (ii) Review and approve EIA/IEE (iii) Submit EIA/IEE to ADB for approval and disclosure in ADB website (iv) sure approved IEEs are disclosed in RUIDP/PMU websites and summary posted in public areas accessible and understandable by local people. (v)) Ensure environmental management plans (EMPs) are included in the bid documents and contracts (vi)) Organize an orientation workshop for PMU, PIU, ULB and all staff involved in the project implementation on (a) ADB SPS, (b) Government of India national, state, and local environmental aws and	(i) Over-all environmental safeguards compliance of the project (iii) Monitor and ensure compliance of EMPs as well as any other environmental provisions and conditions. (i) Review monthly monitoring report (ii) Prepare and submit to ADB semi-annual monitoring reports (iv) If necessary prepare Corrective Action Plan and ensure implementation of corrective actions to ensure no environmental impacts; (iii) Review and submit Corrective Action Plans to ADB capacity building programs on environmental safeguards (iv) Coordinate with	Compliance monitoring to review the environmental performance of project component, if required and as specified in EMP

Responsible Agency	Responsibility		
	Pre-Construction Stage	**Construction Stage**	**Post-Construction**
	regulations, (c) core labor standards, (d) OH&S, (e) EMP implementation especially spoil management, working in congested areas, public relations and ongoing consultations, grievance redress, etc. (vii)) Assist in addressing any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs (viii)) Organize an induction course for the training of contractors preparing them on EMP implementation, environmental monitoring requirements related to mitigation measures; and taking immediate actions to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation. (ix) sure compliance with all government rules and regulations regarding site and environmental clearances as well as any other environmental requirements (x)) Assist PMU, PIUs, and project NGOs to document and develop good practice construction guidelines to assist the contractors in implementing the provisions of IEE.) Assist in the review of the contractors' implementation plans to ensure compliance with the IEE.	national and state level government agencies (vi) Assist in addressing any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs (iv) Coordinate PIUs, NGOs, consultants and contractors on mitigation measures involving the community and affected persons and ensure that environmental concerns and suggestions are incorporated and implemented	
Assistant Safeguard Officer, PIU	(i) Conduct initial environmental assessment for proposed project using REA checklists and submit to PMU (ii) Prepare EIA/IEE based on categorization and submit to PMU for approval (iii) Ensure IEE is included in bid documents and contract agreements. Ensure cost of EMP implementation is provided. (iv) sclose approved EIAs/IEEs. (v)) Obtain all necessary	(i) Ensure EMP implementation is included in measuring works carried out by the contractors and certifying payments. (ii) Ensure Corrective Action Plan is implemented. (ii) Conduct public awareness campaigns and participation programs (iii) Prepare monthly reports. (vi) Address any grievances	(i) Conducting environmental monitoring, as specified in the EMP. (ii) Issuance of clearance for contractor's post-construction activities as specified in the EMP.

Responsible Agency	Responsibility		
	Pre-Construction Stage	**Construction Stage**	**Post-Construction**
	clearances, permits, consents, NOCs, etc. Ensure compliance to the provisions and conditions. (vi)) EMP implementation regarding sites for disposal of wastes, camps, storage areas, quarry sites, etc. (vii)) Ensure contractors undergo EMP implementation orientation prior to start of civil works	brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs	
Consultant - PMDSC 1. Environmental Safeguard Specialist 2. Assistant Construction Manager at PIU	(i) Assist PIU in preparation of REA checklists and EIAs/IEEs (ii) Assist PIU in obtaining all necessary clearances, permits, consents, NOCs, etc. Ensure provisions and conditions are incorporated in the IEE and detailed design documents. (iii) Assist in ensuring IEE is included in bid documents and contract agreements. Assist in determining adequacy of cost for EMP implementation. (iv) ssist in addressing any concern related to IEE and EMP. (v)) Assist in summarizing IEE and translating to language understood by local people.	(i) Monitor EMP implementation (ii) Recommend corrective action measures for non-compliance by contractors (iii) Assist in the review of monitoring reports submitted by contractors (iv) ssist in the preparation of monthly monitoring reports (vi) Assist in addressing any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs	(i) Assist in the inspection and verification of contractor's post-construction activities.
Contractors	(i) Ensure EMP implementation cost is included in the methodology. (ii) Undergo EMP implementation orientation prior to award of contract (iii) Provide EMP implementation orientation to all workers prior to deployment to worksites (iv) approval for camp sites and sources of materials. (v)) Ensure copy of IEE is available at worksites. Summary of IEE is translated to language understood by workers and posted at visible places at all times.	(i) Implement EMP. (ii) Implement corrective actions if necessary. (iii) Prepare and submit monitoring reports including pictures to PIU (iv) mply with all applicable legislation, is conversant with the requirements of the EMP; (v)) Brief his staff, employees, and laborer about the requirements of the EMP and provide environmental awareness training to staff, employees, and laborers; (vi)) Ensure any sub-contractors/ suppliers who are utilized within the context of the contract comply with all requirements of the EMP.	(i) Ensure EMP post- construction requirements are satisfactorily complied (ii) Request certification from PIU

Responsible Agency	Responsibility		
	Pre-Construction Stage	Construction Stage	Post-Construction
		The Contractor will be held responsible for non-compliance on their behalf; (vii)) Bear the costs of any damages/compensation resulting from non-adherence to the EMP or written site instructions; (viii)) Ensure that PIU and ACM/ASO are timely informed of any foreseeable activities related to EMP implementation. (vi) Address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs	

C. Training Needs

137. The following **Table 14** presents the outline of capacity building program to ensure EMP implementation. The estimated cost is Rs.275,000 (excluding trainings of contractors which will be part of EMP implementation cost during construction) to be covered by the project's capacity building program. The detailed cost and specific modules will be customized for the available skill set after assessing the capabilities of the target participants and the requirements of the project by the ESS of PMDSC.

Table 14: Outline Capacity Building Program on EMP Implementation

Description	Target Participants& Venue	Estimate (INR)	Cost and Source of Funds
1. Introduction and Sensitization to Environmental Issues (1 day) - ADB Safeguards Policy Statement - Government of India and Rajasthan applicable safeguard laws, regulations and policies including but not limited to core labor standards, OH&S, etc. - Incorporation of EMP into the project design and contracts - Monitoring, reporting and corrective action planning	All staff of PIU and consultants involved in the project At PMU, Jaipur	INR 100,000 (Lump sum)	PMU cost
2. EMP implementation (2 days) - Roles and responsibilities - OH&S planning and implementation - Wastes management (water, hazardous, solid,	All staff and consultants involved in the Pali subproject All contractors prior to award of contract	INR 50,000 (Lump sum)	PMU cost

Description	Target Participants& Venue	Estimate (INR)	Cost and Source of Funds
excess construction materials, spoils, etc.) - Working in congested areas, - Public relations - Consultations - Grievance redress - Monitoring and corrective action planning - Reporting and disclosure - Post-construction planning	At PIU, Pali		
3. Plans and Protocols (1 day) - Construction site standard operating procedures (SOP) - AC pipe protocol - Site-specific EMP - Traffic management plan - Spoils management plan - Waste management plan - Chance find protocol - O&M plans Post-construction plan	All staff of PIU and consultants involved in the project All contractors prior to award of contract or during mobilization stage. At PIU Pali	Lump sum INR 25,000 (Lump sum) Lump sum INR 25,000 (Lump sum)	PMU cost Contractors cost as compliance to contract provisions on EMP implementation (refer to EMP tables)
4. Experiences and best practices sharing - Experiences on EMP implementation - Issues and challenges - Best practices followed	All staff of PIU and consultants involved in the project, all contractors All NGOs	INR 100,000 (Lump sum)	PMU Cost
5. Contractors Orientation to Workers on EMP implementation (OH&S, core labor laws, spoils management, etc.)	All workers (including manual laborers) of the contractor prior to dispatch to worksite	Lump sum INR 25,000 (Lump sum)	Contractors cost as compliance to contract provisions on EMP implementation (refer to EMP tables)

138. Summary of Capacity Building cost for EMP Implementation

Contractor Cost	- INR 50,000
PMU Cost	- INR 275,000
Total	**- INR 325,000**

D. Monitoring and Reporting

139. Prior to commencement of the work, the contractor will submit a compliance report to PIU ensuring that all identified pre-construction environmental impact mitigation measures as detailed in the EMP will be undertaken. PIU with the assistance of the ASO and ESS of PMDSC will review the report and thereafter PMU will allow commencement of works.

140. During construction, results from internal monitoring by the contractor will be reflected in their fortnightly (twice a month) EMP implementation reports to the PIU and Assistant Construction Manager of PMDSC. ASO and ACM will review and advise

contractors for corrective actions if necessary. Monthly report summarizing compliance and corrective measures taken will be prepared by ASO with the assistance of ACM and submitted to PMU.

141. Based on monthly reports and measurements, PMU will draft, review, and submit to ADB, 6-monthly (twice a year) EMP implementation progress report (**Appendix 11**). Once concurrence from the ADB is received the report will be disclosed in the Project website.

142. ADB will review project performance against the RUSDP commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the project's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system.

E. EMP Implementation Cost

143. Most of the mitigation measures require the contractors to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance. Regardless of this, any costs of mitigation by the construction contractors or consultants are included in the budgets for the civil works and do not need to be estimated separately here. Mitigation that is the responsibility of PIU/ULB will be provided as part of their management of the project, so this also does not need to be duplicated here. Cost for the capacity building program is included as part of the project.

Table 15: Cost Estimates to Implement the EMP

	Particulars	**Stages**	**Unit**	**Total Number**	**Rate (INR)**	**Cost (INR)**	**Costs Covered By**
A.	**Mitigation Measures**						
1	Compensatory plantation measures	Construction	Per tree	To be assessed	Lump sum	1,00,000	Civil works contract
	Subtotal (A)					**1,00,000**	
B.	**Monitoring Measures**						
	Air quality monitoring	Construction	per sample	3 x 17 = 51	5,000	2,55,000	Civil works contract
	Noise levels monitoring	Construction	Per sample	3 x 17 = 51	2,000	1,02,000	Civil works contract
	Subtotal (B)					**3,57,000**	
C.	**Capacity Building**						
1.	Introduction and sensitization to environment issues	Pre-construction	lump sum			100,000	PMU
2.	EMP implementation	Construction	lump sum			50,000	PMU
3.	Plans and Protocols	Construction	lump sum			25,000	PMU
			lump sum			25,000	Civil works contract
4.	Experiences and best practices sharing	Construction/Post-	lump sum			100,000	PMU

	Particulars	Stages	Unit	Total Number	Rate (INR)	Cost (INR)	Costs Covered By
		Construction					
5.	Contractors Orientation to Workers on EMP implementation	Prior to dispatch to worksite	Lump sum			25,000	Civil works contract
	Subtotal (C)					**325,000**	
D	**Civil Works**						
1	Construction of shelters for workers.	Construction	Lump sum			1,500,000	Civil works contract
2	Providing Water Supply Facility for the workers	Construction	Lump sum			250,000	Civil works contract
3	Providing Sanitation	Construction	Per unit	16	20,00	320,000	Civil
4	Facility for the workers				0		works contract
5	Barricading to a height of 1.8 m (frame with MS pipes and cover with corrugated sheets)	Construction	m2	18,562	126	2,338,790	Civil works contract
6	Traffic management (Pavement Markings, Channelizing Devices, Arrow Panels and Warning Lights)	Construction	Per unit (at each location)	17	3000	51,000	Civil works contract
	Sub Total (D)					**4,459,790**	
	Total (A+B+C)				**INR**	**52,41,790**	

Contractor Cost - 49,66,790

PMU Cost - 275,000

Total **- 52,41,790**

VIII. CONCLUSION AND RECOMMENDATION

144. The process described in this document has assessed the environmental impacts of all elements of the Pali Bulk Water System subproject. All potential impacts were identified in relation to pre-construction, construction, and operation phases. Planning principles and design considerations have been reviewed and incorporated into the site planning and design process wherever possible; thus, environmental impacts as being due to the project design or location were not significant. During the construction phase, impacts mainly arise from the construction dust and noise, the need to dispose of large quantities of waste soil and import a similar amount of sand to support the pipes in the trenches; and from the disturbance of residents, businesses, traffic and important buildings by the construction work. The social impacts (access disruptions) due to construction activities are unavoidable, as the residential and commercial establishments exist along the roads where pipes will be laid. A resettlement plan has been developed in accordance with ADB SPS 2009 and Government of India laws and regulations.

145. Anticipated impacts of water supply during operation and maintenance will be related to detection and repair of leaks, pipe bursts, O&M of WTPs. These are, however, likely to be minimal, as proper design and selection of good quality pipe material shall

mean that leaks are minimal. Leak repair work will be similar to the pipe-laying work. Faulty section will be exposed and repaired following the same basic procedure as when the pipes were laid.

146. The public participation processes undertaken during project design ensured stakeholders are engaged during the preparation of the IEE. The planned information disclosure measures and process for carrying out consultation with affected people will facilitate their participation during project implementation.

147. The project's grievance redress mechanism will provide the citizens with a platform for redress of their grievances, and describes the informal and formal channels, time frame, and mechanisms for resolving complaints about environmental performance.

148. The EMP will assist the PMU, PIU, PMDSC and contractors in mitigating the environmental impacts, and guide them in the environmentally sound execution of the proposed project. The EMP will also ensure efficient lines of communication between PIU/ULB, PMU, consultants and contractor.

149. A copy of the EMP shall be kept on-site during the construction period at all times. The EMP shall be made binding on all contractors operating on the site, and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.

150. The project will benefit the general public by contributing to the long-term improvement of water supply systems and community livability in Pali. The potential adverse environmental impacts are mainly related to the construction period, which can be minimized by the mitigating measures and environmentally sound engineering and construction practices.

151. Therefore, as per ADB SPS, the project is classified as environmental category B and does not require further environmental impact assessment. However, to conform to GoI guidelines, WTPs require Consent for Establishment (CFE) and Consent for Operation (CFO) from Rajasthan Pollution Control Board.

Appendix 1: REA Check list

WATER SUPPLY

Instructions:

- This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department.
- This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- 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.

152. **Country/Project Title:** India / Rajasthan Urban Infrastructure Development Phase 3 (RUSDP)

153. **Sector Division:** Urban Development

SCREENING QUESTIONS	Yes	No	REMARKS
Water Supply			
A. Project Siting. Is the project area-			
▪ Densely populated?	√		Subproject activities extend to the entire town including the densely populated areas. There are no major negative impacts envisaged, because pipeline will be located in government lands alongside the existing roads and can be constructed without causing permanent disturbance to houses and commercial establishments.
▪ Heavy with development activities?	√		Pali is a developing town; urban expansion is considerable
▪ Adjacent to or within any environmentally sensitive areas?		√	
• Cultural heritage site		√	
• Protected Area		√	
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential environmental Impacts Will the Project cause…			
• Pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?		√	Not applicable. The present project does not involve any proposal for intake works. Raw water is being taken through PHED by Jawai Dam.
• Impairment of historical/cultural monuments/areas and		√	There are no cultural heritage sites/monuments of prominence. There are religious places of

SCREENING QUESTIONS	Yes	No	REMARKS
loss/damage to these sites?			importance. However, the project will not interfere with these places
• Hazard of land subsidence caused by excessive ground water pumping?		√	Not applicable; subproject does not involve groundwater abstraction
• Social conflicts arising from displacement of communities?		√	Project does not involve land acquisition /displacement. No social conflicts envisaged
• Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		√	Not applicable. The present project does not involve any proposal for intake works. PHED will supply raw water taken from Jawai Dam
• Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?		√	PHED will supply raw water taken from Jawai Dam. Presently system of raw water intake exists in the town. The existing raw water supply will continue; no source intervention (new/ augmentation/ modification) is part of this subproject
• Delivery of unsafe water to distribution system?	√		The present project involve proposal for construction of one WTP of 30 MLD and upgrade / refurbishment of three existing water treatment plants. There are chances that unsafe water can enter in the distribution system due to improper functioning of WTPs or entry of unsafe water in the distribution system due pipe leakage/burst. The contractor has to ensure that proposed treatment plants are maintained properly by the ULB to have the outlet quality meeting drinking water standards.
• Inadequate protection of intake works or wells, leading to pollution of water supply?		√	Not applicable. The civil works are limited to construction of WTP and refurbishment of existing WTPs and providing distribution network improvement (DNI)
• Over pumping of ground water, leading to salinization and ground subsidence?		√	Not applicable; subproject does not involve groundwater abstraction
• Excessive algal growth in storage reservoir?	√		Some new OHSRs and refurbishment of existing OHSRs are proposed in the project and there are chances of algal growth if proper cleaning and maintenance is not practiced
• Increase in production of sewage beyond capabilities of community facilities?		√	Sewerage system will also be improved under RUSDP along with water supply in previous project
• Inadequate disposal of sludge from water treatment plants?	√		There are chances that inadequate disposal of sludge from WTPs can cause pollution/nuisance. This is to ensure that sludge from WTPs should be disposed as per guidelines of CPCB/RPCB and/or as given in consent conditions
• Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?	√		One new proposed WTP at Manpura Bhakhri is located away from dense habitation and demarcated by road, boundary of forest area, fencing etc. therefore there is already buffer zone whereas existing WTPs and pumping stations are within campus of PHED, which are having buffer zone to alleviate noise and other possible nuisances
• Impairments associated with transmission lines and access roads?	√		Temporary impairments are anticipated along the new transmission line routes during construction stage.
• Health hazards arising from inadequate design of facilities for	√		There is risk that inappropriate handling, storage or use of chorine may cause serious accidents

SCREENING QUESTIONS	Yes	No	REMARKS
receiving, storing, and handling of chlorine and other hazardous chemicals.			causing severe health risks. All there care should be taken for safe handling, storage and usage of chlorine in WTPs
• Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?	√		There is risk that inappropriate handling, storage or use of chorine may cause serious accidents causing severe health risks. All there care should be taken for safe handling, storage and usage of chlorine in WTPs
• Dislocation or involuntary resettlement of people	√		Temporary livelihood disruption of roadside vendor, hawkers, shopkeepers is envisaged for which Resettlement Plan will be made separately
• Social conflicts between construction workers from other areas and community workers?		√	The contractor will be utilizing the local labour force as far as possible; in case if it is unavoidable, labour camps and facilities will be provided appropriately. No conflicts envisaged
• Noise and dust from construction activities?	√		All the construction machineries employed will comply with noise emission standards of Central Pollution Control Board. Dust suppression measures such as water sprinkling will be employed
• Increased road traffic due to interference of construction activities?	√		Excavation and laying pipelines along public roads will interfere with the traffic. Construction material transport will increase traffic within city. Proper traffic management and construction planning will be ensured to minimize the interference
• Continuing soil erosion/silt runoff from construction operations?	√		Soil erosion/silt runoff is possible during construction works in mansoon. Construction work during monsoon should be carried out with due care so that silt run off due to construction work is prevented.
• 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?	√		There is possibility that if WTPs are not working properly, they may deliver unsafe drinking water in distribution networks. Therefore O&M contractor has to ensure that WTPs are working properly during O&M period and suitability of water quality has to ensure through periodical monitoring of treated water in lab as per SPCB/PHED drinking water standards
• Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?	√		Care should be taken during O&M period to ensure that corrosive chemicals are not entered in distribution networks
• Accidental leakage of chlorine gas?	√		There is risk that inappropriate handling, storage or use of chorine may cause serious accidents due to leakage causing severe health risks. All there care should be taken for safe handling, storage and usage of chlorine in WTPs
• Excessive abstraction of water affecting downstream water users?		√	Water to Pali is received from the regional water supply scheme from Jawai dam located about 88 km away from the town. Only such amount of water shall be taken from this dam, which is allotted for Pali by the Government.
• Competing uses of water?		√	The existing raw water supply will continue; no source intervention (new/ augmentation/ modification) is part of this subproject
• Increased sewage flow due to increased water supply	√		Increased water supply will result increased sewerage flow. Sewerage system will also be improved under RUSDP along with water supply

SCREENING QUESTIONS	Yes	No	REMARKS
• Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant		√	Sewerage system will also be improved under RUSDP along with water supply; this will take care of additional wastewater and appropriate sludge treatment and disposal facility will be part of this project

PRELIMINARY CLIMATE RISK SCREENING CHECKLIST FOR SAMPLE SUBPROJECT

Screening Questions		Score	Remarks[1]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	No such issue may affect the project
	Will the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	No such issue may affect the project
Materials and Maintenance	Will weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity, and hydro-meteorological parameters) affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	No such issue may affect the project
	Will weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	No such issue may affect the project
Performance of project outputs	Will weather/climate conditions and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	No problem will envisaged in future which likely affect the performance of project output

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high risk project.

[1] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Result of Initial Screening (Low, Medium, High): Low

Other Comments: The proposed subproject activity involves construction of one new WTP and refurbishment of three WTPs and laying of transmission main pipe lines for improved water supply in the town, hence the anticipated environmental impacts are very marginal and the construction activities does not impose any threat to the existing climatic conditions.

Appendix 2: National Ambient Air Quality Standards

SL NO:	Pollutants	Time weighted average	Concentration in ambient air		Method of measurement
			Industrial, Residential, Rural & Other Areas	Ecologically Sensitive Areas	
1	Sulphur Dioxide (SO_2) $\mu g/m^3$	Annual 24 hours	50 80	20 80	Improved West and Geake-Ultraviolet fluorescence
2	Nitrogen Dioxide (NO_2) $\mu g/m^3$	Annual 24 hours	40 80	30 80	Modified Jacob &Hochheiser (Na-Arsenite) Chemiluminescence
3	Particulate Matter (Size less than 10 µm) or PM10 $\mu g/m^3$	Annual 24 hours	60 100	60 100	Gravimetric -TOEM -Beta attenuation
4	Particulate Matter (Size less than 2.5 µm) or PM2.5 $\mu g/m^3$	Annual 24 hours	40 60	40 60	Gravimetric -TOEM -Beta attenuation
5	Carbon Monoxide (CO) mg/m^3	8 hours 1 hours	02 04	02 04	Non Dispersive Infra Red (NDIR) Spectroscopy

Appendix 3: National Ambient Air Quality Standards in Respect of Noise

Area code	Category of area/zone	Limit in dB (A)	
		Day time	Night time
A	Industrial area	75	70
B	Commercial area	65	55
C	Residential area	55	45
D	Silence zone	50	40

Appendix 4: General Standards for Discharge of Environmental Pollutants (Wastewater)

S. No.	Parameter	Inland surface water	Public sewers	Land for irrigation
.	.	(a)	(b)	(c)
1	Suspended solids mg/l, max.	100	600	200
2	Particle size of suspended solids	shall pass 850 micron IS Sieve	-	-
3	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
4	Temperature	shall not exceed 5oC above the receiving water temperature		
5	Oil and grease, mg/l max,	10	20	10
6	Total residual chlorine, mg/l max	1.0	-	-
7	Ammonical nitrogen (as N),mg/l, max.	50	50	-
8	Total kjeldahl nitrogen (as N);mg/l, max. mg/l, max.	100	-	-
9	Free ammonia (as NH3), mg/l,max.	5.0	-	-
10	Biochemical oxygen demand (3 days at 27oC), mg/l, max.	30	350	100
11	Chemical oxygen demand, mg/l, max.	250	-	-
12	Arsenic(as As).	0.2	0.2	0.2
13	Mercury (As Hg), mg/l, max.	0.01	0.01	-
14	Lead (as Pb) mg/l, max	0.1	1.0	-
15	Cadmium (as Cd) mg/l, max	2.0	1.0	-
16	Hexavalent chromium (as Cr + 6),mg/l, max.	0.1	2.0	-
17	Total chromium (as Cr) mg/l, max.	2.0	2.0	-
18	Copper (as Cu)mg/l, max.	3.0	3.0	-
19	Zinc (as Zn) mg/l, max.	5.0	15	-
20	Selenium (as Se)	0.05	0.05	-
21	Nickel (as Ni) mg/l, max.	3.0	3.0	-
22	Cyanide (as CN) mg/l, max.	0.2	2.0	0.2
23	Fluoride (as F) mg/l, max.	2.0	15	-
24	Dissolved phos- phates (as P),mg/l, max.	5.0	-	-
25	Sulphide (as S) mg/l, max.	2.0	-	-
26	Phenolic compounds (as C6H50H)mg/l, max.	1.0	5.0	-
27	Radioactive materials:	10-7	10-7	10-8

S. No.	Parameter	Inland surface water	Public sewers	Land for irrigation
	(a) Alpha emitters micro curie mg/l, max. (b)Beta emittersmicro curie mg/l	10-6	10-6	10-7
28	Bio-assay test	90% suivival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% suivival of fish after 96 hours in 100% effluen
29	Manganese	2 mg/l	2 mg/l	-
30	Iron (as Fe)	3mg/l	3mg/l	-
31	Vanadium (as V)	0.2mg/l	0.2mg/l	-
32	Nitrate Nitrogen	10 mg/l	-	-

Appendix 5: Vehicle Exhaust Emission Norms

1. Passenger Cars

Norms	CO(g/km)	HC+ NOx(g/km)
1991Norms	14.3-27.1	2.0(Only HC)
1996 Norms	8.68-12.40	3.00-4.36
1998Norms	4.34-6.20	1.50-2.18
India stage 2000 norms	2.72	0.97
Bharat stage-II	2.2	0.5
Bharat Stage-III	2.3	0.35 (combined)
Bharat Stage-IV	1.0	0.18 (combined)

2. Heavy Diesel Vehicles

Norms	CO(g/kmhr)	HC (g/kmhr)	NOx (g/kmhr)	PM(g/kmhr)
1991Norms	14	3.5	18	-
1996 Norms	11.2	2.4	14.4	-
India stage 2000 norms	4.5	1.1	8.0	0.36
Bharat stage-II	4.0	1.1	7.0	0.15
Bharat Stage-III	2.1	1.6	5.0	0.10
Bharat Stage-IV	1.5	0.96	3.5	0.02

Source: Central Pollution Control Board

CO = Carbon Monixide; g/kmhr = grams per kilometer-hour; HC = Hydrocarbons; NOx = oxides of nitrogen; PM = Particulates Matter

Appendix 6: Drinking Water Standards

No.	Substance or characteristic	Requirement Desirable limit	Undesirable effect outside the desirable	Permissible limit in the absence of alternate Source	Remarks
Essential Characteristic					
1.	Colour Hazen Units, Max	5	Above 5, consumer acceptance decreases	25	Extended to 25 only if toxic Substance are not suspect in absence of alternate sources
2.	Odour	Un-objectionable	-	-	a) test cold and when heated b) test are several dilutions
3.	Taste	Agreeable	-	-	Test to be conducted only after safely has been established
4.	Turbidity (NTU) Max	5	Above 5, consumer acceptance decreases	10	-
5.	pH value	6.5 to 8.5	Beyond this range the water will after the mucous membrane and/or water supply system	No relaxation	-
6.	Total Hardness (mg/L) CaCO3	300	Encrustation in water supply structure and adverse effects on domestic use	600	-
7.	Iron (mg/L, Fe) Max	0.3	Beyond this limit taste/appearance are affected; has adverse effects on domestic uses and water supply structure and promotes iron bacteria	1.0	-
8.	Chlorides 250 (mg/L, Cl) Max	250	Beyond effects outside the desirable limit	1000	-
9.	Residual free Chlorine (mg/L), Max	0.2	-	-	To be applicable only when water is chlorinated. Tested at customer end. When protection against viral infection is required, it should be min. 0.5 mg/L.
Desirable Characteristics					
10.	Dissolved solids mg/L. Max	500	Beyond this, palatability decreases and may cause gastrointestinal irritation.	2000	-
11.	Calcium (mg/L, Ca) Max.	75	Encrustation in water supply structure and adverse effects on domestic use.	200	-
12.	Magnesium (mg/L, Mg) Max	30	Encrustation in water supply structure and adverse effects on domestic use.	100	-
13.	Copper (mg/L, Cu) Max	0.05	Astringent taste dis coloration and corrosion of pipes fittings and utensils will be caused beyond this.	1.5	-
14.	Manganese (mg/L, Mn) Max	0.1	Beyond this limit taste/appearance are affected, has advers effect	0.3	-

			on domestic use and water supply structure		
15.	Sulphate (mg/L, SO4) Max.	200	Beyond this causes gastro intestinal irritation when magnesium or sodium are present	400	May be extended upto 400 provided magnesium (as Mg) does not exceed 30
16.	Nitrate (mg/L, NO3) Max.	45	Beyond this methaemoglobinemia takes place.	100	-
17.	Fluoride (mg/L, F) Max.	1.0	Fluoride may be kept as low as possible. High fluoride may cause fluorosis.	1.5	-
18.	Phenolic Compounds (mg/L C6H5OH) Max.	0.001	Beyond this, it may cause objectionable taste and odour	0.002	-
19.	Mercury (mg/L Hg) Max	0.001	Beyond this the water becomes toxic	No Relaxation.	To be tested when pollution is suspected
20	Cadmium (mg/L, Cd) Max	0.01	Beyond this the water becomes toxic	No Relaxation.	To be tested when pollution is suspected
21.	Selenium (mg/L, Se) Max	0.01	Beyond this the water becomes toxic.	No Relaxation.	To be tested when pollution is suspected
22.	Arsenic (mg/L, As) Max.	0.05	Beyond this the water becomes toxic	No Relaxation	To be tested when pollution is suspected
23.	Cyanide	0.05	Beyond this the water becomes toxic	No Relaxation	To be tested when pollution is suspected
24.	Lead (mg/L Pb) Max.	0.05	Beyond this the water becomes toxic	No Relaxation	To be tested when pollution is suspected
25.	Zinc (mg/L, Zn) Max.	5	Beyond this limit it can cause astringent taste and an opalescence in water	15	To be tested when pollution is suspected
26.	Anionic detergents (mg/L, MBAS) Max	0.2	Beyond this limit it can cause a light froth in water	1.0	To be tested when pollution is suspected
27.	Chromium (mg/L, Cr6+	0.05	May be carcinogenic above this limit	-	-
28.	Polynuclear Aromatic Hydrocarbons (mg/l, PAH) Max	-	May be carcinogenic	-	-
29.	Mineral oil (mg/L)	0.01	Beyond this limit, undesirable taste and odour after chlorination takes place	0.03	To be tested when pollution is suspected
30.	Pesticides (mg/L) max	Absent	Toxic	0.001	-
Radioactive materials					
31.	Alpha emitters Bq/L Max	-	-	0.1	-
32.	Beta emitters Pci/L Max	-	-	1.0	-
33.	Alkalinity (mg/L,) Max	200	Beyond this limit, taste becomes unpleasant	600	-
34.	Aluminum (mg/L, Al) Max	0.03	Cumulative effect is reported to cause dementia	0.2	
35.	Boron (mg/L) Max	1.0	-	5.0	-

Appendix 7: Compliance with Environmental Criteria for Subproject Selection

Applicability	Environmental Selection Criteria	Compliance
All Subprojects	i. Comply with all requirements of relevant national and state laws.	Being complied
	ii. Avoid significant environmental impacts.	Being complied
	iii. Avoid and/or minimize involuntary resettlement by prioritizing rehabilitation over new construction, using vacant government land where possible, and taking all possible measures in design and selection of site or alignment to avoid resettlement impacts	Complied
	iv. Avoid locating subprojects in forest areas	Complied
	v. If there are underground asbestos cement (AC) pipes in the existing systems, the project design should include that the AC pipes are left undisturbed in the ground vi. Prior to site clearance & trench exaction for pipes/sewers, exact location of underground AC pipes should be ascertain with the Public Health Engineering Department (PHED)	Being complied
	vii. Avoid where possible, and minimize to extent feasible, facilities in locations with social conflicts.	Complied
	viii. Avoid where possible locations that will result in destruction/ disturbance to historical and cultural places/values.	Being complied
	ix. Avoid tree-cutting where possible. Retain mature roadside trees which are important/valuable or historically significant. If any trees have to be removed, plant two new trees for every one that is lost.	Being complied
	x. Ensure all planning and design interventions and decisions are made in consultation with local communities and include women. Reflect inputs from public consultation and disclosure for site selection.	Being complied
Water Supply	i. Comply with all requirements of relevant national and local laws, rules, and guidelines.	Being complied
	ii. Utilize water sources at sustainable levels of abstraction only (i.e. without significant reductions in the quantity or quality of the source overall); augmentation of water supply from an existing groundwater source or development of new groundwater source should be supported by groundwater studies establishing water availability and sustainability	Not applicable as only surface water is being taken as raw water for the proposed sytem
	iii. Avoid using water sources that may be polluted by upstream users;	Being complied
	iv. Avoid water-use conflicts by not abstracting water that is used for other purposes (e.g., irrigation);	Being complied
	v. Locate all new facilities/buildings at sites where there is no risk of flooding or other hazards that might impair functioning of, or present a risk of damage to water treatment plants, tanks/reservoirs, or their environs.	Complied
	vi. Locate pipelines within road right of way (RoW) as far as possible, to reduce the acquisition of new land. Ensure that pipeline routes do not require the acquisition of land from private owners in amounts that are a significant proportion of their total land holding (>10%).	Complied
	vii. Ensure that communities who relinquish land needed for pipelines or other facilities are provided with an improved water supply as part of the scheme.	Not applicable
	viii. Avoid all usage of pipes that are manufactured from asbestos concrete.	Complied
	ix. Ensure water to be supplied to consumers will meet national drinking water standards at all times.	Being complied
	x. Ensure that improvements in the water supply system are combined with improvements in wastewater and drainage to deal with the increased discharge of domestic wastewater.	Being complied
	xi. Ensure appropriate training will be provided to ULB staff on the operations and maintenance of the facilities.	Being complied
	xii. Ensure sludge management facilities are included in the water treatment plant.	Not applicable

Appendix 8: Salient Features of Major Labor Laws Applicable to Establishments Engaged in Construction of Civil Works

(i) **Workmen Compensation Act, 1923 -** The Act provides for compensation in case of injury by accident arising out of and during the course of employment.

(ii) **Payment of Gratuity Act, 1972 -** Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more or on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

(iii) **Employees' PF and Miscellaneous Provisions Act, 1952 -** The Act provides for monthly contributions by the employer plus workers @10 % or 8.33 %. The benefits payable under the Act are:

(a) Pension or family pension on retirement or death as the case may be; (b) deposit linked insurance on the death in harness of the worker; (c) payment of PF accumulation on retirement/death etc.

(iv) **Maternity Benefit Act, 1951 -** The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

(v) **Contract Labour (Regulation and Abolition) Act, 1970 -** The Act provides for certain welfare measures to be provided by the Contractor to contract labor and in case the Contractor fails to provide, the same are required to be provided by the Principal Employer by Law. The principal employer is required to take Certificate of Registration and the Contractor is required to take a License from the designated Officer. The Act is applicable to the establishments or Contractor of principal employer if they employ 20 or more contract labor.

(vi) **Minimum Wages Act, 1948 -** The employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employment.

(vii) **Payment of Wages Act, 1936 -** It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.

(viii) **Equal Remuneration Act, 1979 -** The Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees in the matters of transfers, training and promotions etc.

(ix) **Payment of Bonus Act, 1965 -** The Act is applicable to all establishments employing 20 or more workmen. The Act provides for payments of annual bonus subject to a minimum of 8.33 % of wages and maximum of 20 % of wages to employees drawing Rs. 3,500/- per month or less. The bonus to be paid to employees getting Rs. 2,500/- per month or above up to Rs.3,500/- per month shall be worked out by taking wages as Rs.2,500/- per month only. The Act does not apply to certain establishments. The newly set up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of the Act.

(x) **Industrial Disputes Act, 1947 -** The Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

(xi) **Industrial Employment (Standing Orders) Act, 1946 -** It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the employer on matters provided in the Act and get the same certified by the designated Authority.

(xii) **Trade Unions Act, 1926 -** The Act lays down the procedure for registration of trade unions of workmen and employees. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities.

(xiii) **Child Labor (Prohibition and Regulation) Act, 1986 -** The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labor is prohibited in Building and Construction Industry.

(xiv) **Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979 -** The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The inter-state migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home up to the establishment and back, etc

(xv) **The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act (BOCW Act), 1996 and the Cess Act of 1996 -** All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under this Act. All such establishments are required to pay Cess at rate not exceeding 2% of the cost of construction as may be notified by the Government. The employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for workers near the workplace etc. The employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

Following are the major requirements under this Act, applicable to this project-

Employer shall-

- Provide and maintain, at suitable point, sufficient quantity of wholesome drinking water, such point shall be at least 6 meters away from any washing areas, urinals or toilets
- Provide sufficient urinals and latrines at convenient place, easily accessible by workers
- Provide free of charge, temporary living accommodations near to work sites with separate cooking place, bathing and lavatory facilities and restore the site as pre conditions after completing the construction works
- Provide crèche with proper accommodation, ventilation, lighting, cleanliness and sanitation if more than fifty female workers are engaged
- Provide first aid facilities in all construction sites

For safety of workers employer shall provide-

- Safe access to site and work place
- Safety in demolition works
- Safety in use of explosives
- Safety in operation of transporting equipments and appoint competent person to drive or operate such vehicles and equipments
- Safety in lifting appliance, hoist and lifting gears
- Adequate and suitable lighting to every work place and approach
- Prevention of inhalation of dust, smoke, fumes, gases during construction works and provide adequate ventilation in work place and confined space
- Safety in material handling and stacking/un stacking
- Safeguarding the machinery with fly-wheel of moving parts
- Safe handling and use of plants operated by compressed air
- Fire safety
- Limit of weight to be lifted by workers individually
- Safety in electric wires, apparatus, tools and equipments
- Provide safety net, safety sheet, safety belts while working at height (more than1.6 mtrs as per OSHA)
- Providing scaffolding, ladders and stairs, lifting appliances, chains and accessories where required
- Safety in pile works, concrete works, hot asphalt, tar, insulation, demolition works, excavation, underground construction and handling materials
- Provide and maintain medical facilities for workers
- Any other matters for the safety and health of workers

Appendix 9: Sample Outline Spoil Management Plan

- The Spoil Management Plan should be site specific and be part of the monthly Construction Management Plan.
- The contractor, in consultation with the ULB, has to find out appropriate location/s for the disposal of the excess soil generated. The spoils should be deposited only at these sites.
- Further precautions need to be taken in case of the contaminated spoils.
- The vehicle carrying the spoil should be covered properly.
- The spoils generating from each site should be removed on the same day or immediately after the work is complete. The site / road should be restored to the original condition.

1. Spoils information

The spoil information contains the details like a) The type / material, b) Potential contamination by that type, c) Expected volume (site / component specific), d) Spoil Classification etc.

2. Spoils management

The Spoil Management section gives the details of a) Transportation of spoil b) disposal site details c) Precautions taken d) Volume of contaminated spoil, if present, d) Suggested reuse of disposal of the spoil

3. Documentation

The volume of spoil generated (site specific, date wise), site disposed, reuse / disposal details should be documented properly.

Appendix 10: Sample Outline Traffic Management Plan

A. Principles for TMP around the Water Pipes/Sewer Construction Sites

1. One of the prime objectives of this TMP is to ensure the safety of all the road users along the work zone, and to address the following issues:

i. the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;

ii. protection of work crews from hazards associated with moving traffic;

iii. mitigation of the adverse impact on road capacity and delays to the road users;

iv. maintenance of access to adjoining properties; and

v. addressing issues that may delay the project.

B. Operating Policies for TMP

2. The following principles will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around work zones while reasonably protecting workers and equipment.

i. Make traffic safety and temporary traffic control an integral and high-priority element of project from planning through design, construction, and maintenance.

ii. Inhibit traffic movement as little as possible.

iii. Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.

iv. Inspect traffic control elements routinely, both day and night, and make modifications when necessary.

v. Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.

vi. Train all persons that select, place, and maintain temporary traffic control devices.

vii. Keep the public well informed.

viii. Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

3. **Figure A2 to Figure A12**illustrates the operating policy for TMP for the construction of water pipes and the sewers along various types of roads.

C. Analyze the impact due to street closure

4. Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

i. approval from the ULB/Public Works Department (PWD) to use the local streets as detours;

ii. consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;

iii. determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;

iv. determining if additional traffic control or temporary improvements are needed along the detour route;

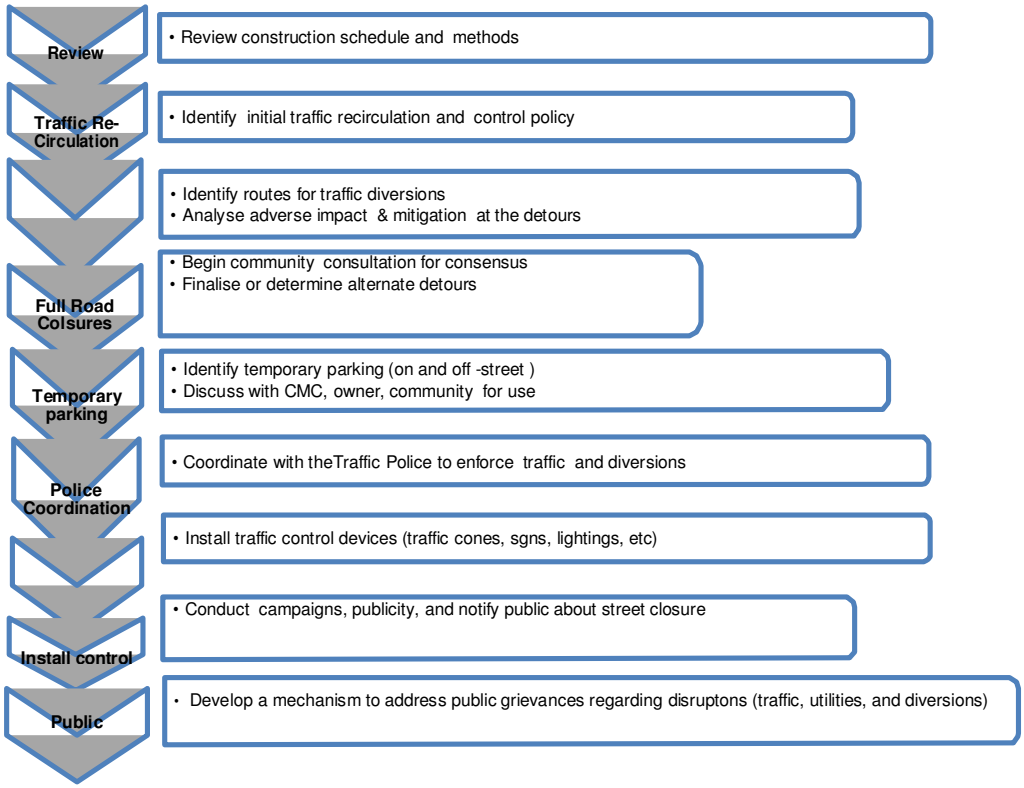
v. considering how access will be provided to the worksite;

vi. contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and

vii. developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

5. If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the detour street or public opposition, the full closure can be restricted to weekends with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.

Figure A1: Policy Steps for the TMP



D. Public awareness and notifications

6. As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works.

7. The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

8. The PIU will also conduct an awareness campaign to educate the public about the following issues:

i. traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);

ii. defensive driving behaviour along the work zones; and

iii. reduced speeds enforced at the work zones and traffic diversions.

9. It may be necessary to conduct the awareness programs/campaigns on road safety during construction.

10. The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centres. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will also be available at the PIU, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

i. explain why the brochure was prepared, along with a brief description of the project;

ii. advise the public to expect the unexpected;

iii. educate the public about the various traffic control devices and safety measures adopted at the work zones;

iv. educate the public about the safe road user behaviour to emulate at the work zones;

v. tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and

vi. indicate the office hours of relevant offices.

E. Install traffic control devices at the work zones and traffic diversion routes

11. The purpose of installing traffic control devices at the work zones is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the work zones. The following traffic control devices are used in work zones:

i. Signs

ii. Pavement Markings

iii. Channelizing Devices

iv. Arrow Panels

v. Warning Lights

12. Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary "STOP" and "GO").

13. **Figure A2 to Figure A12** illustrates a typical set-up for installing traffic control devices at the work zone of the area, depending on the location of work on the road way, and road geometrics:

i. Work on shoulder or parking lane
ii. Shoulder or parking lane closed on divided road
iii. Work in Travel lane
iv. Lane closure on road with low volume
v. Lane closure on a two-line road with low volume (with yield sign)
vi. Lane closure on a two-line road with low volume (one flagger operation)
vii. Lane closure on a two lane road (two flagger operation)
viii. Lane closure on a four lane undivided Road
ix. Lane closure on divided roadway
x. Half road closure on multi-lane roadway
xi. Street closure with detour

14. The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.

15. Traffic police should regulate traffic away from the work zone and enforce the traffic **diversion** result from full street closure in certain areas during construction. Flagggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

16. In addition to the delineation devices, all the construction workers should wear fluorescent **safety** vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.

Figure A2 & A3: Work on shoulder or parking lane & Shoulder or parking lane closed on divided road

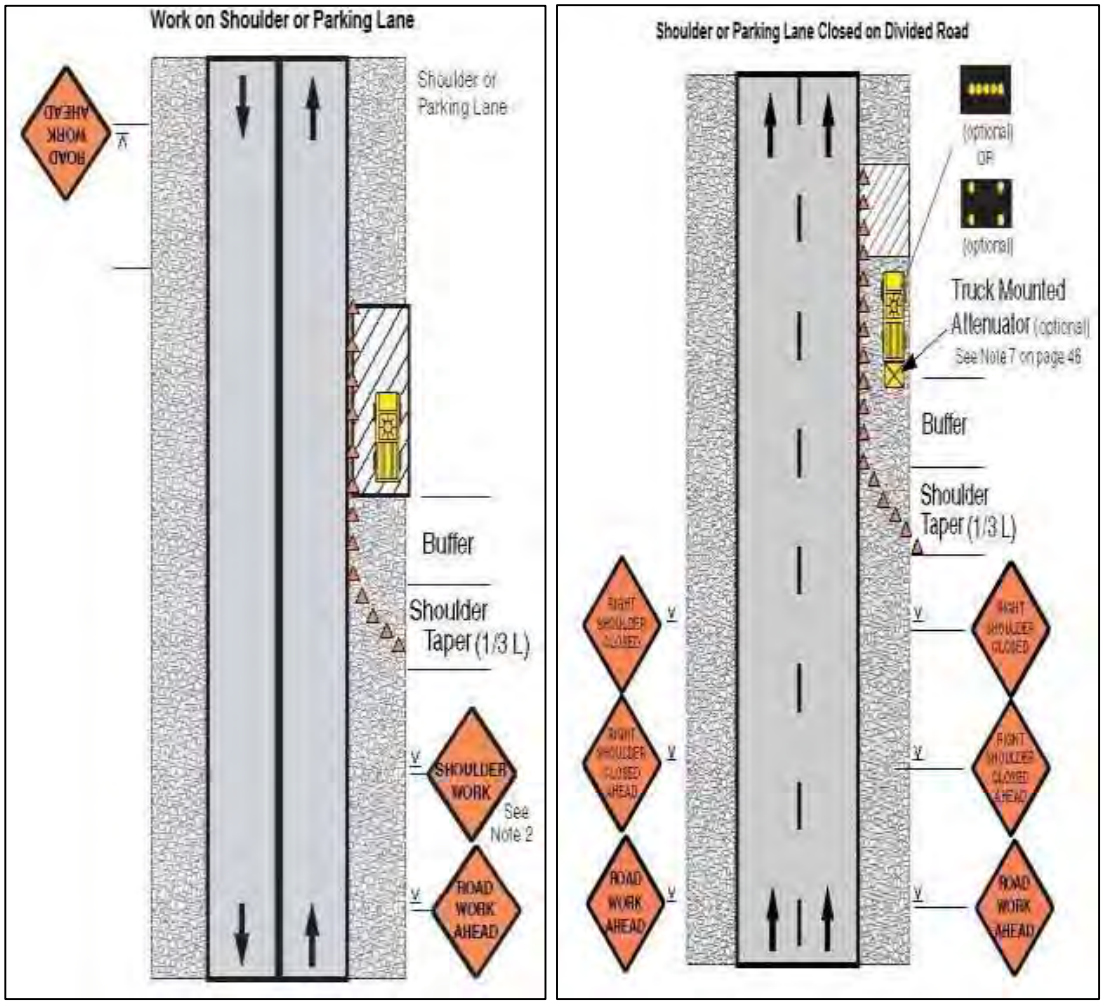


Figure A4 & A5: Work in Travel lane & Lane closure on road with low volume

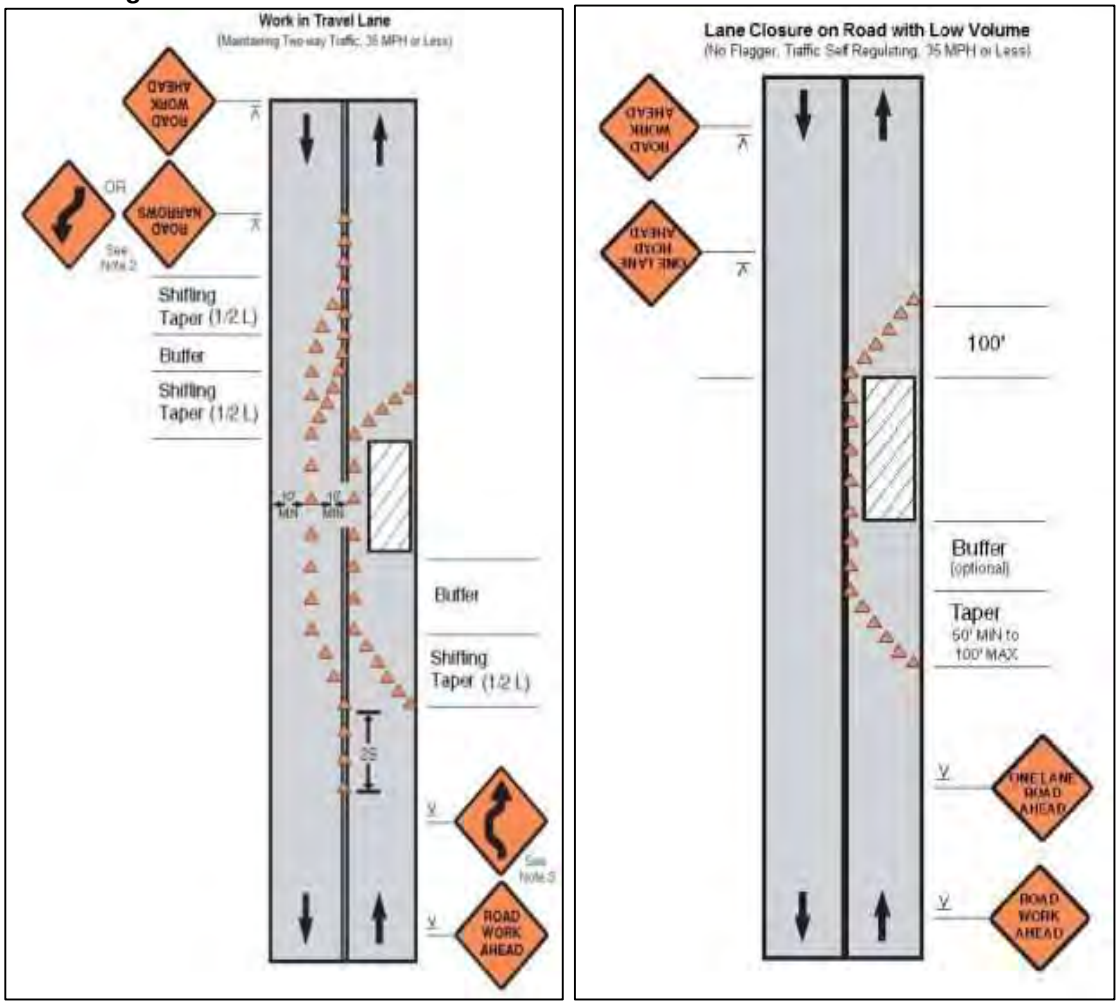


Figure A6 & A7: Lane closure on a two-line road with low volume (with yield sign) & Lane closure on a two-line road with low volume (one flagger operation)

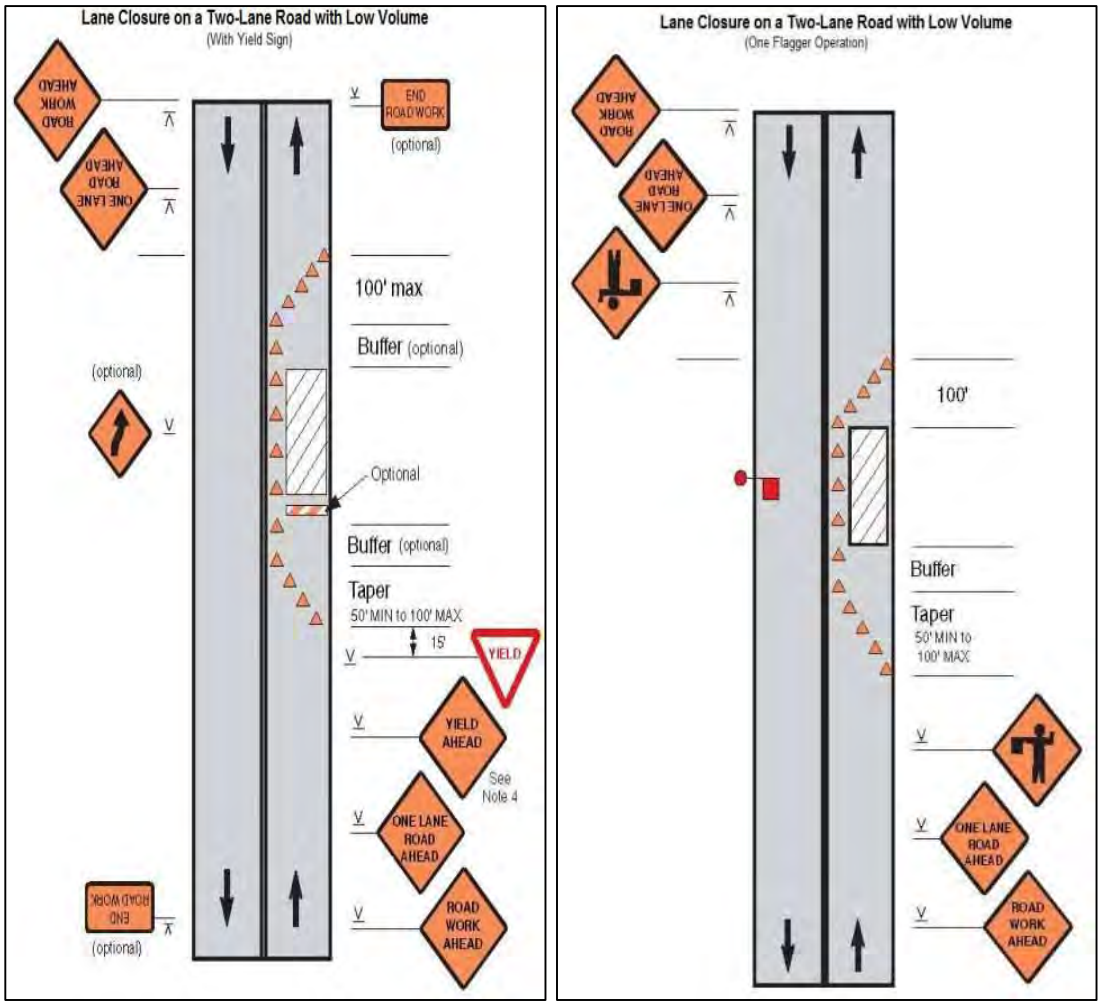


Figure A8 & A9: Lane Closure on a Two-Lane Road (Two Flagger Operation) & Lane Closure on a Four-Lane Undivided Road

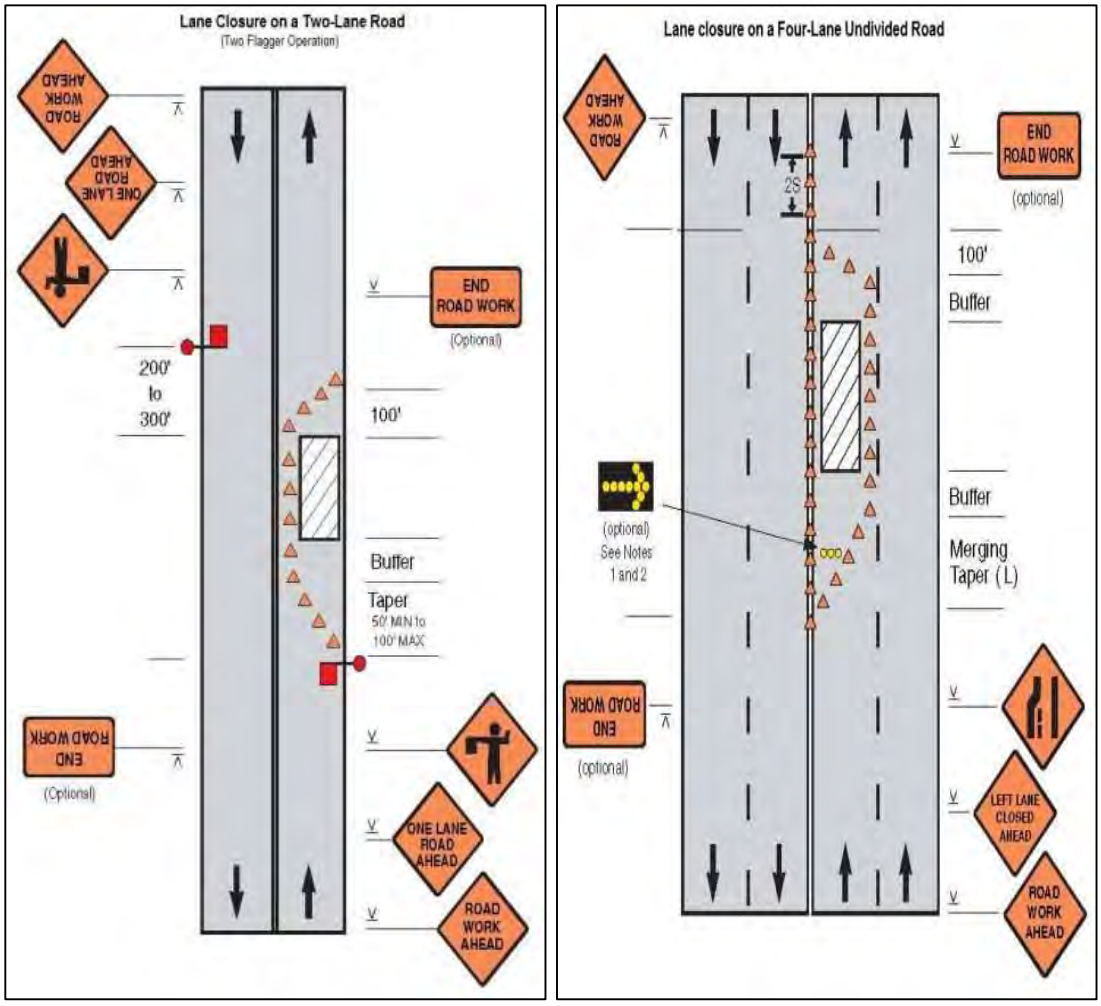
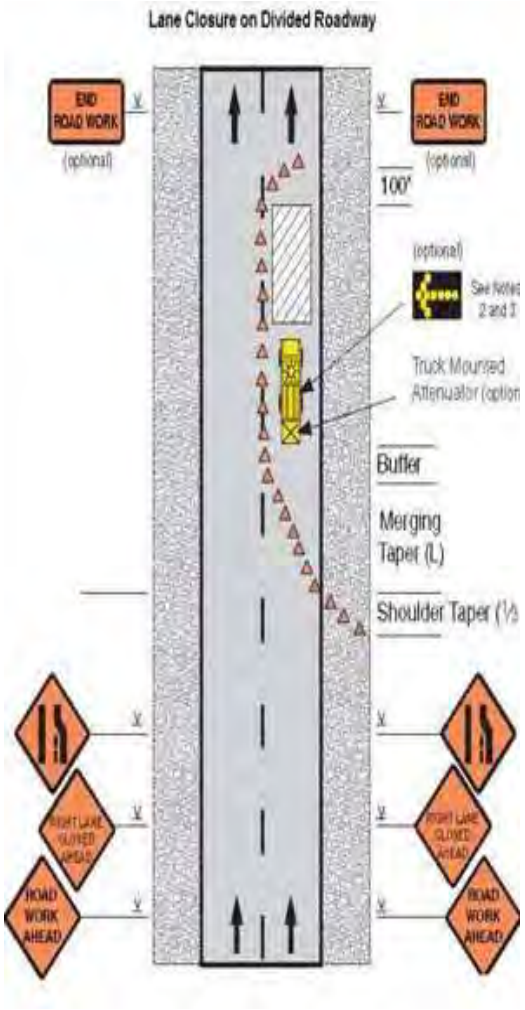


Figure A10 & A11: Lane Closure On Divided Roadway & Half Road Closure On Multi-Lane Roadway



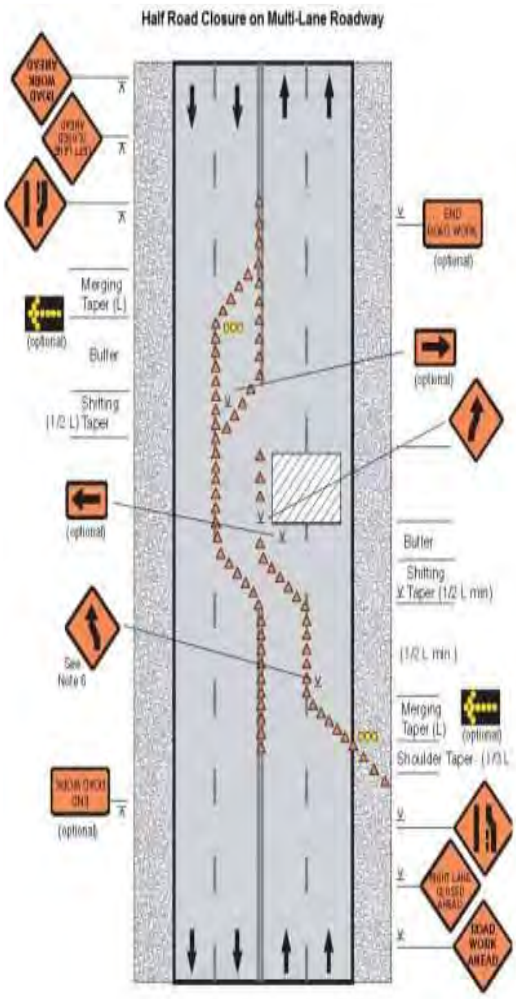
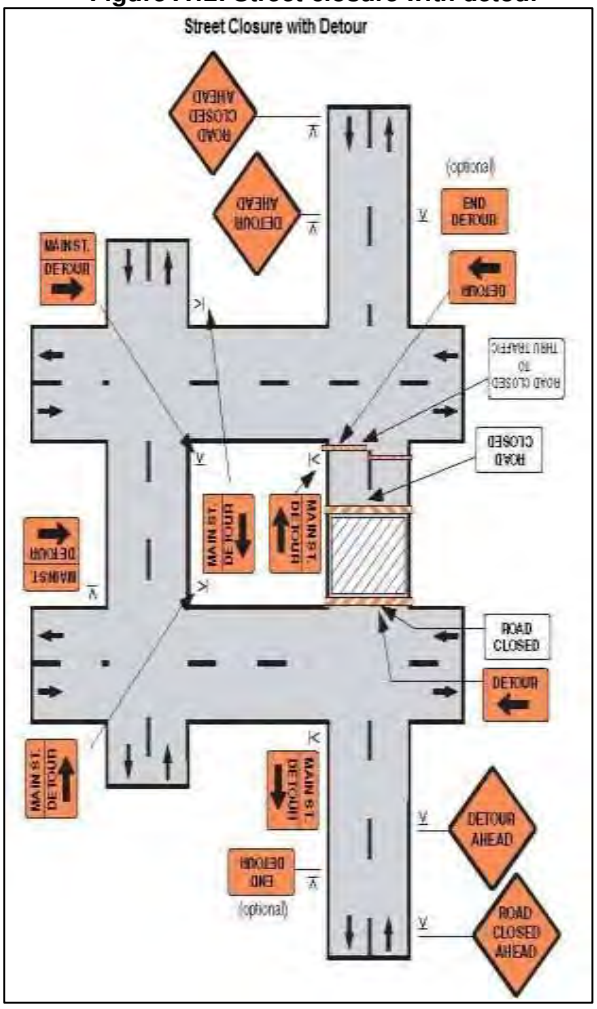


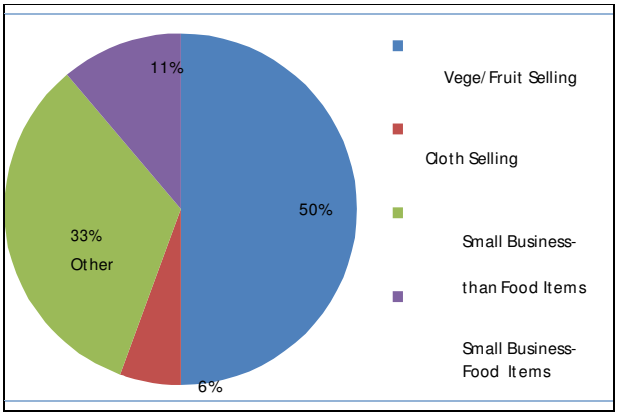
Figure A12: Street closure with detour



Appendix 11: Public Consultations Conducted During Project Preparation

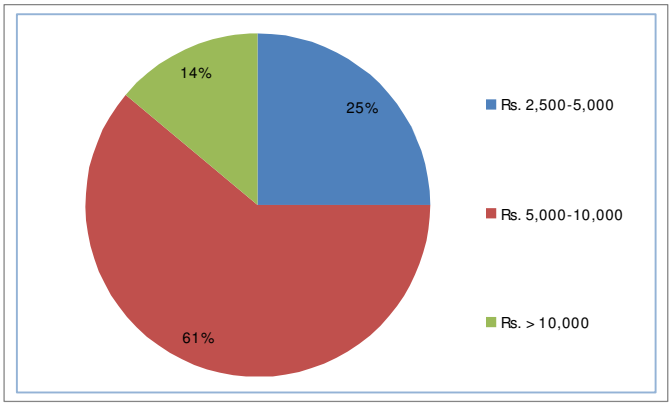
A. Results of Socio-economic Surveys Conducted in June-August 2013

1. Transect walks identified a total of 36 APs whose business will be temporarily affected during pipe laying, as they carry their activities with in RoW. These businesses can be broadly classified into four main categories as: (i) vegetable/fruit selling; (ii) cloth selling; (iii) small business other than food items such as bangle, shoe, crockery items etc. selling; and (iv) small businesses related to food items such as juice, tea and fast food selling. Almost 50 percent of these however are engaged in vegetable/fruit selling. Some of the surveyed APs indicated that they sometimes take rounds in confined areas to sell their products home-to-home though their place of standing is stationary/ fixed otherwise. Almost all of them (95 percent) have movable structure while some APs sit on roads for selling their goods. An average cost of their business unit/structure was estimated at Rs. 14,278 with minimum at Rs. 3,000 and maximum at Rs. 50,000.



2. Street vending is quite a common practice in Pali and around 44 percent of the APs indicated that they are doing their business at present location for more than 10 years. An additional 31 percent indicated that they have this fixed location for more than five years while the remaining 25 percent said they have moved in respective places in last 3-5 years.

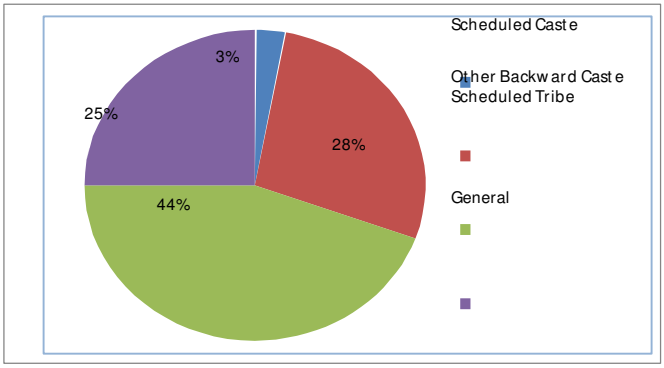
3. In terms of the socio-economic background, a majority of these vendors appeared to be poor. However, none of them earn income below poverty line (Rs. less than 2,500 per month). More than 50 percent earn monthly income between Rs. 5,000-10,000 and belong to lower middle class group. Average monthly income works out at Rs. 7,875 with minimum at Rs. 3,000 and maximum at Rs. 21,000. Considering work week of six days (26 days per month), average daily income is estimated at Rs.



303 for APs. This is certainly higher than daily minimum wages prescribed for the region for skilled labour at Rs.166.

4. Only one fourth of the APs belong to general (upper) caste category while the remaining are scheduled tribes (STs-3%), scheduled caste (SCs-28%), and other backward classes (OBC- 44%). STs in Pali do not show any distinct indigenous characteristics that are different than mainstream society. Though there are women APs, there were no women headed households (WHH) [1] found during the survey. Total vulnerable[2] APs comprise 31 percent of the total surveyed APs. Average family size for surveyed APs was 5.6. All the surveyed APs were residents of Pali living in the city for more than 5 years.

5. Transect walk data/analysis will be updated road wise where pipelines will be laid before mobilization of contractor and revised RP will be submitted to the ADB for approval[3]. A 100 percent census and socio-economic surveys will be undertaken to register and document the status of affected people (APs) within subproject impact area[4].



B. Proceedings of City Level Stakeholder Consultation Meeting at Pali on April, 28, 2014

1. This stakeholder consultation meeting was organised on April 28, 2014 at Pali District collector's meeting hall. The meeting was organised by the Pali Nagar Parishad (PNP) with the support of RUIDP PMU and ADB PPTA Team. District Collector Pali chaired the meeting. The PNP Chairman (elected head of PNP), and Commission (administration head of PNP) participated in the meeting. In all 19 persons, representing various agencies, attended the meeting (List of persons attended the meeting is enclosed herewith).
2. The objective of the meeting was to appraise the stakeholders about the proposed Rajasthan urban Infrastructure Development Project III (RUIDP III). The subprojects proposed for Pali in water supply and sewerage sector, and the likely environmental and social issues, and the proposed mitigation measures were discussed during the meeting.
3. A detailed presentation on overall RUIDP III, and subprojects and components proposed in Pali was made to the stakeholders. Executive summary of Initial Environmental Examination (IEE) conducted for the Pali subproject, Environmental Management Plan, proposed Grievance Redress Mechanism

[1] Household is considered women headed when she is the single bread earner of the family or earn most of the income for the family.
[2] Vulnerable households may include female-headed household, physically handicapped-headed household scheduled tribe-headed households, Below Poverty Line households, and households with marginal land holdings, that is the only source of livelihood, and majority of that land is being acquired under the project
[3] It is suggested under this RUSDP that separate RPs needs to be prepared for each subproject (separate for water supply and sewerage, and not city wise) and list of temporary APs should be separated from any APs which envisage permanent impacts. RPs should also include separate and clear sections on their socio-economic profile, impacts and entitlements.
[4] During RP revision, census/socio-economic surveys for temporary impacts should include specific questions on place of business, its seasonal variation and AP's migrant nature. A separate list of such APs should be made to suggest that they may not be present at the same location during construction time/compensation. These APs however will be still entitled for compensation (if affected due to project). However, such list will tentatively indicate PMU/PIU/ADB the extent of missing APs during implementation. It is also suggested under this RUSDP that missing APs under temporary impacts not traceable for more than 18 months after the start of compensation disbursement, or do not claim their entitlement within project construction period, will bear no impacts of the project and hence will not be considered for compensation.

(GRM), draft Entitlement Matrix of the Resettlement Framework was displayed at the meeting, and were made available to the interested persons.

4. The comments, suggestions of the stakeholders are presented below:

- All the stakeholders were supportive of the project and indicated their willingness to participate in the project to make it successful.
- Stakeholders were of the view that these subprojects provide benefits to all the people by improving water supply and sewerage.
- Most of the stakeholder, including the Collector, opined that drainage and solid waste management should also be taken up in the project. However, RUIDP PMU officials informed the meeting that this project's focus is on water supply and sewerage.
- Most of the stakeholders advocated use of treated waste water for industrial purposes, and should be included in the sewerage project proposals.
- Stakeholder also suggested to include in the project, development of Lakhotia Lake, located in the centre of the city. It was informed the RUIDP III focus will be on water supply and sewerage.
- Stakeholders were concerned about the road restoration works after laying water and sewer lines. The concern was that normally road restoration is not taken up after the work. It was informed that road restoration works are part of sewer/water supply projects, and will be taken up.

Photographs of stakeholder consultation

List of Participants:

RAJASTHAN URBAN INFRASTRUCTURE DEVELOPMENT PROJECT (RUIDP), JAIPUR

Public Consultation Workshop by PPTA for RUIDP Phase-III

Town: [redacted] PALI
Venue: Meeting Hall at District Collector Office
Time & Date: 11 Am on 25.04.2014 (28/4/14)

S.No	Name of the Officer/Participant	Designation	Mobile No.	Signature
1	Collector, Pali			
2	Chairman, Pali	President MC	9982501499	[illegible]
3.	Arun Vyas	EE. RUIDP [illegible]	9414134012	[illegible]
4.	Chamu Math	SE PWD Pali	9414027100	[illegible]
5.	Nemaram Parihar	SE PHED Pali	9829473889	[illegible]
6.	Ashok Kumar Bairwa	EE RUIDP Jaipur	9829712527	[illegible]
7.	NAGARAJU A.	[illegible]	9989 [illegible]	[illegible]
8.	S.C. Khanduri CEE	Team [illegible]	09711185155	[illegible]
9	R.C. VAISHNAV	R M RIICO	9414294601	[illegible]
10	IMTIYAZ BAIG	Ex. E.N. [illegible]	9413357302	[illegible]
11	R.S. Gehlot	A.En. W.R. Pali	9414610065	[illegible]
12	Ganpat L. Suthar	ATP, Pali	8696742424	[illegible]
13	LALIT TANDON	E.E. PHED	9414069426	[illegible]
14	Virendra Pal Sharma	ATP M.C Pali	9413371388	[illegible]
15	Manish Attreya	JEn RUIDP	9828515194	[illegible]
16	Ram Bharos	JEn, UIT	7597803669	[illegible]
17	Heer Singh Rajpurohit	JEn, N.P. Sojat	9413137080	[illegible]
18	[illegible]	[illegible] Planner	9958228111	[illegible]
19	Krishna Chaithanya T	Sr. Supdt. [illegible]	9828917712	[illegible]
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C. Public consultation held in Pali in July, August and December 2015

Date-22.07.2015
PHED Office, Pali

- Meeting with PHED officials and discussion were done about proposed project under Pali phase-1 and phase-2, locations of the project sites and proposed alignments.
- Consultations with following PHED officials were done-

S.No.	Name and Designation
1.	Mr. Ishwar Chand Jain, SE, PHED, Pali
2.	Mr. Rajesh Kumar Agarwal, Executive Engineer, PHED, Pali
3.	Mr. Hari Ram Choudhary, AEN, PHED, Pali

- It was informed by PHED that land allotment for new (proposed) WTP at Manpura, Bhakri is under process and shall be available soon for construction of WTP
- It was also found that there is requirement of replacement of about 15 km old AC pipe lines of different dia in proposed water supply networks
- PHED officers assured of their full co-operation with RUIDP during planning and implementation of the project

Date-23.07.2015

- Meeting with Nagar Parishad officials, PIU, RUIDP, Pali officials, RIICO officials, CETP, Pali officials held at Pali
- Consultations with following was done during visit of the day-

S.No.	Name and Designation
1.	Mr. K.P. Vyas, Executive Engineer, Nagar Parishad, Pali
2.	Mr. Manish Atre, JEN, Nagar Parishad, Pali
3.	Mr. Shankar Lal, Executive Engineer, PIU (UIDSSMT), RUIDP, Pali
4.	Mr. S.P. Mathur, Assistant Engineer, PIU (UIDSSMT), RUIDP, Pali
5.	Mr. Dipak Parihar, Chief Executive Officer, Pali Water Pollution Control, Treatment and Research Foundation, CETP, Industrial Area, Pali
6.	Mr. Adarsh Dwivedi, Site Incharge, STP (UIDSSMT), Industrial Area, Pali (ENVIRAD)
7.	Mr. A. K. Saxena, Regional Manager, RIICO, Pali

Date- 25&26 August 2015, 09-11 December 2015

Public consultations were done near different site locations of water supply project in Pali to access the awareness of general public, present water supply situations, environmental and health conditions in town, their opinion about the proposed project and any suggestion if any. It was found that the sanitation conditions are very poor and no sewerage system exists in town. Most of the households are dependent on individual septic tanks and may dispose their sewer directly in to drains, which ultimately mix with river through municipal nallas. Water supply is provided only 1-2 hours daily in most of areas, whereas in some areas on alternate days. People shown keen interest in proposed water supply system and shown their full co-operation during execution. They were willing to bear the incontinence caused due to proposed works for improved water supply system. Outbreak of infectious diseases; like malaria, diarrhea and stomach infections were also reported due to poor water supply and sewer system. Some movable shopkeepers were noted within ROW in market and residential areas and most of them were ready to relocate to other places during execution. Consultations with following were done during site visits on these dates-

S.No.	Name, place and occupation
1.	Bhagwan Ram, Bhura Ram, Security guards WRD at proposed WTP site at Manpura Bhakhri
2.	Kishor Meghwal, Hari Ram, residents of Manpura Bhakhri
3.	Prema Ram, owner Jambheshwar Bhojanalaya, Paniyari Chouraha
4.	Mohd. Rizwan, Biju, Narayan, shopkeepers, Haider Colony
5.	Vinod Rao, H.No. 99, Manohar Vaishnav, H.No. 101, Mastan Baba Colony
6.	Sohan Lal, Jamuna Devi, Shopkeepers near Surajpole Gate
7.	Suresh, Kailash Ruparam, Shopkeepers near RICCO industrial area, Punnaita
8.	Rajendra Singh, Kailash Chandra, Surendra Singh Sekhawat, employees of PHED at Labour colony
9.	Narayan Ram, Helper, PHED, Industrial area IV phase
10.	Laxmi Narayan, H.N. 523, Sikandar, residents of Raiko Ki Dhani

Consultations at Manpura Bhakhri WTP site

Consultations at Manpura Bhakhri village

Consultations at Mastan Baba

Consultation at labour colony PHED campus

Consultations near Surajpole

Consultation near Shantinath Colony

Appendix 12: Sample Monthly Reporting Format for Assistant Safeguards Officer/Assistant Construction Manager

1. Introduction

- Overall project description and objectives
- Description of sub-projects
- Environmental category of the sub-projects
- Details of site personnel and/or consultants responsible for environmental monitoring
- Overall project and sub-project progress and status

No.	Sub-Project Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre-Construction	Construction	Operational Phase		
		□	□	□	□		
		□	□	□	□		
		□	□	□	□		

2. Compliance status with National/ State/ Local statutory environmental requirements

No.	Sub-Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

3. Compliance status with environmental loan covenants

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required

4. Compliance status with the environmental management and monitoring plan

- Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.
- There should be reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:
    - o What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries;

- If muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads;
- adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;
- Are their designated areas for concrete works, and refuelling;
- Are their spill kits on site and if there are site procedure for handling emergencies;
- Is there any chemical stored on site and what is the storage condition?
- Is there any dewatering activities if yes, where is the water being discharged;
- How are the stockpiles being managed;
- How is solid and liquid waste being handled on site;
- Review of the complaint management system;
- Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary Monitoring Table

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						
Operational Phase						

Overall Compliance with CEMP/ EMP

No.	Sub-Project Name	EMP/ CEMP Part of Contract Documents (Y/N)	CEMP/ EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed and Additional Measures Required

5. Approach and methodology for environmental monitoring of the project

- Brief description on the approach and methodology used for environmental monitoring of each sub-project

6. Monitoring of environmental impacts on project surroundings (ambient air, water quality and noise levels)

- o Brief discussion on the basis for monitoring
- o Indicate type and location of environmental parameters to be monitored
- o Indicate the method of monitoring and equipment to be used
- o Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements

As a minimum the results should be presented as per the tables below.

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Site No.	Date of Sampling	Site Location	Parameters (Monitoring Results)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Noise Quality Results

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Government Standard)	
			Day Time	Night Time

7. Summary of key issues and remedial actions

- Summary of follow up time-bound actions to be taken within a set timeframe.

8. Appendixes

- Photos
- Summary of consultations
- Copies of environmental clearances and permits
- Sample of environmental site inspection report
- Other

Appendix 13: Sample Environmental Site Inspection Report

Project Name Contract Number

NAME:__DATE: __ TITLE:__DMA: LOCATION:__GROUP__:

WEATHER:	Project Activity Stage	Survey	
		Design	
		Implementation	
		Pre-Commissioning	
		Guarantee Period	

Monitoring Items	Compliance
Compliance marked as Yes / No / Not applicable (NA) / Partially Implemented (PI)	
EHS supervisor appointed by contractor and available on site	
Construction site management plan (spoils, safety, schedule, equipment etc.,) prepared	
Traffic management plan prepared	
Dust is under control	
Excavated soil properly placed within minimum space	
Construction area is confined; no traffic/pedestrian entry observed	
Surplus soil/debris/waste is disposed without delay	
Construction material (sand/gravel/aggregate) brought to site as & when required only	
Tarpaulins used to cover sand & other loose material when transported by vehicles	
After unloading , wheels & undercarriage of vehicles cleaned prior to leaving the site	
No AC pipes disturbed/removed during excavation	
No chance finds encountered during excavation	
Work is planned in consultation with traffic police	
Work is not being conducted during heavy traffic	
Work at a stretch is completed within a day (excavation, pipe laying & backfilling)	
Pipe trenches are not kept open unduly	
Road is not completely closed; work is conducted on edge; at least one line is kept open	
Road is closed; alternative route provided & public informed, information board provided	
Pedestrian access to houses is not blocked due to pipe laying	
Spaces left in between trenches for access	
Wooden planks/metal sheets provided across trench for pedestrian	
No public/unauthorized entry observed in work site	
Children safety measures (barricades, security) in place at works in residential areas	
Prior public information provided about the work, schedule and disturbances	
Caution/warning board provided on site	
Guards with red flag provided during work at busy roads	
Workers using appropriate PPE (boots, gloves, helmets, ear muffs etc)	
Workers conducting or near heavy noise work is provided with ear muffs	
Contractor is following standard & safe construction practices	
Deep excavation is conducted with land slip/protection measures	
First aid facilities are available on site and workers informed	
Drinking water provided at the site	
Toilet facility provided at the site	
Separate toilet facility is provided for women workers	
Workers camps are maintained cleanly	
Adequate toilet & bath facilities provided	
Contractor employed local workers as far as possible	
Workers camp set up with the permission of PIU	

Adequate housing provided	
Sufficient water provided for drinking/washing/bath	
No noisy work is conducted in the nights	
Local people informed of noisy work	
No blasting activity conducted	
Pneumatic drills or other equipment creating vibration is not used near old/risky buildings	

Signature

_____

Sign off

_____

Name
Position

Name
Position

Appendix 14: Sample Grievance Registration Form
(To be available in Hindi and English)

The_____ Project welcomes complaints, suggestions, queries, and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

Date	Place of registration	Project Town Project:			
Contact information/personal details					
Name		Gender	* Male * Female	Age	
Home address					
Place					
Phone no.					
E-mail					
Complaint/suggestion/comment/question Please provide the details (who, what, where, and how) of your grievance below: If included as attachment/note/letter, please tick here:					
How do you want us to reach you for feedback or update on your comment/grievance					

FOR OFFICIAL USE ONLY

Registered by: (Name of official registering grievance)	
Mode of communication: Note/letter E-mail Verbal/telephonic	
Reviewed by: (Names/positions of officials reviewing grievance)	
Action taken:	
Whether action taken disclosed:	Yes No
Means of disclosure:	

Appendix 15: Management Plan for Night works at Project Sites

Following requirements should be fulfilled for construction works at night hours-

1. Night works should be avoided at construction sites specially in residential areas and should be performed only when day works are not possible due to excessive traffic/public/pedestrian movement, site of cultural or religious importance, where there is huge crowd during day hours or any other unavoidable circumstances.
2. Contractor should plan for night works only after directions from PMU/PIU/DSC
3. Contractor should submit plan for night works for approval from PIU.
4. PIU should ensure that prior written information should be given to local authorities such as district administration, Police/traffic police, line agencies concerned, residents welfare association/business association/vyapar mandal of the affected areas and their consents/permissions should be taken prior to start of night works.
5. PIU/DSC engineers should check and ensure that all the preparation as per management plan is done by contractor and contractor is having all the necessary equipments and materials for night works.
6. Contractor is required to have following equipments/arrangements for night works-
   - Contractors should have hand held noise level meter for measurement of noise during night hours
   - Contractors should have hand held lux meter for the measurement of illumination during night hours
   - Preferably electrical connections is available for running equipments otherwise sound proof/super silent Diesel Generator set should be available
   - Sound level should not increase as per following-

Type of area of work	Maximum noise level dB(A)
Industrial	70
Commercial	55
Residential	45
Silence zone	40

   - Illumination should be as follows-

Minimum illumination (lx)	Areas to be illuminated	Type of work activity
54	Illumination throughout the work area	General work area lighting, and performance of visual tasks of large size, or medium contrast, or low require accuracy
108	Illumination of work area and areas adjacent to equipment	Performance of visual tasks of medium size, or low to medium contrast, or medium required accuracy
216	Illumination of task	Performance of visual tasks of small size, or low contrast or high required accuracy or fine finish

   - As far as possible ready mix concrete from batching plant to be used, otherwise the concrete should be prepared away from residential areas and brought to the site
   - All the noise activity like hammering, cutting, crushing, running of heavy equipments should be done in day time and avoided in night time
   - Workers engaged in night works should have adequate rest/sleep in day time before start of night works
   - Worker engaged for night works should have previous experience of night works and should be physically fit for such works including clear vision in night

- All the necessary provisions of traffic aids such as traffic signals, road signage, barricades, cautions boards, traffic diversion boards etc. should be available with fluorescent/retro-reflective arrangements
- Workers should be trained before start of night works about risks and hazards of night works and their mitigation measures and should be provided all the protective aids (PPEs) including fluorescent/retro-reflective vests
- Horns should not be permitted by equipments and vehicles
- Workers should not shout and create noise
- First aid and emergency vehicles should be available at site
- Emergency preparedness plan should be operative during night works
- Old persons and pregnant women and women having small kids should not work in night time
- All the vehicles and equipments being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise
- All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works

7. PIU/DSC site engineers and contractors safety personnel should closely monitor the safety of works continuously and noise and illumination levels on hourly basis and maintain photographic and videographic records as well as register the observations
8. Night works should be stopped early in the morning at least one hour before start of pedestrian/traffic movement
9. After completion of night works all the site should be cleaned and maintained obstruction free for day time movement of vehicles and pedestrians
10. Drivers and workers should be alert and responsive during night works
11. All the wages to workers working in night hours should be as per the applicable labour acts
12. Avoid any nuisance which may create problems to nearby habitants and work peacefully during night hours
13. Night works should not be conducted near hospitals and during peak seasons such as peak tourist season, students' exam times etc.

Appendix 16: Photographs of Proposed Sites

Proposed site for WTP at Manpura Bhakhri

Vegetations and natural drain at WTP site

Forest boundary on back side of WTP site

Hills near the proposed WTP site

Existing approach road to WTP site

Existing structure of Ground Water Department near proposed WTP site

Proposed alignment from Manpura Bhakhri WTP to Mastan Baba Colony

Cause way on river Bandi on the proposed alignment

Existing Mandli Pum p House

PHED Headworks

PHED Headworks

Proposed site for Railway crossing near Pali Junction

Lakhotia Talab and pump house

Proposed alignment at Jodhpur Road

Proposed site of OHSR at Labour colony near existing OHSR

Existing OHSR and proposed site for new OHSR at Shantinath Colony

Proposed site for OHSR at Raiko ki Dhani near existing OHSR

Site for proposed OHSR at Industrial area