



Initial Environmental Examination

July 2023

India: Rajasthan Secondary Towns Development Sector Project

Subproject : Water Supply Project in Laxmangarh City, District - Sikar, Rajasthan
Part 1 of 3 : Main Report (Pages 1-127) and Appendices 1 - 14

Prepared by Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited, Government of Rajasthan for the Asian Development Bank. This is an updated version of the initial environmental examination report originally posted in November 2021 available on (<https://www.adb.org/projects/documents/ind-42267-031-iee-29>).

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Subject:- Compliance of ADB's Environmental Safeguard policy- Submission of updated Initial Environmental Examination Reports of 14 towns under RSTDSP (Loan Number-3972 IND).

Please find enclosed herewith updated Initial Environmental Examination reports of 14 town projects:- Laxmangarh water supply subproject; Ratangarh, Fatehpur, Pratapgarh, Ladnu, Didwana & Makrana sewerage subprojects and Abu Road, Sirohi, Sardarshahar, Banswara, Kuchaman, Khetri & Mandawa water supply and sewerage subprojects for ADB's review and approval.

Kindly acknowledge the receipt.

Encl: Soft copies (word and pdf) of above Updated IEEs.


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Addl. Project Director
RUIDP, Jaipur

Updated Initial Environmental Examination Report

Document Title: Updated IEE
Project Number: 42267-031
June 2023

Project: India- Rajasthan Secondary Towns Development Sector Project (RSTDSP) - Water Supply Project in Laxmangarh City, District - Sikar, Rajasthan

Prepared by Project Management Unit, Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited, Government of Rajasthan for the Asian Development Bank.

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CURRENCY EQUIVALENTS (As of March 2019)

<u>Currency unit</u>	<u>=</u>	<u>Indian rupee (₹)</u>
<u>₹1.00</u>	<u>=</u>	<u>\$0.0138</u>
<u>\$1.00</u>	<u>=</u>	<u>₹72.388</u>

ABBREVIATIONS

ADB	–	Asian Development Bank
BOCW	–	Building and other Construction Workers
CGWB	–	central ground water board
CLC	–	city level committee
CPCB	–	central pollution control board
CPHEEO	–	Central Public Health and Environmental Engineering Organization
CTE	–	consent to establish
CTO	–	consent to operate
CWR	–	clear water reservoir
DBO	–	design-build-operate
DPR	–	detailed project report
EHS	–	environmental health and safety
EIA	–	environmental impact assessment
EMP	–	environmental management plan
FAO	–	Food and Agricultural Organization
FCO	–	fertilizer control ordinance
FSSM	–	Fecal Sludge and Septage Management
IEE	–	initial environmental examination
IFC	–	International Finance Corporation
LSGD	–	Local Self Government Department
MOEFCC	–	Ministry of Environment, Forest and Climate Change
OHSR	–	overhead service reservoir
PHED	–	Public Health Engineering Department
PIU	–	project implementation unit
PMU	–	project management unit
PWD	–	Public Works Department
REA	–	rapid environmental assessment
ROW	–	right-of-way
RSPCB	–	Rajasthan State Pollution Control Board
RSTDSP	–	Rajasthan Secondary Towns Development Sector Project
RUDSICO-EAP	–	Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited-Externally Aided Projects
RUDSICO	–	Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation
SCADA	–	supervisory control and data acquisition
SBR	–	sequential batch reactor
SEIAA	–	State Environmental Impact Assessment Authority
SPS	–	Safeguard Policy Statement, 2009
STP	–	sewage treatment plant
TEER	–	treated effluent elevated reservoir
TESR	–	treated effluent storage reservoir
ULB	–	urban local body
WHO	–	World Health Organization
WTP	–	water treatment plant

WEIGHTS AND MEASURES

°C	Degree Celsius
km	kilometre
lpcd	litres per capita per day
mm	milli meter
m	metre
MLD	million litres per day
mm	millimetre
Nos	Numbers
Sq.km	Square Kilometer

NOTES

- (i) In this report, "\$" refers to US dollars.
"INR" and "₹" refer to Indian rupees

TABLE OF CONTENTS

I.	EXECUTIVE SUMMARY	I
I.	Introduction	1
	Background	1
	Purpose of Initial Environmental Examination Report	2
	Report Structure	4
II.	DESCRIPTION OF THE PROJECT	5
	Location of Project town	5
	Present Status of Water Supply and Sewerage	5
	Infrastructure Improvements Designed in Laxmangarh City under RSTDSP	5
	Land Acquisition and Involuntary Resettlement	9
	Subproject Benefits	9
	Implementation Schedule	9
	Changes in project locaton and scope of works	10
III.	Analysis of alternatives	18
IV.	Policy, legal and administrative frameworks	20
	ADB Safeguard Policy	20
	National & State Laws	22
V.	DESCRIPTION OF THE ENVIRONMENT	37
	Physical Resources	37
	Ecological Resources	41
	Economic Development	42
	Socio Cultural Resources	44
	Environmental Settings of Investment Program Component Sites	45
VI.	ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES	48
	Introduction	48
	Pre-Construction Impacts – Design and Location	49
	Location Impacts	49
	Design Impacts	50
	Water Reservation for Laxmangarh	51
	Environmental Audit of Existing Water Supply Infrastructure	52
	Construction Impacts	59
	Operation and Maintenance Impacts	71
VII.	PUBLIC CONSULTATION AND INFORMATION DISCLOSURE	72
	Overview	72
	Public Consultation	72
	Consultation during Project Preparation	73
	Consultation during construction	73
	Information Disclosure	74
VIII.	GRIEVANCE REDRESS MECHANISM	75
	Project Specific Grievance Redress Mechanism	75
IX.	ENVIRONMENTAL MANAGEMENT PLAN	78
	Environmental Management Plan	78
	Institutional Requirements	110
	Training Needed	120
	Monitoring and Reporting	122
	EMP Implementation Cost	122
X.	CONCLUSION AND RECOMMENDATION	124

List of Appendices

Appendix 1: Rapid Environmental Assessment (REA) Checklist	128
Appendix 2: Drinking water standards	132
Appendix 3: Compliance with Environmental Criteria for Subproject Selection	134
Appendix 4: Ambient Air Quality, Vehicle, Diesel Generator Emissions Standards	138
Appendix 5: Ambient Air Quality Standards in Respect of Noise	142
Appendix 6: Salient Features of Major Laws Applicable to Establishments Engaged in Construction of Civil Works	144
Appendix 7: Groundwater Quality Test Reports	147
Appendix 8: Biodiversity Assessment Report - Laxmangarh	148
Appendix 9: Sample chance find protocol	169
Appendix 10: Salient features of the IGNP canal (Source of surface water)	170
Appendix 11: Surface Water Allocation Letter from Executive Engineer, PHED	172
Appendix 12: Feasibility report of tube wells	173
Appendix 13: Location details of tube wells	175
Appendix 14: Preliminary audit note on existing facilities	176
Appendix 15: Updated Asbestos Containing Material (ACM) Management Plan	186
Appendix 16: Sample Outline Spoil Management Plan	222
Appendix 17: Sample Outline Traffic Management Plan	223
Appendix 18: Environmental Monitoring Plan - Ambient Air, Noise, Water and Soil	233
Appendix 19: IFC benchmark standards for workers accommodation	235
Appendix 20: Guidelines and Emergency plan for handling and storing chlorine	247
Appendix 21: Details of Public Consultations	253
Appendix 22: Minutes of City level Stakeholder Committee (CLC) Meeting	266
Appendix 23: Sample Grievance Registration Form	269
Appendix 24: Office order for establishing GRM	270
Appendix 25: Sample Environmental Site Inspection Checklist	273
Appendix 26: Semi Annual Environmental Monitoring Report Format	275
Appendix 27: Details of land availability, ownership and NOCs for sites	281
Appendix 28: Layout of CWR showing storage area for asbestos material	283
Appendix 29: WHO Interim Guidance on Water, Sanitation, Hygiene and Waste Management for the COVID19 virus	284
Appendix 30: Site Visit for Due Diligence of Environmental Safeguards	290
Appendix 31: Environmental Monitoring Location and results in Laxmangarh	295

I. EXECUTIVE SUMMARY

Rajasthan Secondary Towns Development Sector Project (RSTDSP), the fourth phase of investment projects financed by Asian Development Bank (ADB) and implemented by the Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited (RUDSICO), previously known as Rajasthan Urban Infrastructure Development Project (RUIDP). RSTDSP will support the ongoing efforts of the Government of Rajasthan (GOR) towards improving the water and wastewater services in about 14 towns¹. RSTDSP seeks to improve water supply and sewerage (WSS) services in secondary towns with populations between 20,000-115,000 through a sector loan modality. The project is aligned with the following impact(s): (i) access to potable, affordable, reliable, equitable, and environmentally sustainable drinking water supply in all urban areas of Rajasthan improved²; and (ii) health status of urban population, especially the poor and under-privileged improved³. The project will have the following outcome: urban service delivery in secondary towns of Rajasthan improved. There are three outputs.

Output 1: Water supply infrastructure in project towns improved with climate-resilient and inclusive features. By 2027: (i) about 1,350 kilometers (km) of water supply pipelines will be commissioned through a district metered area approach for effective non-revenue water (NRW) management, (ii) about 100,000 households will be connected to an improved water supply system (including at least 95% below poverty line [BPL] households) with 100% functional meters allowing for the introduction of volumetric billing, (iii) 3 new water treatment plants (WTP) will be commissioned with total capacity of at least 28 million liters per day (MLD) and (iv) 2 water treatment plants WTP will be rehabilitated.

Output 2: Sanitation systems in project towns improved with climate-resilient, cost-effective and inclusive features.⁴ By 2027: (i) about 1,300 kilometers of sewers will be constructed, (ii) 19 sewerage treatment plants (STP)s with co-treatment of wastewater and fecal sludge and with a total capacity of about 80 million liters per day will be commissioned and 3 existing STPs will be upgraded to meet current effluent standards, (iii) about 103,000 new household connections (including at least 95% BPL households) to sewer system will be installed, (iv) 1 fecal sludge treatment plant with total 10 kilo liters per day (KLD) capacity will be commissioned, and (v) agreements for reuse of wastewater mainly for industry or agriculture will be signed in at least 5 project ULBs.

Output 3: Institutional and human capacities strengthened for service improvements, gender equality and sustainability. Under the sector project: (i) at least 500 women will gain professional experience through an internship program at RUDSICO, (ii) about 500 staff and 500 elected representatives of project ULBs, including 80% of eligible women, will report increased knowledge on operation and maintenance (O&M) of WSS services, CWIS, financial sustainability and gender equality and social inclusion (GESI) action plan implementation, (iii) about 500 girls will report enhanced knowledge in conducting water

¹ Secondary towns under consideration are Abu Road, Banswara, Didwana, Fatehpur, Kuchaman, Ladnu, Laxmangarh, Makrana, Pratapgarh, Ratangarh, Sardarshahar, Sirohi, and Heritage towns - Khetri, Mandawa.

² Government of Rajasthan. 2018. *Rajasthan: Urban Water Supply Policy*. Jaipur.

³ Government of Rajasthan. 2016. *State Sewerage and Wastewater Policy*. Jaipur.

⁴ Climate resilient and inclusive features included are: improvements in the distribution system to reduce losses; rainfall water harvesting; energy-efficient pumps; solar panels at project facilities; pressure control mechanisms in the water system to help avoid losses through pipe bursts; and wastewater reuse for productive uses.

audits in schools and households, and (iv) data platforms will be established in all project towns⁵.

Laxmangarh City water supply subproject is one of the subprojects designed under the investment component of RSTDSP. Presently source of water in Laxmangarh town is ground water. The town is benefited from 34 no. of tube wells at various locations in the city. Out of this, 12 TWs are connected to CWR at A.En. Head Works whereas 11 TWs are connected to CWR at Bad ke Balaji HW. 34 TWs considered as GW source. Water collected from 34 Nos. tube wells are collected at Clear Water Reservoirs at A.EN office and Bad Ke Balaji and further it transferred to ESR available at various location in the town. Presently about 70-80% area of municipality limit is covered under the drinking water supply scheme by PHED. Remaining areas which is newly developed and newly added to the municipality area is remain unconnected with piped scheme. Currently water supply service in Laxmangarh town is unreliable coupled with quality issues and huge distribution losses.

Screening and assessment of potential impacts. 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 Safeguard Policy Statement (SPS) 2009. Per the Government of India Environmental Impact Assessment (EIA) Notification 2006, this subproject does not require EIA study or environmental clearance. The potential environmental impacts of the subproject have been assessed using ADB Rapid Environmental Assessment (REA) checklist for water supply Potential impacts were identified in relation to design, construction and operation phases. This initial environmental examination (IEE) addresses the infrastructure components designed under Laxmangarh City Water Supply subproject.

Categorization. Environmental assessment has been conducted for the Laxmangarh water supply subproject based on (i) detailed design, and (ii) most likely environmentally sensitive components. The environmental assessment used ADB's rapid environmental assessment (REA) checklists for water supply and "No Mitigation Scenario Checklist". The environmental assessment of Laxmangarh water supply subprojects is not likely to have any significant adverse environmental impacts that are irreversible, diverse, or unprecedented. Potential impacts are mostly site-specific and few of them are irreversible. In most cases mitigation measures can be designed with uncomplicated measures commonly used at construction sites and known to civil works contractors.

First and second updated IEEs of this subproject were approved by ADB in August 2021 and November, 2021, respectively and were disclosed on ADB and RUIDP websites. ADB approved updated Initial Environmental Examination (IEE) Report, November, 2021 is updated due to (i) updating Asbestos Containing Material Management Plan (ACMMP) and (ii) decrease in length of water supply network from 162.64 km to 161.04 km. No other change in scope or location occurred between the second updated IEE and current update and SIP for the subproject is approved. While updating the IEE, the environmental category of the subproject continued to remain 'B'. The revised and approved IEE will supersede the earlier version of IEE and shall be contractually binding on the contractor.

Laxmangarh Water Supply subproject is continued to be Environmental Category B as per the ADB SPS 2009 as no significant impacts are envisaged. Accordingly, this updated Initial Environmental Examination (IEE) has been prepared which assesses the environmental impacts and provides mitigation and monitoring measures to ensure that there are no significant impacts as a result of the project.

⁵ Includes supervisory control and data acquisition system, hydraulic model, geographic information system, and drinking water and treated wastewater quality monitoring system.

Project Scope. The subproject is formulated to address gaps in water supply infrastructure in a holistic and integrated manner. The main objective of the project is to improve water efficiency, security, and provide safe drinking water; this will have an important effect on public health. Investments under this subproject include: (i) Rehabilitation of Tubewells 34 Nos., (ii) Construction of 2 nos. of CWR of 250 K L at Bad ke Balaji HW and 100 KL at PHED A.En. Campus (iii) Distribution Network- 161.04 km (75 mm to 280 mm) (iv) Rehabilitate 3 CWRs of 900 KL total capacity and 8 nos. of OHSR of 3880 KL total capacity (v) Provision for SCADA system. (vi) Provision for House connections- 9007 Nos. (vii) Electrical and Mechanical works and (viii) Construction of 2 CRMC (at PHED AEn. Campus and opposite PHED Exn. Office) and 1 MCC at PHED EXn campus.

Description of the Environment. Subproject components are located in Laxmangarh City in Sikar and 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 Government lands for structures and for pipe laying in existing road right of way (RoW). 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. Laxmangarh town has hot and dry climate. The cold season lasts for about three and half months from November to the end of February. The period from April to the end of June constitutes the hot season. The Monsoon starts in the end of June. The temperature rises to 45-50°C in summers and falls to a minimum of -2° to 4° in winters. Mean annual rainfall (1971-2011) of the district is 463.0 mm.

Potential Environmental Impacts and Mitigation Measures. 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 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.

Locations and siting of the designed infrastructures were considered to further reduce impacts. These include (i) locating facilities on government-owned land to avoid the need for land acquisition and relocation of people; and (ii) 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.

Measures such as appropriate scheduling of works (non-monsoon season, low traffic hours, etc.) and minimizing inconvenience by best construction methods will be employed like trenchless pipe laying for water supply for the depth of more than 3.5 mtr and in areas where traffic is more. Traffic management plan will be prepared by contractor before start of construction works for pipe-laying works 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.

Environmental Management. An environmental management plan (EMP) is included as part of this IEE, which includes (i) mitigation measures for environmental impacts during implementation; (ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting; (iii) public consultation and information disclosure; and (iv) a grievance redress mechanism. 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.

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 to be carried out by the Contractor will be reported to the RUDSICO who shall report to the ADB as per agreed upon reporting procedures. The cost for the implementation of the EMP and the associated monitoring measures is estimated at approximately (budgetary provision) for mitigating the anticipated impacts by designed subproject component is approx. INR 17,587,580 (in words Rupees One Crore Seventy Five Lacs Seven Thousand Five Hundred and Eighty) This indicative cost includes INR 7,000,000 (USD 100,000) for asbestos management (identification, inventory, removal, transport, temporary storage, disposal/treatment, and overall supervision of contractor related to asbestos materials).

The IEE and EMP was included in the bid and contract documents to ensure compliance with the conditions set out in this document. The contractor has submitted to PIU, for review and approval, an updated EMP / site-specific EMP (SEMP) including (i) designed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; and (iii) monitoring program per EMP. No works are allowed to commence prior to approval of SEMP. A copy of the EMP/approved SEMP has been kept on-site during the construction period at all.

Implementation Arrangements. Government of Rajasthan's Local Self Government Department (LSGD) acting through RUDSICO, the project Executing Agency. The project management unit (PMU) is housed in RUDSICO's division for externally aided projects (EAP). There are two Zonal officers in Jaipur and Jodhpur and project implementation units (PIUs) in each project town / urban local body (ULB). PMU is responsible for submitting environmental assessment and monitoring reports to ADB, monitoring of safeguards compliance, addressing safeguards issues, providing support and guidance to PIUs. The PIUs are responsible for the day-to-day monitoring of EMP implementation, information disclosure, consultations and other field-level activities. PMU has appointed a Project Officer for environment and each PIU deputed an Assistant Safeguard Officers (ASOs). The PMU environment project officer is assisted by specialists from Project Management and Capacity Building Consultants (PMCBC) and Construction Management and Supervision Consultants (CMSC).

Consultation, Disclosure and Grievance Redress. The stakeholders were involved in developing the IEE through discussions on-site and a public consultation workshop at city level, after which views expressed were incorporated into the IEE and in the planning and development of the project. Apart from on-site public consultations, a stakeholder meeting of City Level Committee (CLC) was held and CLC has appreciated and approved the subproject. The IEE will be made available at public locations, the Draft and first updated IEE was disclosed and this updated IEE will also be disclosed to a wider audience via the ADB and RUDSICO 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. A grievance redress mechanism (GRM) is described within the IEE to ensure any public grievances are addressed quickly.

Monitoring and Reporting. The PMU, PIU and consultants will be responsible for monitoring and reporting. During construction, results from internal monitoring by the DBO contractor will be reflected in their monthly EMP implementation reports to the PIU. PIU with the assistance of CMSC, will monitor the compliance of contractor, prepare a quarterly environmental monitoring report (QEMR) and submit to PMU. The PMU will oversee the implementation and compliance and will submit semi-annual environmental monitoring reports (SEMR) to ADB. ADB will post the

environmental monitoring reports on its website. Monitoring reports will also be posted RUDSICO/PMU websites.

Conclusions The citizens of the Laxmangarh will be the major beneficiaries. The subproject is primarily designed to improve environmental quality and living conditions of Laxmangarh town through provision of safe drinking water supply. The benefits arising from this subproject include: (i) increased availability of potable water at appropriate pressure to all households including urban poor; (ii) reduced time and costs in accessing alternative sources of water. (iii) better public health particularly reduction in waterborne and infectious diseases; (iv) reduced risk of groundwater contamination; (v) reduced risk of contamination of treated water supplies; and, (vi) reduced dependence on fresh water resource due to reuse of treated wastewater, and (vi) improvement in quality of water bodies due to disposal of treated effluent meeting disposal standards.

The subproject is 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 and procedures. Based on the findings of the third updated IEE, there are no significant impacts and the project is continued as Category "B". The subproject is not covered by the GoI EIA Notification (2006).

There is no further environmental impact envisaged due decrease in water supply network length from 162.64 km to 161.04 km. No separate environmental assessment is required.

Recommendations. The applicable recommendation to this subproject based on the findings of draft IEE, as per this update the compliance status of the recommendations of draft IEE are as follows;

Recommendations already Implemented with this update:

- Obtain all statutory clearances at the earliest time possible and ensure conditions/provisions are incorporated in the detailed design
- Include this IEE in bid and contract documents;- implemented, the ADB approved Draft IEE is part of bid documents
- Ensure contractor appointed qualified environment, health and safety (EHS) officers prior to start of works
- Involvement of contractors, including subcontractors, in first level GRM;- complied Conduct safeguards induction to the contractor upon award of contract
- Updation/revision of this IEE based on detailed design and/or if there are unanticipated impacts, change in scope, alignment, or location
- Strictly supervise EMP implementation
- Documentation and reporting on a regular basis as indicated in the IEE
- Continuous consultations with stakeholders
- Timely disclosure of information and establishment of GRM
- Commitment from PMU, PIUs, project consultants, and contractors to protect the environment and the people from any impact during project implementation
- Update and implement the asbestos management plan per site-specific conditions; - Asbestos Manangment Plan has been prepared and updated (Attached as **Appendix 15**) by Asbestos expert.

Recommendations which are not applicable to this project

- Update and implement the recommendations from the biodiversity assessment report;- There are no impact on biodiversity (endangered, threatened or protected) due to project activites, therefore further biodiversity assessment is not required for this project.

I. INTRODUCTION

Background

1. Rajasthan Secondary Towns Development Sector Project (RSTDSP), the fourth phase of investment projects financed by Asian Development Bank (ADB) and implemented by the Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited (RUDSICO), previously known as Rajasthan Urban Infrastructure Development Project (RUIDP). RSTDSP will support the ongoing efforts of the Government of Rajasthan (GOR) towards improving the water and wastewater services in about 14 towns⁶. RSTDSP seeks to improve water supply and sewerage (WSS) services in secondary towns with populations between 20,000-115,000 through a sector loan modality. The project is aligned with the following impact(s): (i) access to potable, affordable, reliable, equitable, and environmentally sustainable drinking water supply in all urban areas of Rajasthan improved⁷; and (ii) health status of urban population, especially the poor and under-privileged improved⁸. The project will have the following outcome: urban service delivery in secondary towns of Rajasthan improved. There are three outputs.

Output 1: Water supply infrastructure in project towns improved with climate-resilient and inclusive features. By 2027: (i) about 1,350 kilometers (km) of water supply pipelines will be commissioned through a district metered area approach for effective non-revenue water (NRW) management, (ii) about 100,000 households will be connected to an improved water supply system (including at least 95% below poverty line [BPL] households) with 100% functional meters allowing for the introduction of volumetric billing, (iii) 3 new water treatment plants (WTP) will be commissioned with total capacity of at least 28 million liters per day (MLD) and (iv) 2 water treatment plants WTP will be rehabilitated.

Output 2: Sanitation systems in project towns improved with climate-resilient, cost-effective and inclusive features.⁹ By 2027: (i) about 1,300 kilometers of sewers will be constructed, (ii) 19 sewerage treatment plants (STP)s with co-treatment of wastewater and fecal sludge and with a total capacity of about 80 million liters per day will be commissioned and 3 existing STPs will be upgraded to meet current effluent standards, (iii) about 103,000 new household connections (including at least 95% BPL households) to sewer system will be installed, (iv) 1 fecal sludge treatment plant with total 10 kilo liters per day (KLD) capacity will be commissioned, and (v) agreements for reuse of wastewater mainly for industry or agriculture will be signed in at least 5 project ULBs.

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⁶ Secondary towns under consideration are Abu Road, Banswara, Didwana, Fatehpur, Kuchaman, Ladnu, Laxmangarh, Makrana, Pratapgarh, Ratangarh, Sardarshahar, Sirohi, and Heritage towns - Khetri, Mandawa.

⁷ Government of Rajasthan. 2018. *Rajasthan: Urban Water Supply Policy*. Jaipur.

⁸ Government of Rajasthan. 2016. *State Sewerage and Waste water Policy*. Jaipur.

⁹ Climate resilient and inclusive features included are: improvements in the distribution system to reduce losses; rainfall water harvesting; energy-efficient pumps; solar panels at project facilities; pressure control mechanisms in the water system to help avoid losses through pipe bursts; and wastewater reuse for productive uses.

financial sustainability and gender equality and social inclusion (GESI) action plan implementation, (iii) about 500 girls will report enhanced knowledge in conducting water audits in schools and households, and (iv) data platforms will be established in all project towns¹⁰.

2. 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. Laxmangarh water supply subproject is one of the subprojects designed under RSTDSP. Presently source of Laxmangarh town is ground water. The town is benefited from 34 nos. of tube wells at various locations in the city. Out of this, 12 tube wells are connected to Clear Water Reservoir (CWR) at AEN Head Works whereas 11 tube wells are connected to CWR at Public Health Engineering Department (PHED) Campus at Bad ke Balaji Head Works. Further, it is transferred to Elevated Storage Reservoir (ESR) available at various location in the town. Presently, about 70-80% area of municipality limit is covered under the drinking water supply scheme by the PHED. Remaining area which is newly developed and newly added to the municipality area is remaining unconnected with piped scheme. Currently, water supply service in Laxmangarh town is unreliable coupled with quality issues and huge distribution losses.

3. The subproject is formulated to address gaps in water supply infrastructure in a holistic and integrated manner. The main objective of the project is to improve water efficiency, security, and provide safe drinking water; this will have an important effect on public health. Investments under this subproject include: (i) Rehabilitation of Tubewells 34 Nos., (ii) Construction of 2 nos. of CWR of 250 KL at Bad ke Balaji HW and 100 KL at PHED A.EN. Campus (iii) Distribution Network- 167.73 km (75mm to 280mm) (iv) Rehabilitation of 3 CWRs of 900 KL total capacity and 8 nos. of OHSR of 3880 KL total capacity (v) Provision for SCADA system. (vi) Provision of House connections-9007 Nos. (vii) Electrical and Mechanical works and (viii) Construction of 2 CRMC (at PHED AEn. Campus and opposite PHED Exn. Office) and 1 MCC at PHED Exn Campus.

Purpose of Initial Environmental Examination Report

4. 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 SPS, 2009. The potential environmental impacts of the subproject have been assessed using ADB rapid environmental assessment (REA) checklist for water supply (Appendix 1). Then potential negative impacts were identified in relation to pre-construction, construction and operation of the improved infrastructure, 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, 2019 requirements for environment category B projects.

5. The Laxmangarh water supply subproject is designed for implementation under the design-build-operate (DBO) modality, where in which the design is carried out by the selected bidder based on the feasibility/preliminary project report prepared prior to bidding. Thus, this IEE is based on the preliminary project report prepared by RUDSICO/PMU. The IEE was based mainly on field reconnaissance surveys and secondary sources of information. No field monitoring (environmental) survey was conducted; however, the environmental monitoring program developed as part of the environmental management plan (EMP) will require the contractors to

¹⁰ Includes supervisory control and data acquisition system, hydraulic model, geographic information system, and drinking water and treated wastewater quality monitoring system.

establish the baseline environmental conditions prior to commencement of civil works. The results will be reported as part of the environmental monitoring report and will be the basis to ensure no degradation will happen during subproject implementation. Stakeholder consultation was an integral part of the IEE.

6. IEE of this subproject was prepared and approved by ADB based on feasibility/preliminary design, and included in bid and contract of this DBO package. Updated IEE reflecting the final subproject designs including any change in scope, locations etc., and the approval of the same by ADB is required prior to start of construction. Since the designs are being finalized zone/subzone / component wise, it is also planned to update IEE in stages to proceed with the construction of components for which designs are completed. First and second updated IEEs of this subproject were approved by ADB in August 2021 and November, 2021, respectively and were disclosed on ADB and RUIDP websites. ADB approved updated Initial Environmental Examination (IEE) Report, November, 2021 is updated due to (i) updating Asbestos Containing Material Management Plan (ACMMP) and (ii) decrease in length of water supply network from 162.64 km to 161.04 km. No other change in scope or location occurred between the second updated IEE and current update and SIP for the subproject is approved. While updating this IEE, the environmental category of the subproject continued to remain 'B'. The revised and approved IEE will supersede the earlier version of IEE and shall be contractually binding on the contractor.

Table 1: Subproject Scope, Components, status of detailed design, and changes – up to June 2023

Components / scope of works as per the Draft IEE	Components completed detailed design			Change in scope, design	Change in location
	Last IEE Update	Current IEE update	Cumulative (including this IEE update)		
Clear water reservoir- New 250KL Bad ke Balaji HW and 100 KL at A.EN. PHED Campus.	Approved	Approved	Approved	-	No change
Water supply distribution networks (167.73 Km) including House service connection of 9007	Approved	Approved	Approved	Water supply network decreased from 162.64 km to 161.04 km	No change
Rehabilitation & Refurbishment of 3 CWRs of 900 KL total capacity Rehabilitation of 08 existing OHSRs	-	-	-	-	-
Rehabilitation of 34 tube wells including replacement of pipes, pumps, valves, all electro-mechanical items etc	-	-	-	-	-
One chlorinator room and vacuum feed chlorination system of capacity of 1 kg per hour	Approved	Approved	Approved	-	-
Construction of Consumer Relation Management	Approved	Approved	Approved	-	No change

Centers (CRMC) – 2 no. CRMC-1 PHED A.EN. Campus CRMC-2 Near PHED Exn Campus Master Control Centre- 1 no. at PHED A.EN campus					
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7. The implementation of the subprojects will be governed by Government of India and Rajasthan and other applicable environmental acts, rules, regulations, and standards. Environmental safeguards will be followed in accordance with the ADB SPS, 2009. During the design, construction, and operation of the project the borrower/client will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards.

Report Structure

8. This Report contains the following eleven (11) sections including the executive summary at the beginning of the report:

- Executive Summary
- Introduction
- Description of the Project
- Analysis of alternatives
- Policy, Legal and Administrative Framework
- Description of the Environment
- Anticipated Environmental Impacts and Mitigation Measures
- Public consultation and information disclosure
- Grievance Redress Mechanism
- Environmental management plan
- Conclusions and Recommendations

II. DESCRIPTION OF THE PROJECT

Location of Project town

9. Laxmangarh is a town in Sikar district of Rajasthan state in India. It is the sub-divisional headquarters of the Laxmangarh sub-division in Sikar district. It is also the Tehsil headquarters of the Laxmangarh Tehsil. Laxmangarh is also Panchayatsamiti headquarters of the Laxmangarh Panchayatsamiti in the district. It is situated on National Highway-52 at a distance of 24 km from Sikar in north. It is situated 145 km away from Jaipur in the north-west via NH52.

10. The town situated as latitude 27.823829°N and longitude 75.024841° E. Laxmangarh is known for its fort and havelis, though none of them are protected monuments. It has an average elevation of 222 metres. The geographical area of the city is about 16.26 Sq. Km. As per 2011 census population of town is 53392. Laxmangarh City is one of the 40 project towns selected for implementation of the ADB funded RUIDP Phase-IV projects. Under the investment component of the project, it is designed to provide Water Supply System in Laxmangarh City and cover whole town within municipal limit by Water Supply.

Present Status of Water Supply and Sewerage

11. **Water Supply**– Presently source of Laxmangarh town is ground water. The town is benefited from 34 no. of tube wells at various locations in the city. Out of this, 12 tube wells are connected to Clear Water Reservoir (CWR) at AEN Head Works whereas 11 tube wells are connected to CWR at Bad ke Balaji Head Works. 34 TWs considered as GW source. Water collected from 34 nos tube wells are collected at CWRs at AEN office and Public Health Engineer Department (PHED) Campus at Bad Ke Balaji. Further it is transferred to Elevated Storage Reservoir (ESR) available at various locations in the town. Presently, about 70-80% area of municipality limit is covered under the drinking water supply scheme by PHED. Remain area which is newly developed and newly added to the municipality area remains unconnected with piped scheme. Currently water supply service in Laxmangarh town is unreliable coupled with quality issues and huge distribution losses.

12. At present, an intermittent water supply system is running in the town with actual service level 100 LPCD at consumers end, which will improved to 135 LPCD after full commissioning of Fathpur-Laxmangarh water supply project of PHED. At present it is partially commissioned, and water is received (about 5.12 MLD) at both the Headworks at Bad Ke Balaji and A.En. campus. After commissioning of this project, water will be provided 12m Head with continuous supply. Under existing water supply system PHED is monitoring the water quality from existing CWRs/ESRs and Water quality report is given as Appendix 7.

13. **Sewerage**: Laxmangarh town is covered under UIDSSMT (Eleven City Sewerage Project) of Gol of amounting Rs. 83.38 Crs. In this project around 121 Kms sewer line was proposed with three STPs of capacity 3.0 MLD (Todikui); 1.50MLD (New Indra Aavas Colony) and 1.0 MLD (Near Basin Road Banjara Basti) and around 6381Nos. of manholes will be executed. About 6000 houses will be benefitted through house sewer connections.

14. Till date approx. 115 km of sewer line was laid in town. 1.5 MLD STP is at commissioning in process & the remaining two STPs are under construction phase. Laying of around 5351 manholes are completed and 1750 houses are connected through house sewer connections. Project is completed 75%.

Infrastructure Improvements Designed in Laxmangarh City under RSTDSP

15. **Need of the Project & Source of water**: All the TWs and OWs are connected to direct

distribution and cannot be considered as sustainable source as they have very low discharge yield. A package “Fatehpur-Laxmangarh Water Supply project” was sanctioned by PHED and under execution. Laxmangarh will get deficit water (excluding GW) from this project of PHED Rajasthan source as Khumbha Ram Lift Canal.”. The work of pipeline system from canal off take point to A. En HW and Bad ke Balaji HW has been completed. 500 mm DI pipe has been laid from canal off take to A. En HW and Bad ke Balaji HW. Presently Total water abstracted from Tube Wells is 4.14 MLD (34 TW) and availability of 12.06 MLD (2041) water allocation from the “Fatehpur-Laxmangarh Water Supply Project”. Treated water will be available from “Fatehpur-Laxmangarh Water Supply Project” of PHED up to Bad ke Balaji and AEN Campus H/w of Laxmangarh town. WTP of this scheme is at Dhannasar.

16. **Water demand & availability:** Overall drinking water supply requirements are as follows: -

Table 2. Population and Water Demand and Water Availability (MLD)

Year	Stage	Population	Water Demand at Consumer end	Total Water Demand	Total Available Water (Surface +TWs)	Treated Surface Water	TWs** within city (19 nos)	OWs*** within city (4 nos)
2021	Base Year	60,087	8.11	10.0	10.10	10.20	3.42	0.72
2036	Intermediate Year	68,115	9.20	11.30	11.10	10.20	3.42	0.72
2051	Ultimate Year	73,988	10.0	12.20	12.33	12.06 (2041)	3.42	0.72

*Water from Fatehpur-Laxmangarh Drinking Water Supply Project, of PHED, GoR.

**TW Ground water source has been kept alive.

*** Open Wells are old and discharge is low therefore not considered in scheme

17. Following **Table-3** shows the nature and size of the various components of the subproject.

Table 3: Proposed Water Supply Components in Laxmangarh

Infrastructure	Function	Description	Location
Water Supply			
Clear water reservoir	Storage and pumping of clear water for supply	New 250KL Bad ke Balaji HW and 100 KL at PHED A.EN. Campus.	Existing PHED campus headworks at Bad ke Balaji and Existing A.EN. PHED Campus.
Water supply distribution networks including House service connection	Collect water from service reservoir and distribution to households	New Construct 161.04 km of distribution network (75 mm to 280 mm material : HDPE pipes of PE-100 grade & PN-6) New 9007 Consumer Connections.	Existing ROW of roads under Nagar Palika at different locations of town
Rehabilitation of CWRs and OHSRs	Storage and supply of clear water through gravity	Existing Rehabilitation & Refurbishment of 3 CWRs of 900 KL total capacity Rehabilitation of 08 existing OHSRs. Designed works for rehabilitation	RCC CWR at A.En office Head Works and Bad ke Balaji. Pump Houses at PHED Campus Bad ke Balaji HW and

Infrastructure	Function	Description	Location
		• Earth work Excavation • PCC • Raft / bottom beam • Columns, bracings & bottom beam below conical wall • Conical wall & first lift of vertical wall • Remaining vertical wall & top dome with other ancillary works such as plinth protection, etc. • piping and hydraulic testing / Plastering • Instrumentation and SCADA	AEN PHED Campus. Rehabilitation of existing OHSRs at BSNL office, Panchayat samiti, Balika school, Aen. Head work, Garh, Kabristan (bhootnath), Bad ke Balaji, Saytanarayana
Rehabilitation of existing Tube Wells	Abstract groundwater	Rehabilitation Out of total existing 34 tube wells in town, Rehabilitation work to be done for all 34 tube wells Replacement of pipes, pumps, valves, all electro-mechanical items etc.	TWs at different locations in town. (4 on fatehpur road near modi college, 3 on hamirpura road, 2 on moud near bad ke balaji campus, 1 at parsiya mandir, 1 at bad ke balaji campus. 4 on khirwa road, 1 behind balika school, 1 inside A.En campus, 1 in Ramleela maidan, 1 near panchayat samiti campus)
Chlorinator system	Post chlorination / disinfection of water prior to supply	New One chlorinator room and vacuum feed chlorination system of capacity 1 kg per hour	Existing PHED campus headworks at Bad ke Balaji and Existing A.EN. PHED Campus.
Consumer Relation and Management Centre and Master Control Centre	Consumer relations and SCADA system control for entire water supply system	New Consumer Relation Management Centers (CRMC) – 2 no. Master Control Centre- 1 no.	CRMC-1 PHED A.EN. Campus CRMC-2 Near PHED Exn Campus and MCC at PHED Exn campus

18. There are total 8 water supply zones proposed in the town and all 8 are approved. Designs of both CWRs (250 KL and 100 KL), chlorinator room and vacuum feed chlorination system of capacity of 1 kg per hour, 2 CRMCs at PHED A.EN. Campus and Near PHED Exn Campus and 1 MCC building at PHED Exn. campus have been approved.

19. This subproject complies with the environmental subproject selection criteria agreed between the government and the ADB (Compliance checklist is at **Appendix 3**). Details of Water Supply Networks are presented in **Figure 1** Zone wise diagram of designed water supply & **2** shows layout plan, designed components in Google Earth map is given in **Figure 3 & 4**, on SOI topomap is given in **Figure-5**., Coordinates of designed components are given below:

Coordinates of Designed component of Water Supply in Laxmangarh

Components	Latitude	Longitude
CWR at PHED Campus Bad Ke Balaji	27°48'46.71"N	75°1'53.73"E
CWR at PHED A.EN. Campus	27°49'21.57"N	75°1'50.46"E
CRMC near PHED Exn. Campus	27°50'14.39"N	75° 0'30.79"E
CRMC at PHED A.EN. Campus	27°49'21.57"N	75°1'50.46"E

20. Excavation for the pipe laying works will be undertaken maximum through open trenching, which will be maximum width of 1 m only on one side of the road ROW with maximum length, an average 140 m per day for water supply lines. Excavation, laying of pipes and backfilling will be completed within the day. 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.

21. **Operation & maintenance phase.** There is provision of 10 years O&M of the complete water supply scheme after one year defect liability period in the scope work. Scope of works under the O & M phase is given below:

Table 4: Scope of Works under Operation & Maintenance Phase

Sl. No.	Obligation	Period
1.	Drawing water from TWs to CWRs including water pumping main and Maintenance of entire underground water system.	From the date of Commissioning Certificate
2.	Operating & maintaining all the Clear/TW Water pumping stations to fill all the CWRs/OHSRs through transmission/pumping pipelines and operation of chlorination system, maintenance of complete system including maintaining the infrastructure and specified Water levels at each of the reservoirs throughout the O&M period.	From the date of Commissioning Certificate
3.	Managing the distribution network for distributing water efficiently, equitably and minimizing non-revenue water (NRW) and maintaining the infrastructure on DMA basis in the distribution network.	From Sectional Completion Certificate
4.	Providing continuous pressurized water supply with improvement in level of service on continuous basis to the connected consumers and maintaining the infrastructure while meeting the performance indicators. A minimum of 12 m water column pressure shall be maintained at all ferrule points, but it shall not exceed the maximum allowable pressure.	From Sectional Completion Certificate
5.	Meter reading, customer services and maintaining the infrastructure in water supply	From Sectional Completion of DMA
6.	Meter reading, bimonthly billing, bill distribution, revenue collection and customer services and maintaining the infrastructure in water supply sector.	From Date of Construction Completion Certificate
7.	Sampling treated water received at all the CWRs/ESRs and from random points within the Zones/DMA to ensure that it meets the Potable Water Specification and monitor on monthly basis;	From Sectional Completion Date

Sl. No.	Obligation	Period
8.	Assessing and minimizing non-revenue water and locating the causes for high NRW and bringing down the NRW level within the 7% for DMA, 12 % from clear water source.	From Sectional Completion Certificate
9.	Provide consumer service connections on approval or sanction by Employer Representative or line agency through Employer Representative.	From Commencement Date
10.	Contractor will provide continuous on-the-job trainings that will start from the day the contractor gets mobilized, and other capacity building programs by the contractor as important regular activities for staff of the Employer, PHED and Local Body.	From Commencement Date
11.	Maintaining environmental and safety norms at entire system components.	From Commencement Date

Land Acquisition and Involuntary Resettlement

22. The subproject will be in properties held by the local government and access to the subproject area is thru public rights-of-way, existing roads & already available govt. land (i.e. AEN Campus and PHED Campus Bad Ke Balaji). Hence, land acquisition and encroachment on private property will not occur.

Subproject Benefits

23. The subproject is primarily designed to improve environmental quality and living conditions of Laxmangarh through provision of water supply. The benefits arising from this subproject include: (i) increased availability of potable water at appropriate pressure round the clock to all households including urban poor; (ii) reduced time and costs in accessing alternative sources of water. (iii) better public health particularly reduction in waterborne and infectious diseases; and (v) reduced risk of contamination of treated water supplies.

Implementation Schedule

24. After the completion feasibility study /preliminary designs, bids were invited in March 2019 for the subproject to be implemented under the DBO (design-build-operate) modality. After evaluation of bids, work was awarded to successful bidder on dtd. 22.06.2020. Project completion period is 3 years i.e. 21.06.2023. After completion of construction and commissioning, scheme will be operated by DBO contractor for 10 years, and after which the O&M will be carried out by ULB.

Status of Detailed Design

25. There are total 8 water supply zones proposed in the town and all 8 zoned are approved. Designs of CWRs (250 KL and 100 KL), chlorinator room and vacuum feed chlorination system of capacity of 1 kg per hour, 2 CRMCs at PHED A.EN. Campus and Near PHED Exn Campus and 1 MCC building at PHED Exn. Campus have been approved. Due Diligence of site of approved zones for pipe laying works has been done in December 2020 and report is attached as **Appendix 30** in this IEE. The updated layout plan of water distribution network for Laxmangarh of all 8 approved zones is given in **figure 7**.

Changes in project locaton and scope of works

26. There is no change in location of any subproject component, however water supply network decreased from 162.64 km to 161.04 km. This decrease in water supply network occurred due to actual confirmatory survey done by DBO contractor in proposed water supply zone, without adding any new area or any change in allignment.



Figure 2: Schematic diagram of designed water supply system- Laxmangarh

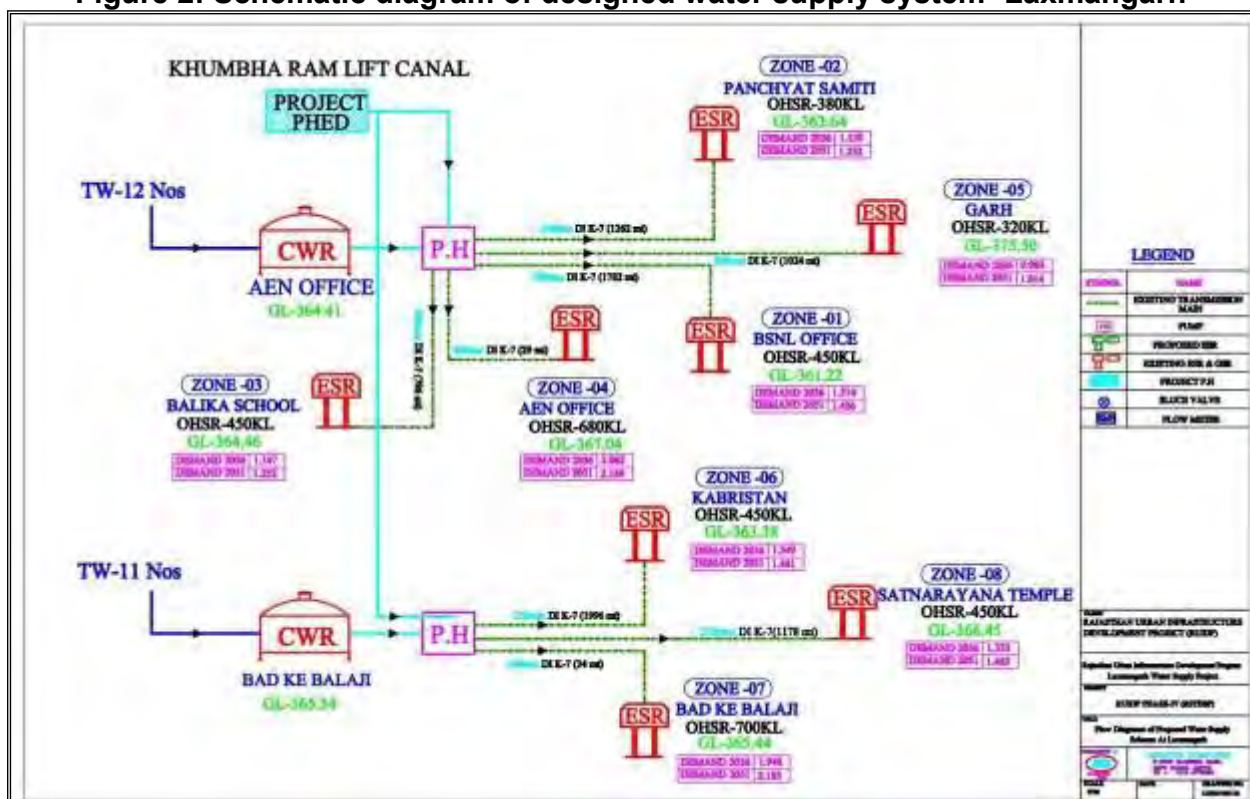


Figure 3: Designed CWR at Bad Ke Balaji PHED campus and sensitive receptor



Figure 4: Proposed CWR and CRMC at A.En. PHED campus and sensitive receptor



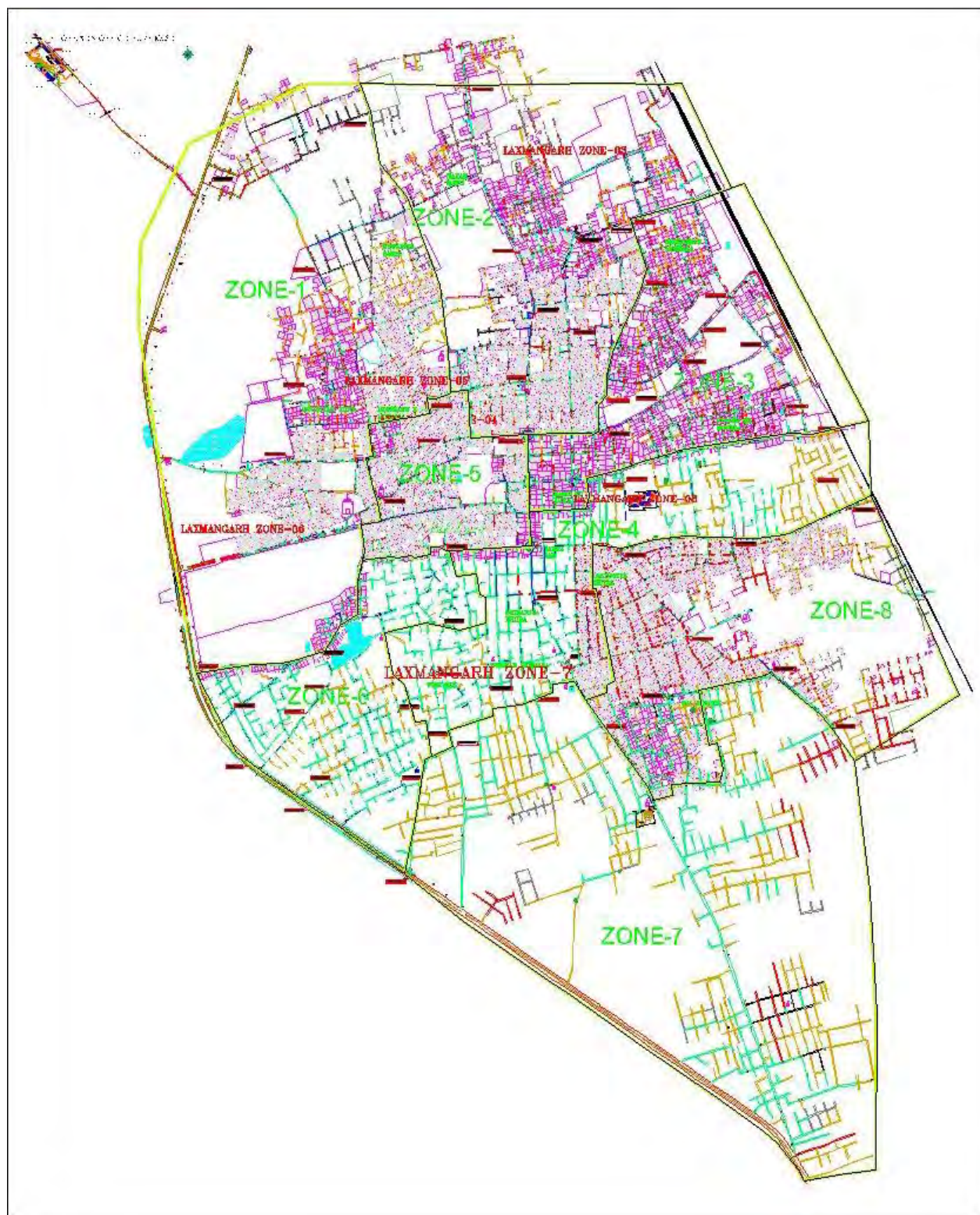
Figure 5: Proposed site for CRMC and MCC near PHED Exn. Office in Google Map



Figure 6: Subproject Component locations on SOI Toposheet of Laxmangarh



Figure 7: Approved Water Supply distribution network (all 8 zones) at Laxmangarh Town



III. ANALYSIS OF ALTERNATIVES

27. The SPS requires an analysis of project alternatives to determine the best method of achieving project objectives (which is providing potable water to people in Laxmangarh Town, in this case), while minimizing environmental impacts. Alternative analysis provides opportunity to integrate environmental considerations into early stages of project (i.e. pre-feasibility or feasibility study), so that adverse environmental impacts can be avoided or minimized by various alternatives. It also provides opportunity to study various options vis a vis costs, provides a logical base, via transparent process, assist in decision making, gaining public support and ultimately in project approvals and timely implementation.

28. The designed water supply subproject component in Laxmangarh town include, water conveyance, storage and distribution. Descriptions of various alternatives considered for critical components such as water source and location, are presented in the following table 5.

Table 5: Analysis of Alternatives

1.	Project Need – No Project Alternative
Type of alternative	No Project alternative
Description of alternatives	Laxmangarh subproject is designed to improve the service level of basic infrastructure-water supply, which will ultimately improve At present source of Laxmangarh town is ground water. The town is benefited from 34 no. of tube wells at various locations in the city. Out of this, 12 tube wells are connected to Clear Water Reservoir (CWR) at AEN Head Works whereas 11 tube wells are connected to CWR at Bad ke Balaji Head Works. 34 TWs considered as GW source. Water collected from 34 nos tube wells are collected at CWRs at AEN office and Public Health Engineer Department (PHED) Campus at Bad Ke Balaji. Further it is it transferred to Elevated Storage Reservoir (ESR) available at various location in the town. Presently, about 70-80% area of municipality limit is covered under the drinking water supply scheme by PHED. Remain area which is newly developed and newly added to the municipality area remains unconnected with piped scheme. Currently water supply service in Laxmangarh town is unreliable coupled with quality issues and huge distribution losses. At present, an intermittent water supply system is running in the town with actual service level 100 LPCD at consumers' end, which will improved to 135 LPCD after full commissioning of Fathpur-Laxmangarh water supply project of PHED. At present it is partially commissioned and water is received (5.12MLD) at both the Headworks at Bad Ke Balaji and A.En. campus. After commissioning of this project, water will be provided 12m Head with continuous supply. The project intends to provide following benefits to the town population, and the “no project” alternative will deprive people of these benefits: • 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 groundwater contamination; • reduced risk of contamination of treated water supplies; and, improvement in quality of water bodies due to disposal of treated effluent meeting disposal standards

Selected Alternative	Without subproject would yield the town to be continuously under-serviced that puts the health of the general public at an increasing risk and could potentially worsen the living environment. This 'no project' scenario would impede further social and economic development of the district and the defer commitments to improve the proportion of the population with sustainable access to clean water and basic sanitation. Given the large-scale benefits to the population and environment, 'with project' alternative is considered appropriate
2.	Alternative source of water
Type of alternative	'Water source'
Description of alternatives	Groundwater: Presently source of Water at Laxmangarh town is ground water. The town is benefited from 42 no. of tube wells and 10 open wells at various locations in the city. Out of this, 34 TWs are directly connected to headworks CWRs at A.En campus and Bad ke Balaji campus. From 11 TWs, water is transferred to CWR at Bad ke balaji HW and from remaining 8 TWs water is being transferred to CWRs at A.En campus HW. Water from these 34 tube wells is collected at Clear Water Reservoir at both the campuses and further it is transferred to 8 nos. of ESRs at various location in the town. All other TWs and OWs are connected to direct distribution and cannot be considered as sustainable source as they have very low discharge yield. Presently total water abstracted from Tube Wells is 4.14 MLD (34 TW). Water demand in the town estimated as 10.10 MLD (base year 2021) and 12.33 MLD (design year 2051). Depending entirely on ground water supply is considered unsustainable. Surface Water: A package "Integrated Taranagar Jhunjhunu Sikar Khetri Drinking Water Supply Project, Package II" is sanctioned by PHED and under execution. Laxmangarh will get deficit water (excluding GW) from this project of PHED Rajasthan source as Khumbha Ram Lift Canal.". The work of pipeline system from canal off take point to Aen HW and bad ke Balaji HW has been completed. 500 mm DI pipe has been laid from canal off take to A.En. HW and bad ke Balaji HW. Combined ground and surface source – adoption of conjunctive use: Either the groundwater or surface water is not able to fulfil the projected town demand, and therefore it is designed to utilize both the source optimally. That surface water is provided 12.06 MLD (2041) water allocation from the "Integrated Taranagar Jhunjhunu Sikar Khetri Drinking Water Supply Project, Package II, and remaining supply gap will be met by tubewells/openwells. Additional rehabilitation of 34 tubewells are designed. Given less than 100% dependability of Surface water, in the low rainfall years, the deficit from the Kumbha Ram Lift Canal will be met by tubewells and accordingly the water abstraction from groundwater sources will be increased as required.
Selected Alternative	Selected source: Combined ground and surface source- Existing tube wells and Kumbha Ram Lift Canal water
3.	Project Locations
Description of alternatives	Location of designed Infrastructure: The location of designed Clear Water Reservoirs (CWRs) is existing PHED campus at Bad Ke Balaji and another at A.En. Campus. Adequate land is available for designed work.
	Water distribution lines: In wider roads water 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. CRMC and MCC: Designed infrastructure of CRMC and MCC is in existing PHED campuses at Bad Ke Balaji and A.En. campus. Sufficient land is available for designed work. No any alternative land is designed.

IV. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS

ADB Safeguard Policy

29. ADB SPS Requires that during the design, construction, and operation of the project necessary compliance to all applicable laws and international conventions / treaties along with pollution prevention and control technologies and practices consistent with international good practice, are ensured.

30. **Screening and Categorization with that of ADB SPS 2009.** ADB uses a classification system to reflect the significance of a project's potential environmental impacts. A project's category is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts in the project's area of influence. Each designed project is scrutinized as to its type, location, scale, and sensitivity and the magnitude of its potential environmental impacts. Projects are assigned to one of the following four categories:

- (i) **Category A.** A designed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA) is required.
- (ii) **Category B.** A designed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE) is required.
- (iii) **Category C.** A designed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.
- (iv) **Category FI.** A designed project is classified as category FI if it involves investment of ADB funds to or through a FI.

31. The environmental impacts of Laxmangarh water supply subproject have been identified and assessed as part of the planning and design process. An environmental assessment using ADB's Rapid Environmental Assessment Checklist for water supply (see 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.

32. **Environmental Management Plan.** An EMP which addresses the potential impacts and risks identified by the environmental assessment shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the Project's impact and risks.

33. **Environmental Audit of Existing Facilities.** ADB SPS requires an environmental audit, if a subproject involves facilities and/or business activities that already exist or are under construction, including an on-site assessment to identify past or present concerns related to impacts on the environment. The objective of this compliance audit is to determine whether actions were in accordance with ADB's safeguard principles and requirements for borrowers/clients, and to identify and plan appropriate measures to address outstanding compliance issues.

34. **Public Disclosure.** The IEE will be put in an accessible place (e.g., local government offices,

libraries, community centers, etc.), and a summary translated into local language for the project affected people and other stakeholders. The following safeguard documents will be put up in ADB's website so that the affected people, other stakeholders, and the public can provide meaningful inputs into the project design and implementation:

- (i). For environmental category A projects, a draft EIA report at least 120 days before Board consideration;
- (ii). Final or updated EIA and/or IEE upon receipt; and
- (iii). Environmental monitoring reports submitted by the Project Management Unit (PMU) during project implementation upon receipt.

35. Consultation and Participation. ADB SPS require borrower to conduct meaningful consultation¹¹ with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

36. Grievance Redress Mechanism. ADB SPS require borrowers to establish a mechanism to receive and facilitate resolution of affected people's concerns, complaints, and grievances about the subproject's performance. The grievance mechanism shall be scaled to the risks and adverse impacts of the subproject.

37. Monitoring and Reporting. Borrower shall monitor, measure and document the implementation progress of the EMP. If necessary, the borrower shall identify the necessary corrective actions, and reflect them in a corrective action plan. Borrower shall prepare and submit to ADB semi-annual environmental monitoring reports that describe progress with implementation of the EMP and compliance issues and corrective actions, if any. For subprojects likely to have significant adverse environmental impacts during operation, reporting will continue at the minimum on an annual basis until ADB issues a project completion report.

38. Unanticipated Environmental Impacts. Where unanticipated environmental impacts become apparent during subproject implementation, ADB SPS requires the borrower to update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts.

39. Occupational Health and Safety. ADB SPS requires the borrower¹² to ensure that workers¹³ are provided with a safe and healthy working environment, taking into account risks inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. Borrower shall take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work, including:

- (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to

11 Per ADB SPS, 2009, meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues

12 In case where responsibility is delegated to subproject contractors during construction phase, borrower shall ensure that the responsibilities on occupational health and safety are included in the contract documents

13 Including nonemployee workers engaged by the borrower/client through contractors or other intermediaries to work on project sites or perform work directly related to the project's core functions.

workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

40. Community Health and Safety. ADB SPS requires the borrower to identify and assess risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning of the subproject, and shall establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts.

41. Physical Cultural Resources. Borrower is responsible for siting and designing the subproject to avoid significant damage to physical cultural resources. ADB SPS requires that such resources likely to be affected by the subproject are identified, and qualified and experienced experts assess the subproject's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process. When the designed location of a subproject component is in areas where physical cultural resources are expected to be found as determined during the environmental assessment process, chance finds procedures shall be included in the EMP.

42. ADB SPS International Best Practice Requirements. ADB SPS requires that, during the design, construction, and operation of the project, the executing agency shall apply pollution prevention and control technologies and practices that are consistent with international good practice, as reflected in internationally recognized standards. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When Government of India regulations differ from these levels and measures, the PMU and PIUs will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the PMU and PIUs will provide full and detailed justification for any designed alternatives that are consistent with the requirements presented in ADB SPS.

National & State Laws

43. The implementation of the subprojects will be governed by Government of India and State of Rajasthan and other applicable environmental acts, rules, regulations, and standards. These regulations impose restrictions on the activities to minimize or mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure subprojects are consistent with the legal framework, whether applicable international, national, state or municipal or local. Key standards include those related to drinking water quality, air quality, effluent discharge, and protected areas. Compliance is required in all stages of the subprojects including design, construction, and operation and maintenance.

44. Environmental assessment. The GoI EIA Notification of 2006 (replacing the EIA Notification of 1994), sets out the requirement for Environmental Assessment in India. This states that Environmental Clearance (EC) is required for specified 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.

45. None of the components of this water supply subproject falls under the ambit of the EIA

Notification 2006, and, therefore EIA Study or EC is not required for the subproject

46. Following **Table 6** presents a summary of environmental regulations and mandatory requirements applicable to Laxmangarh City Water Supply subproject.

Table 6: Applicable Environmental Regulations

Acts/ Laws/ Rules	Description	Requirement	Relevance to Project Phase
EIA Notification, 2006	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. Categories A projects require Environmental Clearance from the Ministry of Environment Forest and Climate Change (MoEF& CC). Category B projects require Environmental Clearance from the State Environmental Impact Assessment Authority (SEIAA).	None of the components of this subproject falls under the ambit of the notification. No EIA study or environmental clearance required.	-
National Environment Policy (NEP), 2006.	NEP is a comprehensive guiding document in India for all environmental conservation programs and legislations by Central, State and Local Government. The dominant theme of this policy is to promote betterment of livelihoods without compromising or degrading the environmental resources. The policy also advocates collaboration method of different stakeholders to harness potential resources and strengthen environmental management.	RSTDSP should adhere to NEP principle of “enhancing and conservation of environmental resources and abatement of pollution”.	All phases of project
Rajasthan State Environment Policy, 2010 including And Rajasthan Environment	Follows the National Environment Policy, 2006 and core objectives and policies are: -Conserve and enhance environmental resources; assure environmental sustainability of key economic	Project implementation should adhere to the policy aims of conservation and enhancement of environmental resources, integration of environmental concerns	All phases of project

Acts/ Laws/ Rules	Description	Requirement	Relevance to Project Phase
Mission and Climate Change Agenda for Rajasthan (2010-14)	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	into projects/plans, and capacity building in environmental management. Under water sector, major concerns, as the policy notes, are huge water losses and wastage, declining water availability, pollution. Relevant recommendations for the project include control of losses, integrated water resources management, control of raw water pollution¹⁸, reuse and recycling. Avoid/minimize use of forest lands. With reference to climate change adoption and mitigation following should be considered in the project: (i) diminishing flows in surface water bodies, and groundwater depletion, and revival traditional water bodies as water sources (lakes/tanks); (ii) equal stress on demand side management in water; and (iii) minimize energy use - design energy efficiency systems.	
Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments (1987)	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 conferring on and assigning to CPCB/SPCBs powers and functions relating to water pollution control. Control of water pollution is achieved through administering	No WTP designed and hence this Act is not applicable in this sub-project.	-

Acts/ Laws/ Rules	Description	Requirement	Relevance to Project Phase
	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 to Establish (CTE) under Section 25 of the Act from Rajasthan Pollution Control Board (RPCB) before starting implementation and Consent To Operate (CTO) before commissioning.		
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 CTE and CTO 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.	The following will require CTE and CTO from RPCB: (i) Diesel generators (ii) Batching Plant, hot mix plants; and (iii) stone crushers, if installed for construction. All relevant forms, prescribed fees and procedures to obtain the CTE and CTO can be found in the RPCB website: (http://environment.rajasthan.gov.in)	Construction
Biodiversity Act of 2002	This Act 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	-
Wildlife Protection Act, 1972 and amendment 1991	This overarching Act provides protection to wild animals, birds, plants and matters connected with habitat protection, processes to declare protected	Not applicable – none of the project components are located in or near protected areas.	Construction

Acts/ Laws/ Rules	Description	Requirement	Relevance to Project Phase
	areas, regulation of wildlife trade, constitution of state and national board for wildlife, zoo authority, tiger conservation authority, penalty clauses and other important regulations.	Nearest protected areas is Tal Chhaper Sanctuary, about 60 km from Laxmangarh town.	
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 Forests and Climate Change (MoEFCC), Government of India	Not applicable; none of the components of the subproject are located in forest.	Construction
Environment (Protection) Act, 1986 and amended in 1991 and the following rules/notifications;	This is an “umbrella” legislation that empowers the Central Government to take all necessary measures to protect and improve the quality of the environment and prevent, control and abate environmental pollution. Empowers central government to enact various rules to regulate environmental pollution, including standards for quality of air, water, noise, soil; discharge standards or allowable concentration limits for environmental pollutants, handling of hazardous substances, locating/prohibiting industries, etc.,	These are rules/notification that have been brought out under this Act, which are relevant to RSTDSP and are list below	Construction and Operation
Indian Drinking Water Standards	Gives details of the permissible and desirable limits of various parameters in drinking water as per the Bureau of Indian Standards	Appendix 2 provides drinking water standards	Construction and operation
Environmental Standards (ambient and discharge).	Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards	Appendix 4 provides applicable standards for ambient air quality. Appendix 4 provides Emission Limits for New DG Sets Appendix 4 provides Stake Height Requirement for DG Sets Contractor is also required to keep all his vehicles maintained and control all the construction activities so that ambient air quality remains within prescribed limit.	Construction and Operation

Acts/ Laws/ Rules	Description	Requirement	Relevance to Project Phase
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 5 provides applicable noise standards and noise limit for diesel generators	Construction and Operation
Solid Waste Management Rules, 2016	Responsibility of Solid Waste Generator (i) segregate and store the waste generated in three separate streams namely bio-degradable, non biodegradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorized waste pickers or waste collectors as per the direction or notification by the local authorities from time to time; (ii) store separately construction and demolition waste, as and when generated, in his own premises and shall dispose off as per the Construction and Demolition Waste Management Rules, 2016; and (iii) No waste generator shall throw, burn or bury the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.	Contractor to follow all the rules during construction works	Construction and Operation
Construction and Demolition Waste Management Rules, 2016	Every waste generator shall segregate construction and demolition waste and deposit at collection centre or handover it to the authorized processing facilities Shall ensure that there is no littering or deposition so as to prevent obstruction to the traffic or the public or drains. Large generators (who generate more than 20 tons or more in one day or 300 tons per project in a month) shall submit waste management plan and get appropriate approvals from the local authority before starting construction or demolition or remodeling work,	Construction waste shall be collected at stockpile area for 8-10 days and will be sent to disposal site. Disposal site shall be identified and allotted by Nagar Palika after mobilization of contractor (during SIP period) and can't be mentioned at this time. Contractor to follow all the rules during construction works. Sludge or any material if classified as hazardous waste / material is to be handled and disposed according to this Rules	Construction

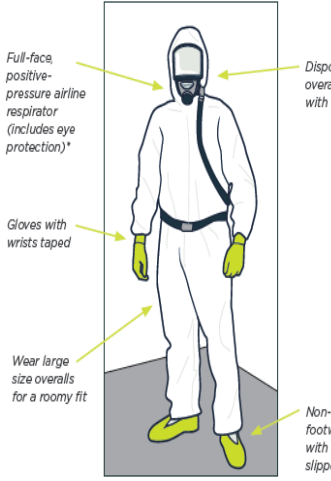
Acts/ Laws/ Rules	Description	Requirement	Relevance to Project Phase
	Large generators shall have environment management plan to address the likely environmental issues from construction, demolition, storage, transportation process and disposal/ reuse of C & D Waste. Large generators shall segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar, Large generators shall pay relevant charges for collection, transportation, processing and disposal as notified by the concerned authorities;		
Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016,	Responsibilities of the occupier for management of hazardous and other wastes.- (1) For the management of hazardous and other wastes, an occupier shall follow the following steps, namely:- (a) prevention; (b) minimization; (c) reuse, (d) recycling; (e) recovery, utilization including co-processing; (f) safe disposal. (2) The occupier shall be responsible for safe and environmentally sound management of hazardous and other wastes. (3) The hazardous and other wastes generated in the establishment of an occupier shall be sent or sold to an authorized actual user or shall be disposed of in an authorized disposal facility. (4) The hazardous and other wastes shall be transported from an occupier's establishment to an authorized actual user or to an authorized disposal facility in accordance with the provisions of these rules. (5) The occupier who intends to get its hazardous and other wastes treated and disposed of by the operator of a treatment, storage and disposal facility shall give to the operator of that facility, such specific	Contractor to comply all the requirements of this Act during construction works. There are asbestos cement (AC) in the existing water supply system. As per these Rules, any waste with asbestos concentration limit exceeding 10,000 mg/kg (i.e. 1%), and is in the form of friable, powdered or finely divided state, is classified as hazardous waste. As per Bureau of Indian Standards (BIS), "AC pipes generally contain about 10-15% asbestos fibers in a cement matrix that comprises the rest of the materials and are termed as locked in asbestos products as these products have the asbestos fibers bound in cement. There is very little possibility of generation of airborne asbestos fibers during any reasonable handling, storage, and use of such products. However, during storing and installation,	Construction and operation

Acts/ Laws/ Rules	Description	Requirement	Relevance to Project Phase
	information as may be needed for safe storage and disposal. (6) The occupier shall take all the steps while managing hazardous and other wastes to- 6 (a) contain contaminants and prevent accidents and limit their consequences on human beings and the environment; and (b) provide persons working in the site with appropriate training, equipment and the information necessary to ensure their safety.	recommended work practices shall be followed to avoid harmful exposure". No AC pipes are proposed, existing AC pipes will be left as it is. However, stored AC pipes may have to removed / handled, and if such waste pipes confirm to the provisions of this act, waste shall be treated as hazardous waste and disposed as per the rules.	
Wetlands (Conservation and Management) Rules, 2017	The Rules specify activities which are harmful and prohibited in the wetlands such as industrialization, construction, dumping of untreated waste and effluents, and reclamation. The Central Government may permit any of the prohibited activities on the recommendation of Central Wetlands Regulatory Authority.	Not applicable as subprojects components are not located in or near to designated wetland area.	
Ancient Monuments and Archaeological Sites and Remains Act, 1958 and Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010	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 Laxmangarh town. Archeological potential is negligible. In case of chance finds, the contractors/PIU will be required to follow a protocol as defined in the Environmental Management Plan (EMP).	Construction
The Building and Other Construction Workers (BOCW) Act 1996 and Rajasthan Building and Construction Workers Rules 2009	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	Contractors are required to follow all the provisions of BOCW Act and Rajasthan BOCW Rules. Salient features of Rajasthan BOCW Rules are- Chapter III, section 17- Registration of establishments Chapter VIII, section 61- Hours of works, intervals or rest and spread over,	Construction

Acts/ Laws/ Rules	Description	Requirement	Relevance to Project Phase
	accommodations near to work sites with separate cooking place, bathing and lavatory facilities and restore the site as preconditions 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 workplace Safety in demolition works Safety in use of explosives Safety in operation of transporting equipment and appoint competent person to drive or operate such vehicles and equipment Safety in lifting appliance, hoist and lifting gears Adequate and suitable lighting to every workplace and approach Prevention of inhalation of dust, smoke, fumes, gases during construction works and provide adequate ventilation in workplace and confined space Safety in material handling and stacking/unstacking Safeguarding the machinery with flywheel 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 equipment Provide safety net, safety sheet, safety belts while working at height (more than 1.6 m as per OSHA) Providing scaffolding, ladders and stairs, lifting appliances, chains and accessories where required Safety in pile works, concrete	overtime Section 62- weekly rest Section 63- night shift Section 67- registers of workers Section 68- Muster roll, wages register Section 70- latrine and urinal facilities Chapter XI- Safety and Health Section 78- fire protection Section 79- emergency action plan Section 80- fencing of motors Section 81- lifting and carrying of weight Section 82- H andS policy Section 83- dangerous and harmful environment Section 84- Overhead protection Section 88- eye protection Section 89- PPEs Section 90- electrical hazards Section 97- use of safety helmets and shoes Chapter XIII-lifting appliances and gears Chapter XV- transport and earth moving equipment Chapter XVI- concrete works Chapter XVII- demolition works Chapter XVIII-Excavation and tunneling Chapter XX- ladders and step ladders Chapter XXII- structural frame and formworks Chapter XXIV- medical facilities and first aid box	

Acts/ Laws/ Rules	Description	Requirement	Relevance to Project Phase
	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		
Contract Labor (Regulation and Abolition) Act, 1970; The Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979	Provides for 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. 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.,	Applicable to all construction works in the project Principle employer (RUDSICO-EAP) to obtain Certificate of Registration from Department of Labour, as principle employer Contractor to obtain license from designated labor officer Contractor shall register with Labor Department, if Inter-state migrant workmen are engaged Adequate and appropriate amenities and facilities shall be provided to workers including housing, medical aid, traveling expenses from home and back, etc., Appendix 6 provides applicable labor laws including amendments issued from time to time applicable to establishments engaged in construction of civil works.	Construction and operation
The Child Labour (Prohibition and Regulation) Act, 1986	Prohibits employment of children below 14 years of age in certain occupations and processes Employment of child labor is prohibited in building and construction Industry.	No child labour shall be employed	Construction and operation
Minimum Wages Act, 1948	Minimum wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of buildings, roads and runways are scheduled employment.	Applicable to all construction works in the project All construction workers should be paid not less than the prescribed minimum wage	Construction and operation

Acts/ Laws/ Rules	Description	Requirement	Relevance to Project Phase
Workmen Compensation Act, 1923	Provides for compensation in case of injury by accident arising out of and during the course of employment.	Compensation for workers in case of injury by accident	Construction and operation
Equal Remuneration Act, 1979	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.	Equal wages for work of equal nature to male and female workers	Construction and operation
IS 11768: 1986/2005: Recommendations for disposal of asbestos waste material	The standard emphasizes that every employer who undertakes work which is liable to generate asbestos containing waste, shall undertake adequate steps to prevent and /or reduce the generation of airborne dust during handling, storing, transportation and final disposal of final disposal of asbestos and asbestos containing products.	The crux is waste avoidance: the practice inculcated should focus the on minimal waste generation. Waste Collection: In the project circumstance, the waste is referred to the damaged powered asbestos which will be collected in the Permissible plastic bags to be disposed to the nearest TSDF facilities.	Construction
IS 12081: Pictorial Warning to be implemented on equipment containing Asbestos Contaminated Products.	The objective of the caution is to make the person handling to take all pre-cautionary measures and make them aware of all the possible risk.	The following signs and personal protective equipment shall be used in handling ACM. 	Construction

Acts/ Laws/ Rules	Description	Requirement	Relevance to Project Phase
			
IS 11451: Safety and Health Requirements related to Occupational Exposure to Asbestos contaminated Products.	This standard details the occupational exposure allowable and safety at work place to be enforced.	In the project the norms pertaining to limiting number of hours working with ACM will be 8.0 hrs/48 hrs a week and the medical examination has to be periodic, the environmental monitoring has to be done as per the protocol. The safety at work place shall be enforced.	Construction
IS 11768: Waste Disposal Procedure for Asbestos Containing Products.	The protocol pertaining to disposal of the waste is emphasized.	The collection of ACM powered will be in permissible plastic bags, which will be twisted tight at the neck so that the wear and tear due to abrasion will be minimum and the transportation of the asbestos waste has to be done by the authorized vendor to the approved landfill site.	Construction
The Rajasthan Monuments, Archaeological Sites and Antiquities Act, 1961; the Rajasthan Monuments, Archaeological Sites and Antiquities	Any construction/excavation work in the 'protected area' (as declared by GoR under the Act) requires priori permission of Department of Archeology and 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,	Not applicable - there are no protected monuments in the town In case of chance finds, the contractor/ PIU will be required to follow a protocol as defined in the Environmental Management Plan (EMP).	Construction

Acts/ Laws/ Rules	Description	Requirement	Relevance to Project Phase
(amendment) Act 2007	including time for completion, procedures to be followed during the work and for chance finds etc.		
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; none of the components / pipeline alignment are in forest areas.	Construction
International Conventions and treaties			
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 Site in or near Laxmangarh Town. Not applicable to Laxmangarh Water Supply subproject.	-
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973	India is a signatory of this convention which aims to control international commercial trade in endangered species	Not applicable in this project as no endangered species of wild fauna and flora is found in project town.	-
Montreal Protocol 1992	India is a signatory of this convention which aims to reduction in the consumption and production of ozone-depleting substances (ODS), while recognizing differences in a nation's responsibilities. Ozone depleting substances are divided in two groups Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbon carbons (HCFCs)	Not applicable in this project as no ODS are involved in construction works	-
Basel Convention on Trans-boundary Movement of Hazardous Wastes, 1989	India is a signatory of this convention which aims to reduce trans-boundary movement and creation of hazardous wastes	Contractor to follow the provisions of Hazardous Waste Rules 2016 for storage, handling, transport and disposal of any hazardous waste emerged during construction works	-

Acts/ Laws/ Rules	Description	Requirement	Relevance to Project Phase
		Under this Convention, asbestos or asbestos waste in the form of dust and fibers is classified as hazardous waste.	
Convention on Migratory Species of Wild Animals (CMS), 1979 (Bonn convention)	CMS, also known as Bonn convention, was adopted in 1979 and entered into force on 1 November 1983, which recognizes that states must be the protectors of migratory species that live within or pass through their national jurisdictions, and aims to conserve terrestrial, marine and avian migratory species throughout their ranges. Migratory species threatened with extinction are listed on Appendix I of the Convention. CMS Parties strive towards strictly protecting these species, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them. Migratory species that need or would significantly benefit from international cooperation are listed in Appendix II, and CMS encourages the Range States to conclude global or regional agreements.	Not applicable to this project as no migratory species of wild animals are reported in the project areas.	-

47. Clearances / permissions to be obtained prior to start of construction. Table-7 shows the list of clearances/permissions required for project construction. This list is indicative and the contractor should ascertain the requirements prior to start of the construction, and obtain all necessary clearances/permission prior to start of construction.

Table 7: Clearances and permissions required for Construction activities

Sl. No.	Construction Activity	Status under which Clearance is required	Implementation	Supervision
1	Land for project activity	Allotment and approval for specific land use	ULB	PMU
2	Use of construction area	Approval for use of city roads and shifting of utilities	ULB, PWD and other utility agencies such as BSNL, electricity department	PIU
3	Establishment of construction camps	Allotment and approval for specific land use	Contractor	PIU

Sl. No.	Construction Activity	Status under which Clearance is required	Implementation	Supervision
4	Tree Cutting	State Forest Department/ Revenue (Tehsildar)	PIU	PIU and PMU
5	Approval for use of Railway Right of Way (RoW).	North Western Railway Division and other Utility Agencies, if required	PIU	PIU and PMU
6	Approval for use of City Roads	ULB and other Utility Agencies such as PHED, BSNL etc.	Contractor/PIU	PIU
7	Hot Mix Plants, Crushers, Batching Plants and DG set	Consent to Establish (CTE) and Consent to Operate (CTO) from RSPCB	Contractor	PIU
8	Sand Mining Quarries and borrow areas	Permission from District Collector/ State Department of Mines & Geology	District Collector / State Department of Mining	Contractor
9	New Quarries and borrow areas	Environmental Clearance under EIA Notification, 2006	Contractor	PIU
10	Temporary traffic diversion measures	District Traffic Police	Contractor	PIU
11	Construction waste and Demolition Debris Management	Approval from ULB for disposal site is required per Construction and Demolition Waste Management Rules, 2016	Contractor	PIU
12	Use of vehicles and equipment -Pollution Under Control Certificate	Under Motor Vehicles Act, 1988	Contractor	PIU
13	Labour License	Labour Commissioner, Govt, of Rajasthan	Contractor	PIU
14	Approval for all stages of Hazardous Materials use and disposal	RSPCB	Contractor	PIU

48. PMU will be overall responsible for supervision in getting all clearances and provide details to ADB through semi-annual report. PMU will ensure all necessary regulatory clearances and approvals are obtained prior to commencement of works. Respective PIUs, with support of project consultants and DBO contractors, are responsible for obtaining the clearances/permits and ensuring conditions/specifications/provisions are incorporated in the subproject design, costs, and implementation. The PIUs shall report to PMU the status of compliance to clearances/permits as part of the regular progress reporting.

V. DESCRIPTION OF THE ENVIRONMENT

Physical Resources

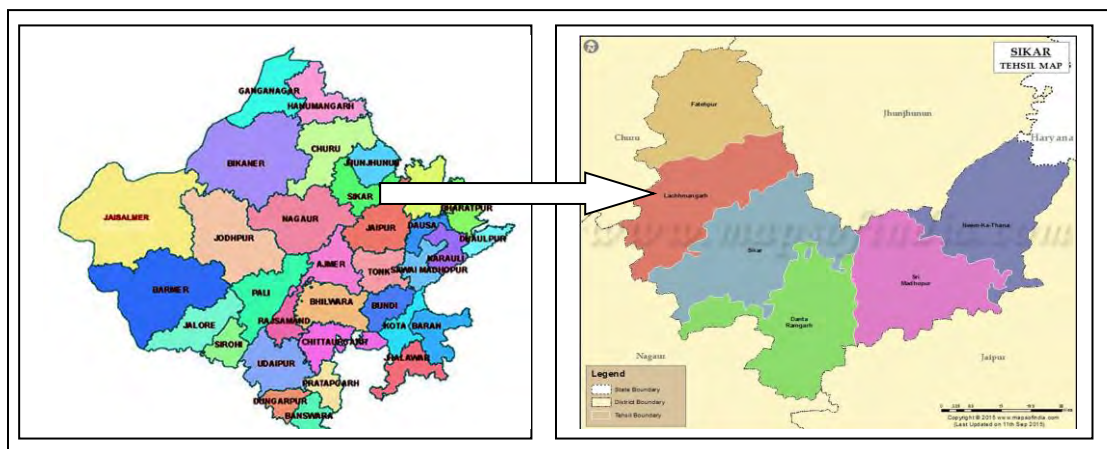
1. Location, Area & Connectivity

49. Laxmangarh is a town in Sikar district of Rajasthan state in India. It is the sub-divisional headquarters of the Laxmangarh sub-division in Sikar district. It is also the Tehsil headquarters of the Laxmangarh Tehsil. Laxmangarh is also Panchayat samiti headquarters of the Laxmangarh Panchayatsamiti in the district. It is situated on National Highway-52 at a distance of 24 km from Sikar in north. It is situated 145 km away from Jaipur in the north-west via NH52. Laxmangarh is surrounded by Kathumar Tehsil towards East, Reni Tehsil towards South, Ramgarh Tehsil towards North, Umren Tehsil towards west.

50. The town is situated at latitude 27.8238290N and longitude 75.0248410E. It has an average elevation of 222 metres. Laxmangarh is known for its fort and havelis. The geographical area of the city is about 16.26 Sq.Km. As per 2011 census population of town is 53392 souls.

51. Laxmangarh does not have any railway station. Nearest railway station is Mandawar Mahwa Road on Churu-Sikar meter gauge section, which is 24 Kms. from Laxmangarh. Laxmangarh is located on National Highway 11 (Agra-Jaipur-Bikaner), 130 Km from state capital Jaipur by road. There are regular buses to Laxmangarh from other major cities of the country. Location map of Laxmangarh town is given in Figure 8.

Figure 8. Location of Laxmangarh in Sikar District, Rajasthan



2. Topography, Soils and Geology

52. Sikar district is in north central of Rajasthan, covers an area of 7732 km². The district has six tehsils namely Laxmangarh, Fatehpur, Sikar, Danta Ramgarh, Shri Madhopur and Nim-ka-Thana. There is network of railways and Roads in the area. Semi arid to arid climate prevails in the district. The average annual rainfall is 460 mm. The district can be divided into two main topographic units the western half characterized by dunal country and 22 waste land, and the eastern half characterized by NE-SW trending hill ranges. These hill ranges act as natural barriers and restrict large scale sand migration from the west.

53. Geologically, the district is not of much significance as the major part of the district is covered by Aeolian sand and sand dunes. Hard rock exposures are mainly confined to the eastern part of the district as isolated outcrop or as thin linear ridges. The Saladipura Group (Archaean) comprise in quartzite, paragneiss dolomitic marble and schist, exposed in the central part of the Khetri Copper belt (Lower Proterozoic age) tappers down in the northcentral part of the district. The lithounits of the Khetri Copper belt mainly include quartzite, phyllite, calc – silicate and marble. Quartzite, staurolite – garnet – biotite schist and marble belonging to Shyangarh Group of Delhi Supergroup are juxtaposed with the Saladipura Group in the southern and eastern part of the district, the scanty outcrops of the Ajabgarh Groups of the Delhi Supergroup (Lower to Middle proterozoic). Granite, pegmatites quartz veins gabbro are the acid and basic intrusive. Faults, shears, fold axis are the manifestation of deep-seated tectonic in the area.

54. **Soil characteristics.** The soils of the district have been broadly classified by Agriculture Department, Govt. of Rajasthan as - Desertic soil, Red desertic soil, Serozems, Saline soil, Lithosols, Regosols and Old alluvium. Soil in the Laxmangarh town is sandy loose soil, which is not fertile for all crops. **Source:** CGWB report Sikar, 2013& Agri. Cont. Plan, Sikar).

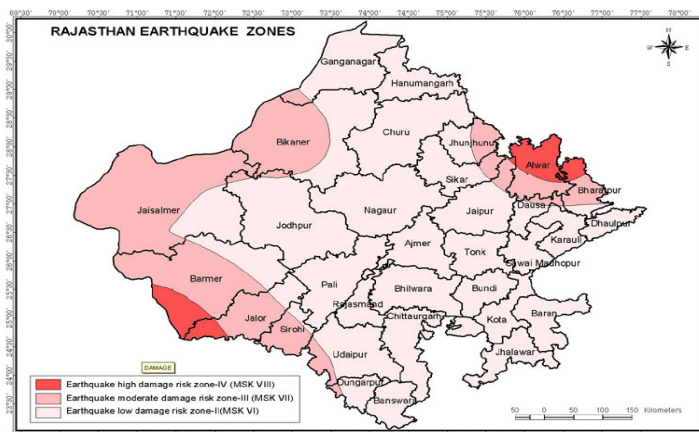
55. Geomorphologically the district is classified into seven geomorphic units namely longitudinal dune, transverse dune, obstacle dunes, sand sheet, piedmont, ridge and valley and pediment. The shadow zones behind ridge and valley acting as sand barriers, are the only areas used for cultivation of seasonal crops. The area is characterized by two hydrogeological domains unconsolidated porous Quaternary formations and consolidated fissured formations with ground water potential ranging from less than 1 to 100 LPS, The district forms the catchment areas for various river valleys. These are Dohan in the northeast, Sabi, Sota and Banganga in the east and Mendha in the south. Although, these river systems originate from Sikar district, they remain dry for the most part of the year due to scanty rainfall and sand migration. As the district is prone to sand accumulation and migration, the effects of environmental hazards related to desertification is visible at most of the places these includes disorganisation of river valley, salinity of ground water and over-stepping of recent dunes over the cultivated lands.

56. **Mineral Resources:** Huge deposit of pyrite-pyrrhotites is recorded from Saladipura (27°40':75°31') which is mined extensively for sulphur extraction. The estimated reserves of 111.62 million tonne (Mt) of pyrite-pyrrhotite with an average of 21.63% Sulphur. Extensive ancient mining activities for copper in the form of old Working and slag, dump are recorded from a number of places within the South Khetri Belt namely Baleshwar (27°43':75°55') South of Mavanda (27°48':75°50').NW of Ghata (27°35':75°50')etc. Apatite is found In Kerpura (27°39' - 75°34') Salwari (27°39':75°36') area In post Delhi - granite as veins. P₂O₅ contains is nearly 41%. Fluorite occurs as stringers, veins and pockets in quartz veins, amphibole rich rock and granite Limestone deposit near Patan (27°50': 75°58') is estimated to contain 6.98 Mt of limestone with 46.54% CaO. Other occurrences are reported from Raipur Jhingar (27°38' : 76°01') and Saladipura. The Khandela area has revealed the presence of moderately radioactive zones in quartz - biotite schist aplitic rocks and quartz-tourmaline veins. The Uranium zone contains 0.04 to 0.11% O₃U₈. The mineralized zones also contain molybdenum and copper mineralization. Barytes occurrences are reported from Kalakhera of Gaonri (27°42':75°50'). Iron ore occurrence from Kalakhera (27°42':75°59') and NW of Jhalra (27°52':75°52') Clay deposit is located NE- of Churla (27°34':75°56') Calcite occurrences are located at Mavanda, Raipur. West of Kalakhera north of Saladipura and many other places' Calcite occurs as veins, pockets and lenses in the marble and gneisses of Delhi Supergroup.

3. Seismology

57. Sikar town lies in Low damage risk Zone – II. The area is less prone to earthquakes as it is located on relatively stable geological plains based on evaluation of the available earthquake zone information. Seismic zoning map of Rajasthan given in Figure 8 below:

Figure 9: Earthquake Zoning Map of Rajasthan



4. Climatic Conditions

58. Sikar district and Laxmangarh town have hot and dry climate. The cold season lasts for about three and half months from November to the end of February. The period from April to the end of June constitutes the hot season. The Monsoon starts in the end of June. The temperature rises to 45-50°C in summers and falls to a minimum of -5° to 4° in winters.

59. Mean annual rainfall (1971-2011) of the district is 463.0 mm whereas normal rainfall (1901-70) is lower than average rainfall and placed at 459.8. Almost 95% of the total annual rainfall is received during the southwest monsoon, which enters the district in the last week of June and withdraws in the middle of September. The mean annual rainfall is highest (536.6 mm) at Neem Ka Thana, which is located in the south eastern part of the district. It is lowest at Fatehpur (407.8 mm), which lies near north western boundary of the district. Climate is generally dry except during the monsoon period. Humidity is the highest in August with mean daily relative humidity of 80%. Mean annual rainfall of the Laxmangarh town is only 300 cm. (**Source:** CGWB report Sikar 2013).

60. **Climate Change Projections.** Average temperature projections from global climate models (PRECIS) suggest a strong increase in temperature for state of Rajasthan. Baseline data of temperature from 1975 to 2005 has been considered. Projections of maximum temperature predicted that temperature varies from 0.6°C in 2020 to 3.2°C in 2080s. Projection trends of minimum temperature increases clearly stated that minimum temperature of atmosphere in the state is slightly increases from 0.9°C in 2020s to 3.9°C in 2080s. In context of precipitation, available rainfall projection from global climate models (PRECIS) suggest an increase in average rainfall for state of Rajasthan depicts that based on the baseline data of precipitation from 1975 to 2005, projection of average annual rainfall varied from 6.6% in 2020s to 9.1% in 2080s. The models also suggest an increase in the duration of dry spells as well as a tendency towards more intense rainfall events. Any likely increase in precipitation would occur in the northern part of the state and any decrease in the southern part of the state. Climate of Rajasthan is varied in nature. Temperature and rainfall are the main climatic factors that determine eco-climate of the area.

Diurnal variations in temperature could be seen in the state of Rajasthan. Temperature reaches above 50°C in summer and 0° in winter in some of district in the state. Pattern of rainfall is uneven and erratic in nature.

5. Surface Water

61. There is no perennial river in the district. The most important rivers in the district are Mendha, Kantli, Dohan, Krishnawati and Sabi. Mendha river flowing in Danta Ramgarh and Sri Madhopur tehsils merges with the Sambhar lake. Kantli originates near Khandela in Sri Madhopur tehsil and flows out of the district in the northeasterly direction to district Jhunjhunu. Dohan River flows in the uppermost northeastern region of the district and covers a small portion of it. Krishnawati River originates from the hills in the southeast of NeemKa Thana and flows out of the district in the northeastern direction. Sabi River flows only in NeemKa Thana tehsil. In the western desertic plain, there is practically no surface drainage system. Apart from these, there are several minor streams or nallahs originating from the hills which flow for short distances and disappear in the sandy tract. There is natural lake near Pritampuri in the eastern part of the district. It is a small depression where rainwater accumulates and lasts for a few months. Similarly, there are no big tanks in the district. However, small tanks or pits are numerous in the area. There are no rivers or lakes in Laxmangarh, whereas some small water ponds exist in the town.

62. There is no as such prominent surface water body near the sub-project areas in Laxmangarh town. The water body is far from the town and the sub-project activities will not affect the water body in any manner. The major source of drinking water is tube well and a project “Integrated Taranagar Jhujhunu Sikar Khetri Drinking Water Supply Project, Package-II” of PHED Rajasthan source as Khumbha Ram Lift Canal is proposed for the town.

6. Groundwater

63. The water level ranges in the area from less than 2m to more than 75m. The depth to water level in general is less than 35m in eastern and central parts of the district falling in NeemKa Thana, Khandela, Sri Madhopur and DantaRamgarh blocks. In the western part of the district, it generally varies from 25 m to more than 45m. Depth to water level less than 10 m has been observed in central and eastern parts of the district, viz. Khandela, Kanwat etc. Depth to water level as recorded in 156 key wells of GWD (2012) ranges from 1.80 to 77.20 and 0.80 to 78.25 mbgl during pre-monsoon and post monsoon respectively.

64. The pH value of ground water in the district ranges from 7.02 to 9.00 indicating alkaline nature of ground water. Electrical conductivity ranges from 405 to 10860 mmhos/cm at 25°C. However, in greater part of the District, it varies from 750 mmhos/cm 25°C to 2500 mmhos/cm 25°C. The electrical conductivity in small areas around Fatehpur, Nechwa (in the western part of district), it is between 2000 and 3000 mmhos/cm 250C. More than 3000 mmhos/cm 250C is noticed around central part such as Samer, Kochhor, Gowati etc. Electrical conductivity more than 5000 mmhos/cm 25°C has been found around Samer, Motlawas, Rewasa etc. (source: Ground Water report of Sikar)

65. Chloride concentration ranges from 14 to 1985 ppm. In greater part of the district, it lies within 300 ppm. The perusal of map indicates that in small patches around northern part of the District viz. Saladipura, Kotri etc., it is between 300 and 500ppm. More than 500 ppm chloride concentration is noticed around central part such as around villages viz. Motlawas, Sama, Sikar, Rewasa. In general, chloride concentration increases towards central part of the district.

66. Fluoride concentration in ground water ranges from 0.10 mg/l to 7.25 mg/l. Higher fluoride concentration (14.28 mg/l) has been observed at Dukia village. In northern part around Khandela&Guhala concentration of fluoride varies from 2.67 to 7.08mg/l. Fluoride in excess of maximum permissible limit has been observed in parts of Fatehpur, Laxmangarh, Dhod, Danta Ramgarh and Khandela blocks

67. Nitrate concentration in excess of maximum permissible limit of 45 mg/l has been observed from isolated pockets in all the blocks except Khandela and Sri Madhopur blocks. (Source: Ground Water Report of Sikar, GWB, Govt. of Rajasthan)

68. Groundwater is the only drinkable water in the region; even when the level of the water table dips very low the people still find ways to obtain it. The TDS level of the local groundwater is 1000 PPM to 3500 PPM, which is quite high; consequently, most educated people use some sort of water purification method, for example reverse osmosis or ultraviolet. Depth of water table in Laxmangarh ranges between 33.30 to 64.60mtrs in pre-monsoon and between 31.43 to 64.80 mtrs. in post-monsoon.

7. Air and Noise Quality

69. Traffic and construction activities are the major sources of air pollution in Laxmangarh City. Being dry area with low rainfall and sandy soil, particulate matters in Laxmangarh city may be higher especially during dry and windblown day.

70. Baseline Air quality monitoring has been conducted in the pre-construction phase (SIP period) by the contractor in the prominent project locations and reports are annexed in Appendix 31. The tests were conducted for PM₁₀, PM_{2.5}, SO₂, and NO₂ and Monitoring results shows that the values for PM₁₀ and PM_{2.5}, is above than the standards prescribed by CPCB's and ADB SPS limits at all the tested locations, except at Power House (Zone 4 & 8) is with CPCB's standard for PM_{2.5}. All other parameters are within prescribed limits as per both standards. Quarterly environmental monitoring shall be conducted in the construction phase and shall be reported in semi-annual environmental monitoring reports.

71. As there are no major industries or other activities, which may create high noise in Laxmangarh City, the main source of noise pollution in the city area is traffic only that also in main and busy roads and other inner and connecting roads are quiet peaceful.

72. Baseline noise quality monitoring has been conducted in the pre-construction phase (SIP period) by the contractor in the prominent project locations and reports are annexed in Appendix 31. It is noted from the results that noise levels at Bad ke Balaji PHED Campus is above the acceptable limits for residential areas prescribed by CPCB and ADB SPS limits for day time whereas during night time results are within prescribed limits as per both standards for residential area at all the locations. Quarterly environmental monitoring shall be conducted in the construction phase and shall be reported in semi-annual environmental monitoring reports.

Ecological Resources

73. **Flora:** The flora of the district consists of a considerable variety. In 1972, 1973, 1.46 percent of the total area of the district was classified as forests. The forest area in Sikar district may be broadly divided into four botanical divisions, some details of which are as follows.

- *Anogeissus pendula* Type: In this type *Anogeissus pendula* (Dhok) usually occurs as pure stands. Its common associates are *Acacia senega* (Kumtha), *Dischrostachys cinerea* (Buiya).
- *Anogeissus pendula* Degraded Type: The *Anogeissus pendula* degraded type is most commonly found on the hill slopes. Due to continuous biotic interferences, this has been reduced to a spreading and creeping form.
- Throny Type: These forests are found on the marginal lands, foothills and consolidated sandy plains or sand-dunes and ravine lands.
- Savannah Type: These type of plants found in plains which are sandy or which contain sandy loam soils. The specie is specially managed for grass production. The tree layer is composed of *Acacia leucophloe* (Ronjh) and *Acacia Senegal* (Kumtha) etc.

74. **Fauna:** The common mongoose and the hedge hog are seen in the entire area of the district due to their adaptability to varied surroundings. Besides, domesticated animals such as cows, oxen, horses, buffaloes and camels are found everywhere in the district. Birds commonly found in the district may be listed as house sparrow, house crow, jungle crow, blue rock common teal and brahmyny duck. Designed works are in urban developed areas only, where there no wild fauna are reported.

75. There is no protected forest or eco-sensitive area nearby the sub-project site. Famous Tal-Chapar Sanctuary is at an aerial distance of approx. 55 kms from Laxmangarh. In the south of Laxmangarh Town (Approx. 12 Kms aerial distance) there is a Beed Laxmangarh Forest with an area of around 9380 acres out of which 9336 acre is reserved for wool and sheep research center. No works are designed within or near to this forest. The detailed biodiversity assesment report is attached as Appendix 8.

Economic Development

1. Land use

76. The Master plan for Laxmangarh is prepared for the year 2013-2031. As per master plan, out of total municipal area of 2320acre, 1929 acres was developed area, out of which 52.58 % was residential area and only 1.87% area was under commercial category. The designed and existing land use plan of town is shown in **Table-8** below:

Table 8: Land Use Plan, Laxmangarh: 2013

S. No.	Use	Land Use - 2013		Proposed Land Use - 2031	
		Area in Acre	% age of developed area	Area in Acre	% age of developed area
1	Residential	1020	52.88	2790	59.11
2	Commercial	36	1.87	141	2.99
3	Industrial	17	0.88	68	1.44
4	Governmental	12	0.62	23	0.49
5	Public & Semi Public	471	24.42	833	17.65
6	Recreational	18	0.93	52	1.10
7	Circulation	355	18.4	813	17.22
	Developed Area	1929	100	4720	100
8	Agriculture and Govt. Reserved (Vacant)	388	-	0	

S. No.	Use	Land Use - 2013		Proposed Land Use - 2031	
		Area in Acre	% age of developed area	Area in Acre	% age of developed area
9	Water Bodies	3	-	3	
	Urbanized Area	2320	-	4847	

(Source: Laxmangarh Master Plan 2013-2031)

2. Industry & Agriculture

77. There is no large scale Industry in Laxmangarh. Only small scale industries such steel utensils and choori (bangle)etcare functioning at very small level. One cement factory at Narodara (outside municipal area) is also there. The agriculture production in crop is slightly more in Kharif season in compared to Rabi season.

78. In Laxmangarh town people are mainly engaged in trade and commerce (25.28%), and construction activities (21.52%), agriculture (11.58%) and small scale industries (17.99%) are the other activities in which people of Laxmangarh are engaged for their livelihood. (Source: Master Plan, Laxmangarh 2013). The large workforce is also migrated to Gulf countries as labour and earning their livelihood.

79. The major Kharif crops are bajra, jowar, pulses, maize and groundnut. Main Rabi crops are wheat, barley, gram and oilseeds. Cotton is an important cash crop that is grown in the district. The area is arid ridden and the main source of their income is agriculture. The agriculture is based on the monsoon rains. The average rainfall in the area is also very less. Certain farmers are now constructing tubewells in the area for irrigation purposes.

3. Infrastructure

80. **Water Supply.** Presently source of Laxmangarh town is ground water. The town is benefited from 34 no. of tube wells at various locations in the city. Out of this, 12 TWs are connected to CWR at A.En. Head Works whereas 11 TWs are connected to CWR at Bad ke Balaji HW. 34 TWs considered as GW source. Water collected from 34 nos tube wells are collected at Clear Water Reservoirs at PHED A.EN.office and PHED campus at Bad Ke Balaji and further it transferred to ESR available at various locations in the town. Presently about 70-80% area of municipality limit is covered under the drinking water supply scheme by PHED. Remain area which is newly developed and newly added to the municipality area is remain unconnected with piped scheme. Currently water supply service in Laxmangarh town is unreliable coupled with quality issues and huge distribution losses.

81. . **Sewerage:** Laxmangarh town is covered under UIDSSMT (Eleven City Sewerage Project) of Gol of amounting Rs. 83.38 Crs. In this project around 121 Kms sewer line was proposed with three STPs of capacity 3.0 MLD (Todikui); 1.50MLD (New Indra Aavas Colony) and 1.0 MLD (Near Basin Road Banjara Basti) and around 6381Nos. of manholes will be executed. About 6000 houses will benefitted through house sewer connections.

82. Till date approx. 115 km of sewer line was laid in town. 1.5 MLD STP is at commissioning in process & the remaining two STPs are under construction phase. Laying of around 5351 manholes are completed and 1750 houses are connected through house sewer connections. Project is completed 75%.

83. **Solid Waste Management** – Door to Door collection is being done by municipality from own

resources. Ward wise door to door collection is being done with help of auto trippers and tractors and being dumped in vacant government land through crude dumping. There is no any sanitary land fill site in the town.

84. 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 Jodhpur Vidyut Vitaran Nigam Limited (JVVNL) and Ajmer Vidyut Vitaran Nigam Limited. In Laxmangarh Power is supplied from the Mansi 132 KV GSM grid by overhead cables carried on metal and concrete poles, mainly located in public areas alongside roads. The power supply in the town is continuous and reliable, except in warmer months with periodic outages in warmer months, and large fluctuations in voltage. Ajmer Vidyut Vitaran Nigam Ltd, (AJMER DISCOM) supply electricity in Laxmangarh through Manasi 132 KV GSSM (2 Grid station). 3.15 MW electricity is supplied per day (source master plan)

85. Transport: There is bus stop of Rajasthan State Road Transport Corporation in the town near Sri Raghunath School from where regular buses for Ratangarh, Churu, Sikar, Fatehpur and Jaipur are available. Express buses also pass through Fatehpur Sikar NH, from where buses for Jaipur and Bikaner can be available. There is a private bus stand near Murli Manohar Temple and Ganesh Temple from where private buses for Navalgarh, Salasar road, Jhunjhunu, Sujangarh, Bairas, Ramangarh, Malasi, Dhod are available. There is proposal for new bus stand by Nagar Palika in the town.

86. There is a railway stations in Laxmangarh as it is situated on Sikar-Churu meter gauge section. Nearest airport is at Jaipur.

Socio Cultural Resources

1. Demography

87. As of 2011 India census Laxmangarh had a population of 81253. Males constitute 51.26% (41098) of the population and females 48.74% (40155). Laxmangarh has an average literacy rate of 72.70%, which is lower than the national average of 74.04%; male literacy is 83.74%, and female literacy is 61.24%. In Laxmangarh, 13.85 % (7394) of the population is younger than 6 years old.

88. The Laxmangarh city is divided into 30 wards for which elections are held every 5 years. The Laxmangarh Municipality has population of 53,392 of which 27,369 are males while 26,023 are females as per report released by Census India 2011. Population of Children with age of 0-6 is 7394 which is 13.85 % of total population of Laxmangarh (M). In Laxmangarh Municipality, Female Sex Ratio is of 951 against state average of 928. Moreover Child Sex Ratio in Laxmangarh is around 881 compared to Rajasthan state average of 888. Literacy rate of Laxmangarh city is 72.70 % higher than state average of 66.11 %. In Laxmangarh, Male literacy is around 83.74 % while female literacy rate is 61.23 %. (Source: Census of India. 2011)

2. History, Culture and Tourism

89. Maharaja Lachhman Singh of Shekhawati constructed the Laxmangarh Fort in 1710 AD, and around it he established the present Laxmangarh town, which was founded in 1712 AD.

90. Maharaja Lachhman Singh of Shekhawati princely state planned it nearly 300 years ago under the Shekhawati region of erstwhile. The reigning kingdom of Jaipur had many thikanas and was one of them. The Thakurs of these Thikana were called Maharajkumars and Mahendra Singh, son of HH Maharao Shri Sir Madho Singh Ji Bahadur was the first Maharajkumar of Laxmangarh and that happened to be the Maharajkumars of Laxmangarh.

91. **Laxmangarh Fort-** The most imposing building in this Laxmangarh town is its small fortress (owned by the Jhunjhunwala Family) which looms over the well laid out township on its west side. Laxman Singh, the Raja of Sikar, built the fort in the early 19th century after Kan Singh Saledhi besieged the prosperous town. Laxmangarh Fort is a ruined old fort on a hill in the town Laxmangarh of Sikar district of Indian state Rajasthan. Situated 30 kilometres (19 mi) from Sikar, it was built by Rao Raja of Sikar, Laxman Singh in 1862, who also founded a village in his own name as Laxmangarh in 1864. The fort of Laxmangarh is a unique piece of fort architecture in the whole world because the structure is built upon scattered pieces of huge rocks.

92. Other than the Laxmangarh fort, the Ghantaghar (Clock Tower) and various havelis with famous Shekhawati fresco paintings and Chhatris are the hallmark of the town. The nearing area of the Laxmangarh town are also very rich in heritage. The PEER Baba ki Samadhi located in the revenue village of Alkhpura Bogan near Hapas is also a 300-year-old monument. The monument is a place of worship for both the Hindus and Muslims of the area. The great fair is organised every year on the sixth of Bhadrapad (Hindi Month). Large number of people participate in the fair. Another important tourism attraction is Radha Murlimanohar Temple, which dates from 1845. It retains a few paintings beneath the eaves and some sculptures of deities around the external walls. To the south of this temple is the busy bazaar, flanked by a series of uniform shops whose overhanging balconies have three scalloped open arches flanked by two blank arches with lattice friezes. The shops were constructed in the mid-19th century by a branch of the Poddar family known as Ganeriwala, who hailed from the village of Ganeri.

Environmental Settings of Investment Program Component Sites

93. The subproject includes laying of water supply pipes and construction of structures in the municipal area of Laxmangarh. 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 in some part of the town are narrow. Roads are lined both sides with open drains. In narrow roads pipes will be laid in the middle of the road, which may affect the traffic. Bigger diameter strategic water mains 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 water pipelines in those roads.

94. Both the CWRs are designed in available Govt. land of PHED, where 4 trees are present which may required to be cut, for which mitigation measures will be required by contractor during construction works. No wildlife has been reported on both the sites. Site environmental features of project are given in Table 9:

Table 9: Environmental Features

S.No.	Subproject Component	Environmental Features of the Site	Photographs										
1	Construction of CWR 250 KL at PHED campus, Bad Ke Balaji	Clear water reservoir will be constructed within the existing campus of PHED at Bad ke Balaji. Adequate land is available for designed work. A flat land vacant (not under any productive use) is available within existing PHED campus. Campus have a well defined boundary wall. No sensitive receptor or habitations exist near the project site. There are 4 trees i.e. Neem (<i>Azadirachta indica</i> and Peepal (<i>Ficus religiosa</i>) etc. exist at CWR site at Bad Ke Balaji, PHED campus which may required to be cut. Tree cutting Permission has been taken from the concerned authority. There is some amount of AC pipes are stored in PHED campus. The designed site is well connected with a black top road											
2	Construction of CWR 100 KL at PHED A.En. Campus	Designed site of CWR (100 KL) is near to existing PHED A.En. Campus in vacant govt. land, which will be made available by Nagar Palika for construction of designed new CWR. • The existing PHED campus is well defined with boundary wall and gated entry. • There are no sensitive receptors or habitation in nearby vicinity. • No wildlife is reported from this area so far. There is some amount of AC pipes are stored in PHED campus. The designed site is well connected with a black top road • The amount of AC pipes stored in both (PHED campus and bad ke Balaji) near designed CWR sites are <table border="1"><thead><tr><th>Dia</th><th>length</th></tr></thead><tbody><tr><td>80 mm</td><td>1000 m</td></tr><tr><td>100 mm</td><td>1500 m</td></tr><tr><td>125 mm</td><td>1100 m</td></tr><tr><td>150 mm</td><td>1500 m</td></tr></tbody></table>	Dia	length	80 mm	1000 m	100 mm	1500 m	125 mm	1100 m	150 mm	1500 m	
Dia	length												
80 mm	1000 m												
100 mm	1500 m												
125 mm	1100 m												
150 mm	1500 m												

		200 mm	1000 m	
3	Rehabilitation of Tubewells	Rehabilitation of 34 Nos.TWs		Tubewells at different location in the town. Location of tube wells is given in Appendix 13.
5	Transmission and distribution network	No transmission system exist and distribution networks will traverse through different roads within the existing ROW. Therefore, no impacts shall be envisaged on structures (temporary or permanent) and CPRs. No sensitive areas in or near the alignment in the stretches where Transmission main/feeder main and distribution network lines are designed. Advance permissions from concerned authorities will be required for road cutting and traffic diversion. No tree cutting will be required as per preliminary design. The existing distribution system is very old and will be completely phased out except DI lines Majority of the existing pipes are of AC; new pipes will be laid without distributing the existing pipes, which will be left as it is in the ground untouched Laxmangarh town has existing 99.7 km of AC pipes of different diameter.		Details of proposed distribution network is given below: 162.64 km (75mm to 280mm)
6	CRMC-1 at PHED AEN Campus	There is an old abandoned building existing in PHED A.En. Campus which is proposed for demolition for the construction of CRMC-1 in Laxmangarh. This site belongs to PHED and suitable for construction of CRMC. There are habitations beside the proposed site and mitigation measures will be required to avoid any adverse impact to nearby habitants. There is also existing CWR, pump house and A.En. Office working in this campus therefore all the precautions should be taken to reduce/avoid any adverse impact to the people and staff visiting this office during time of construction works		 Old building at PHED AEN campus proposed for demolition for construction fo CRMC-1  Habitations beside proposed site

7	CRMC-2 and MCC near PHED Exn. Office	Proposed site for CRMC-2 and MCC is a vacant Govt. land in front of PHED Exn office campus. This is a vacant land under possession of PHED and well demarcated by boundary wall and barbed wire fencing. Demarcation for CRMC building is already done and there are no any environmental issues. No any tree is present at site, no habitation/shops exist near site and no any other significant issues noted at site	 Proposed site for CRMC-2 and MCC demarcated by pillars
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VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Introduction

95. Potential environmental impacts of the designed 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.

96. 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. **Pre-construction impacts.** During pre-construction stage site shall be made free from any of the environmental issues such as tree cutting, arrangement of required facilities etc. Site selection of construction work camps, stockpile areas, storage areas, and disposal areas & Site selection of sources of materials shall be done in pre-construction stage and all the required arrangements should be made in this stage.
- iv. **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.
- v. **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.

97. 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).

98. 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.

99. The ADB Rapid Environmental Assessment Checklist has been used to screen the project for environmental impacts and to determine the scope of the IEE.

100. In the case of this project (i) most of the individual elements are relatively small and involve straight forward 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 body 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.

Pre-Construction Impacts – Design and Location

Location Impacts

101. **Location of CWRs:** Both the CWR's are designed in the Govt. land available with PHED. As for preliminary survey, 4 trees i.e. Neem (*Azadirachta indica* and Peepal (*Ficus religiosa*) etc. exist at CWR site at Bad Ke Balaji, PHED campus which may be required to be cut. Tree cutting Permission has been taken from the concerned authority. No wildlife is reported at the sites.

102. **Location of CRMCs:** Both the CRMCs are proposed in Government lands under possession of PHED. CRMC-1 is proposed in PHED AEN campus in the place of old office building, which is proposed for demolition. There are no trees or natural vegetation existing at this place. Public and PHED officials are visiting at this place for official works. There are some habitations adjacent to this site and therefore mitigation measures will be required during demolition and construction works. Site for construction of CRMC-2 and MCC is proposed in vacant land in front of PHED Exn. Office which is under possession of PHED. There are no any tree, habitation or other features at this site, therefore no significant environmental impacts are anticipated at this site.

103. **Physical Cultural Resources.** There are no notable or significant archeological places or protected monuments or areas in Laxmangarh project area. Therefore, no impacts envisaged but risk of uncovering archeological remains, given the long history of town, during the excavations cannot be ruled out completely. Construction contractors therefore should follow the below measures in conducting any excavation work:

- Create awareness among the workers, supervisors and engineers about the chance finds during excavation work;
- Stop work immediately to allow further investigation if any finds are suspected;
- Inform local Archeological Department / Museum office if a find is suspected and take any action, they require to ensure its removal or protection in situ

- Prepare a chance find protocol (sample is provided in Appendix 9).

104. **Tree cutting at project sites.** As for preliminary survey, it has been found that 4 trees i.e. Neem (*Azadirachta indica* and Peepal (*Ficus religiosa*) etc. exist at CWR site at Bad Ke Balaji, PHED campus which may be required to cut. All efforts shall be taken from PIU/contractor to minimize tree cutting as much as possible. Nevertheless, tree cutting permission has been taken from the concerned authority in advance so that if tree cutting is extremely necessary and unavoidable, there may be no any issue of permission. Compensatory plantation shall be undertaken in the ration of atleast 1:3. Water pipelines will be laid along the road within road right of way. There are no notable trees in the alignment; therefore no tree cutting is envisaged. Following measures need to be implemented to minimize and/or compensate for the loss of tree cover.

- Minimize removal of trees by adopting to site condition and with appropriate layout design of CWRs or any other site with trees
- Obtain prior permission for tree cutting at CWRs site or at any other site that may require tree cutting finalized during detailed design
- Plant and maintain 3 trees for each tree that is felled.

105. **Locations impacts of Water Supply Networks:** The Water Supply transmission and distribution networks will traverse through different city roads within ROW. Therefore no impacts shall be envisaged regarding location. These works will require advance permission from concerned authority for road cutting and traffic diversion etc. No wildlife reported in project impact areas and no tree cutting will be required as per preliminary design and if any tree cutting will be required during execution mitigation measures shall be adopted.

106. It has to be assured by contractor that desired consents from RPCB are obtained for DG Sets, hot mix Plant. Contractor will ensure for compliances of all the conditions as mentioned in the CTE/CTO.

Design Impacts

107. **Design of the Designed Components.** The Central Public Health and Environmental Engineering Organization (CPHEEO) manual suggests a design period of 15/30 years in general while designing the systems components. It is designed to consider 2051 as the ultimate design year for all the components in order to maintain unanimity in the design period and design population. Accordingly, 2021 shall be the base year and 2036 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.

108. Following environmental considerations are already included in the project to avoid and/or minimize adverse impacts and enhance positive benefits:

- Adopting conjunctive use approach in water use; utilizing feasible surface water sources and groundwater source optimally thereby reducing the existing groundwater abstraction to the extent possible
- Locating components and facilities appropriately by avoiding sensitive locations like forests and protected areas (environmentally, socially, and archeologically).
- Designing the entire system to maintain optimal flow and terminal pressure, and optimising the overall energy usage

- Avoiding usage of asbestos containing materials
- Reducing the incidence of water borne diseases by providing 100% population including urban poor with potable water supplies
- Provision of appropriate personal protection equipment to the workers and staff

109. **Water Source Sustainability:** Based on designed water supply rate of 135 lpcd for Laxmangarh town, the total water demand is estimated as 10.0 MLD (base year 2021), and 12.20 MLD (ultimate design year 2051). Nearest surface water sources form Khumbha Ram Lift Canal canal is considered as surface sources of supply.

Water Reservation for Laxmangarh

110. Presently Total water abstracted from Tube Wells is 4.14 MLD (34 TWs) and availability of 12.06 MLD (2041) water allocation from the "Fatehpur-Laxmangarh Water Supply Project". Treated water will be available from "Fatehpur-Laxmangarh Water Supply Project" through Manasi headworks of PHED up to Bad ke Balaji and A.En. Campus H/w of Laxmangarh town. WTP of this scheme is at Dhannasar, the silent features of Indira Gandhi Canal is provided in Appendix 10.

111. **Source:** All the TWs and OWs are connected to direct distribution and cannot be considered as sustainable source as they have very low discharge yield. A package "Fatehpur-Laxmangarh Water Supply project" was sanctioned by PHED and under execution. Laxmangarh will get deficit water (excluding GW) from this project of PHED Rajasthan source as Khumbha Ram Lift Canal". The work of pipeline system from canal off take point to A. En HW and Bad ke Balaji HW has been completed. 500 mm DI pipe has been laid from canal off take to A. En HW and Bad ke Balaji HW. Presently Total water abstracted from Tube Wells is 4.14 MLD (34 TWs) and availability of 12.06 MLD (2041) water allocation from the "Fatehpur-Laxmangarh Water Supply Project". Treated water will be available from "Fatehpur-Laxmangarh Water Supply Project" of PHED up to Bad ke Balaji and AEN Campus H/w of Laxmangarh town. WTP of this scheme is at Dhannasar.

112. **Bore Wells:** At present nearly 10 MLD of Water is being supplied from the Bore Wells. There are 34 No's of Existing Bore Wells located within the municipal Limit of Laxmangarh town. Tube Well discharge along with the Pipeline connecting Tube Wells to CWR is provided in below:

- Approx. Discharge in a Tube Wells 175 LPM = 10500 LPH.
- Pumping Hours of Tube Wells = 20 Hours.
- Total Discharge/Tube Well = 0.18 MLD
- Therefore, there is no requirement of new additional Tube Wells considering the horizon Year 2051.

113. All these Tube Wells are existing, currently connected directly to the CWR of the town. Therefore, existing Pumping arrangements are to be replaced with new ones and rising main lines are to be laid in the designed scheme, the feasibility report of tubewells attached as Appendix 12

114. **Selection of pipe materials for Water Supply system:** The pipe material designed for the Clear water transmission network is duly considering the durability of the material and its strength to withstand the expected normal internal and external stresses. The selection of pipe material has been done considering the parameters like: Ability to withstand internal / external

pressure, Ease in handling and lowering of pipes, Corrosion resistance, Pipe jointing materials should be effective and reliable, Trouble-free maintenance operation should be ensured, Availability of specials and fittings, Pipe roughness coefficient. Various available alternates were compared during detail design like AC pipes, CC, DI and HDPE. AC pipes were not adopted because those are banned by government due to carcinogenic risks and CC pipes were not considered due to profuse leakages and heavy in handling. Therefore DI pipes were considered for transmission and HDPE pipes were considered for *distribution networks*.

Environmental Audit of Existing Water Supply Infrastructure

115. It is designed to utilize existing water supply infrastructure like tube wells, clear water reservoirs, pump houses etc. with necessary improvements. As per the ADB SPS 2009, these are associated facilities and therefore the component operation shall comply with the ADB and applicable environmental laws of India. Besides, ADB SPS lays emphasis on impacts and risks on biodiversity and natural resources, pollution prevention abatement including hazardous waste, occupational health and safety, community health and safety, and physical cultural resources. A random environmental audit is conducted to (i) assess the compliance of the existing infrastructure with environmental legislations and (ii) improve environmental performance to minimize future potential liabilities. The preliminary audit note is given in Appendix 14. A more detailed environmental audit and risk assessment shall be carried out during detailed design stage and incorporated into the final IEE.

116. All the existing infrastructure facilities are located in Laxmangarh town, which is an urban area and where there are no protected or sensitive environmental areas such as forests, wildlife sanctuaries or archeologically protected areas. Therefore, there are no risks or impacts on biodiversity and natural resources. The designed project will optimally utilize the surface and groundwater sources. Due to nature of components, the existing infrastructure components do not fall under the ambit of any environmental related regulations, and therefore there is no requirement of permissions or clearances. Presence of Asbestos Containing Material (ACM) in the form of asbestos cement pipes in the existing water supply infrastructure is a cause of concern due to its potentially hazardous nature. Project, however, do not include rehabilitation or repair of AC pipes, and the project, in fact, designed to discontinue the use of AC pipes. Presence of AC pipes in the existing facilities may create hazardous conditions for the workers and surrounding community. Besides, the generation and disposal of debris and discarded materials, and construction phase health and safety need to be considered and mitigated to comply with the SPS provisions. Following table 10 provides component wise compliances and concerns. Corrective actions for the identified environmental concerns are discussed in the following section.

Table 10: Environmental Audit of Existing Facilities

Infrastructure	Details	Designed Rehabilitation	Compliance with environmental regulatory framework	Environmental Concerns
Tube wells	34 tube wells	Replacement of pipes, submersible pumps, cables, panels, valves,	No requirements under existing laws	Occupational health and safety, public safety during the construction works

Infrastructure	Details	Designed Rehabilitation	Compliance with environmental regulatory framework	Environmental Concerns
		flow meters and synchronization with SCADA enabled devices Depth of the tube wells will not be increased		Disposal of discarded material, debris There are no asbestos containing material / AC pipes noticed
Clear water reservoirs (CWRs)	3 CWR RCC CWR at A.En office Head Works and Garh	Civil repairs and rehabilitation, replacement of pipes, connections, electrical and mechanicals parts as required Cleaning Instrumentation and SCADA	No requirements under existing laws	Storage of AC pipes in existing campus Occupational health and safety, public safety during the construction works Disposal of discarded material, debris including AC pipes
Old building at AEN campus (proposed for demolition for construction of CRMC)	Old and abandoned building which is locked and not being used for any purpose, there are stake of old pipe materials and absolute electrical fittings, no storage of AC pipes at this site, habitations exists beside this land	This building is old and abandoned by PHED and is proposed to be demolished for construction of one CRMC	No AC pipe are present at this site	Occupational health and safety, public safety during the construction works as there are existing habitations adjacent to this old building Disposal of demolition waste after demolition of old building Mitigation measures are required to avoid disturbance to existing PHED office and visitors
OHSRs	There are 8 Nos of OHSR in Laxmangarh. The following eight existing structures are to be repaired / rehabilitated: Rehabilitation of existing OHSRs at BSNL office, Panchayat samiti, Balika school, Aen. Head work, Garh, Kabristan (bhootnath), Bad ke Balaji, Saytanarayana	Civil repairs and rehabilitation, replacement of pipes, connections, electrical and mechanicals parts as required Cleaning Instrumentation and SCADA	No requirements under existing laws	Presence of AC pipes in existing connections Occupational health and safety, public safety during the construction works Disposal of discarded material, debris including AC pipes

Infrastructure	Details	Designed Rehabilitation	Compliance with environmental regulatory framework	Environmental Concerns
Pluming stations	2 pumping stations RCC CWR at A.En office Head Works and Garh	Replacement of pumps, motors Civil repairs and rehabilitation, replacement of pipes, connections, electrical and mechanicals parts as required	No requirements under existing laws	Presence of AC pipes in existing connections Spillage of oils, lubricants etc., Occupational health and safety, public safety during the construction works Disposal of discarded material, waste oils, mechanical and electrical parts, debris including AC pipes
Transmission and distribution	Existing existing distribution: 103.12 km, 80-350 mm diameter pipes	Replacement; new pipes will be laid in the place of existing pipes Pipes will be left as it is in the ground, no rehabilitation / removal designed	No requirements under existing laws	No AC pipe store at site. Exact location and condition of AC pipes not known; no maps available. Accidental disturbance / need to remove in narrow roads Occupational health and safety, public safety during trenching Disposal of AC pipes / debris, Appendix 15 provides storage area of AC pipes during construction.

117. **Corrective Measures.** As presented in the above table, there are no regulatory non-compliance issues in the existing infrastructure. The environmental concerns are mainly related to occupational health and safety, public safety, disposal of debris, discarded materials etc., A work specific environmental management plan needs to be prepared for these aspects. The exact nature of rehabilitation and repair works will be known only during the detailed design phase as the detailed technical audit will be conducted by the DBO contractor and the required rehabilitation and repair measures will be designed accordingly. Therefore, a separate EMP will be prepared for rehabilitation works during the detailed design phase by the DBO contractor, and reviewed and approved by PMU/consultants, and the same will be implemented by the DBO contractor. These are included in the EMP.

118. **Presence of asbestos containing material (ACM),** mainly AC pipes, in the existing

infrastructure is the main concern. Asbestos is recognized as a cause of various diseases and is considered health hazard if inhaled.

119. **Most of the AC are old.** There is no use of new AC pipes but for repairing work in the existing network, and for replace the damaged sections, AC pipes are being used. There will be no use of any AC pipe in the future as under the present project, water supply network is being provided in the entire town with non-AC pipes. It is normal practice in Rajasthan that existing AC pipes are left as it is in the ground and new pipes will be laid in a new alignment. As per the discussion with the local water supply staff in Laxmangarh, existing AC pipes are laid long back, they are deep in ground, more than 2 m at many places, as the road level has raised considerably. In wider roads, there will be adequate space to lay the new pipelines, and therefore there is no need to remove the existing pipelines.

120. However, complete avoidance of handling and disposal of AC pipes may not be possible. There are narrow lanes, where AC pipes may be encountered during the laying of new pipes. Some connections / inlet / outlet pipes at the existing CWRs are also of AC pipes. These will be removed and replaced with new non-AC pipes. At present no maps available on the exact location / position of AC pipes. The local long serving O and M staff of PHED seem to be well aware of the location of AC pipes in the roads. Consultation with the staff indicates that of the total 100 km of underground AC pipes, about 5% may be required to be removed, especially in the narrow lanes to lay the new lines. This will be about 5 km length of water pipes.

121. A temporary storage area has been provided in the project site by the PHED on request of PMU-RUIDP. Asbestos materials present and removed from the construction activities will be temporarily maintained at the identified area. The temporary storage area shall be constructed by the DBO contractor based on the specifications of the asbestos management service contractor.

122. Bureau of Indian Standards (BIS) Guidelines for Safe Use of Products containing Asbestos states that “Asbestos cement products (such as AC pipes) generally contain about 10-15% asbestos fibers in a cement matrix that comprises the rest of the materials and are termed as locked in asbestos products as these products have the asbestos fibers bound in cement. There is very little possibility of generation of airborne asbestos fibers during any reasonable handling, storage, and use of such products. However, during storing and installation, recommended work practices shall be followed to avoid harmful exposure”. According to Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, any waste having asbestos concentration limit of 10,000 mg/kg (i.e. 1%), however this will apply only if the asbestos containing substances are in a friable, powdered or finely divided state. Under the Basel Convention¹⁴, asbestos or asbestos waste in the form of dust and fibers is classified as hazardous waste.

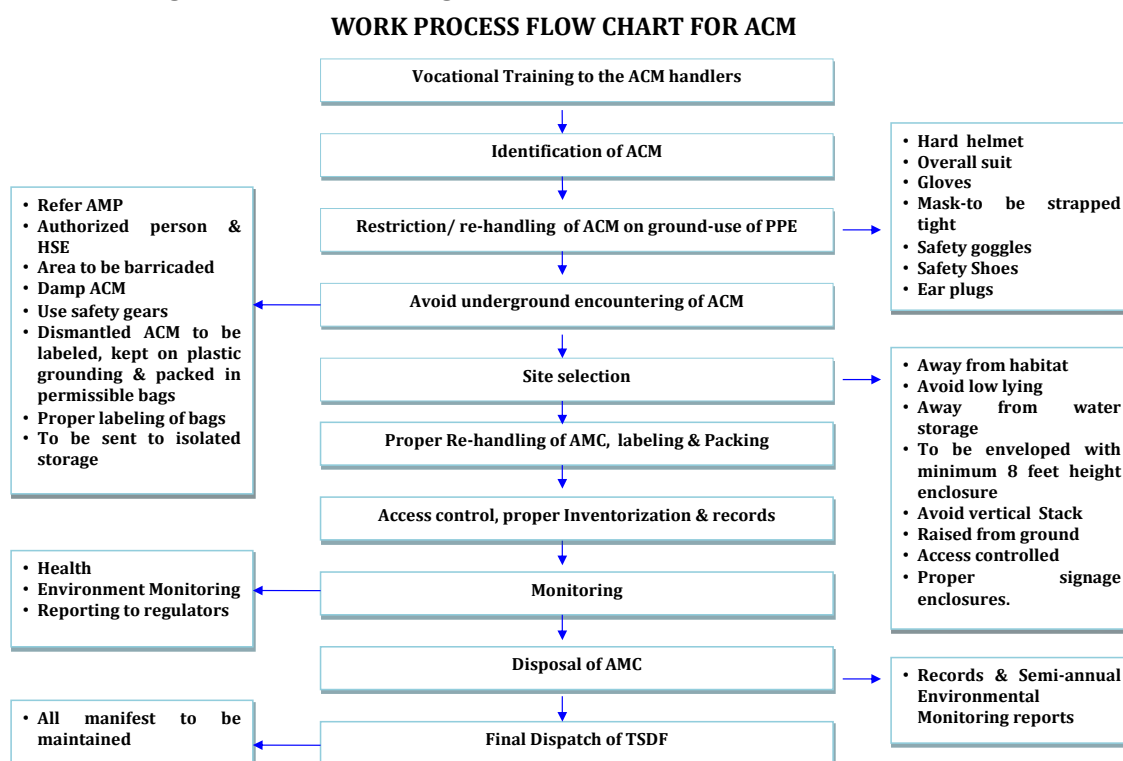
123. Working with or handling AC pipes in manner that produces dust, fibers, air borne particles etc., is very harmful and hazardous to the workers and general public around the work sites. The condition of existing underground AC pipes is not known, however, as these are old, pipes may be in deteriorated conditions. Condition needs to be assessed to check whether it is in friable form or in a condition in which it can release fibers before it is subjected any disturbance or removal.

124. During the IEE preparation, an expert on Asbestos and ACMs was mobilized to assist

¹⁴ Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, adopted in 1989

PMU to conduct an assessment and field validation of the extent of asbestos cement materials covered under the RSTDSP subprojects. The assessment has indicated that specific measures are necessary to safeguard the health and safety of the nearby communities and the potential contractors consistent with the requirements of the ADB SPS 2009. Activities such as clearing, transfer and disposal of AC pipes, work in narrow streets, and interventions in existing AC pipes may have adverse impacts on workers and surrounding population. Air borne asbestos if handled unsafely, cut, drilled or broken into pieces that may cause health issues such as Inflammation of the lungs, Mesothelioma, Peritoneal mesothelioma, Pleural plaques, Asbestosis and Bronchogenic Carcinoma. . The ACM Management Expert of PMCBC have prepared an ACM Management plan for the Laxmangarh subproject after detailed survey of implementation site and other parameters. ACM Expert during his visits to the construction sites at subproject area found no asbestos containing material during construction activities. Based on detailed study by ACM Expert, Asbestos Containing Material Management Plan (ACMMP) has been updated by ACM Management Expert and included in this IEE Report as Appendix 15. Following measures are to be implemented to avoid any impacts:

- ACM Management Plan (AMP) is updated and that includes identification of hazards, the use of proper safety gear and disposal methods. Sample AMP is provided in Appendix 15. Adhere to the workflow process suggested in Figure 8.
- Conduct awareness program on safety during the construction work
- Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day
- 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
- Identify risk of intervention with existing AC pipes. If there is significant risk, implement the AMP strictly that includes identification of hazards, the use of proper safety gear and disposal methods.
- Appropriate actions as defined in the Asbestos Management Plan will have to be adhered to
- Maintain records of AC pipes as per the AMP.

Figure 10: ACM Management Plan – Work Process Flow Chart

125. Requirement for the Contractor and the Subcontractor. The following are operational requirements related to works involving asbestos:

- (i) engaging certified and competent asbestos service provider to identify, handle and remove the asbestos materials present and encountered in the project sites;
- (ii) adopting good practices per EHS Guidelines¹⁵ to minimize the health risks associated with asbestos materials by avoiding their use in new construction and renovation, and, if installed asbestos-containing materials are encountered, by using internationally recognized standards and best practices to mitigate their impact;¹⁶

¹⁵ ADB SPS specifies application of pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's *Environment, Health and Safety (EHS) Guidelines*. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When host country regulations differ from these levels and measures, the borrower/client will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the borrower/client will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in this document.

¹⁶ The EHS Guidelines specify that the use of ACM should be avoided in new buildings and construction or as a new material in remodeling or renovation activities. Existing facilities with ACM should develop an asbestos management plan that clearly identifies the locations where the ACM is present, its condition (e.g., whether it is in friable form or has the potential to release fibers), procedures for monitoring its condition, procedures to access the locations where ACM is present to avoid damage, and training of staff who can potentially come into contact with the material to avoid damage and prevent exposure. The plan should be made available to all persons involved in operations and maintenance activities. Repair or removal and disposal of existing ACM in buildings should be performed only by specially trained personnel following host country requirements or, if the country does not have its own

- (iii) training of workers and supervisors, possession of (or means of access to) adequate equipment and supplies for the scope of envisioned works, and a record of compliance with regulations on previous work;
- (iv) removal, repair, and disposal of ACM shall be carried out in a way that minimizes worker and community asbestos exposure, and require the selected contractor to develop and submit a plan, subject to the PMU and PIU's acceptance, before doing so;
- (v) providing adequate protection to its personnel handling asbestos, including respirators and disposable clothing;
- (vi) notifying the Rajasthan State Pollution Control Board (RSPCB) of the removal and disposal according to applicable regulations as indicated in the technical requirements and cooperating fully with representatives of RSPCB during all inspections and inquiries.

126. PMU will engage an Asbestos Management Specialist to provide training and awareness, and to coordinate with various stakeholders on the risks, management, and mitigation measures required for the identification, safe handling, transport and disposal of the asbestos materials.

127. Out of total 8 zones proposed, design approval for all 8 zones are given. Works are started in mostly outskirts areas of town and no AC pipes are expected to encounter during pipe laying works. Contractor has been instructed to not to remove any AC pipes if encountered and remain in-situ and lay new line parallel to it. Asbestos management plan is being prepared by contractor and shall be updated in next IEE update.

128. **Utilities.** Telephone lines, electric poles and wires, water lines within the designed 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

- identify the locations and operators of these utilities to prevent unnecessary disruption of services during construction phase; and
- instruct construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services

129. 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. Construction sites will be selected by DBO contractor in compliance with these conditions and the same will be reflected in Site Environmental Management Plan (SEMP) which is to be prepared by DBO contractor prior to start of construction and approved by PIU. Material stockpiles will be protected by bunds during the monsoon season to prevent silt runoff into drains. The subproject is likely to generate soil from excavations, which needs to be disposed of safely. The following measures should be considered for disposal of surplus and/or waste soil:

requirements, internationally recognized procedures. Decommissioning sites may also pose a risk of exposure to asbestos that should be prevented by using specially trained personnel to identify and carefully remove asbestos insulation and structural building elements before dismantling or demolition.

- The excavated soil should be removed from construction area at the earliest for beneficial reuse such as land raising / filling of excavated areas.
- Soil should be covered with tarpaulin sheets during the transportation.
- Soil transportation should not be done during the peak hours and should avoid narrow and heavy traffic routes and important religious or tourist sites

130. **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 and 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.

131. **Social and Cultural Resources.** Any work involving ground disturbance can uncover and damage archaeological and historical remains. For this project, excavation will occur in project sites, 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 recognized and measures are taken to ensure they are protected and conserved.

Construction Impacts

132. The civil works for the subproject include earth work excavation for pipeline, 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.

133. The excavation is done in such a way that there will be a minimum depth of 1.2 m above the water pipeline, and in narrow streets the cover above the pipe will be 0.7 m minimum. Sufficient care will be taken while 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 bracings 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.

134. The excavation of trenches for water pipes is expected to generate huge quantities of soil, about 80% of this soil will be used for refilling the trench after placing the pipe and therefore

residual soil after pipe laying and refilling will be required to be disposed of. This soil shall be used for filling low lying area or stored/ dumped in approved debris disposal sites.

135. 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 residents, businesses, and the community in general. These anticipated impacts are temporary and for short duration. Water lines will be laid on either side of the roads/streets.

136. Physical impacts will be reduced by the method of working and scheduling of work, whereby 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.

137. **Designed pipeline.** A detail survey is needed after finalization of alignment to access the feasibility of the alignment for need of any tree cutting, demolition of any structure, road and railway crossings, pipe laying in any private land, presence of any sensitive receptor along alignment, disturbance to public or business etc. Mitigation measures have been prepared for potential adverse impacts. Prior consent from landowners (if pipe laying is required in private land) and NOC from concerned departments (for pipe laying in roads, road/railway crossings etc) prior to start of construction works, is required. To mitigate the impacts of disturbance to road users during pipe laying works on road, it is strongly recommended that contractor dig only those length of road, up to which extent he can lay pipe on the same day and can back fill the trench and restore the road up to motorable conditions. All the safety measures for work on road such as barricades, road signage, traffic assistance etc. is required to be adopted by contractor during construction works. Further if night works are required (however unlikely, applicable only in extreme conditions) all the mitigation measures to reduce impacts of disturbance to minimum level to nearby habitants and road users should be ensured by contractor.

138. **Demolition works.** For the construction of proposed CRMC at PHED AEN campus, an old and abandoned office building is needed to be demolished. Before demolishing the old structure, proper work plan and mitigation measures will be required for demolition works. Following mitigation measures are suggested for contractor-

- Structures to be demolished should be wetted through water sprinkling to reduce dust emission.
- Appropriate site for storage and disposal of demolished materials should be selected prior to start of demolition activities with prior permission/approval of PIU/ULB.
- All the safety measures should be adopted during demolition activities.
- Debris should be removed on the same day in covered container and should be disposed at identified disposal site

139. **Storage and Disposal of excavated earth.** A large quantity of soil will be excavated for pipe laying. Some part of this excavated soil will be reused for backfilling and/or surface leveling; rest of the soil will be needed to be disposed in other locations. Proper storage and disposal plan from contractor is required before start of the work. Prior permission from land owner/concerned authority for storage and disposal of excess earth is required. Prior to the commencement of works, Contractor will follow all the prescribed rules¹⁷ and shall identify a debris disposal site in

¹⁷ Construction and Demolition Waste Management Rules 2016 and Solid Waste Management Rules

consultation with the PIU/ULB and adhering to following criteria:

- 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 activities.
- Debris disposal site shall be at least 200 m away from any surface water body.
- No residential areas shall be located within 200 m downwind side of the site.
- The site is minimum 250 m. away from sensitive locations like hospitals, religious places, ponds/lakes or other water bodies.
- The local governing body and community shall be consulted while selecting the site.
- Soil storage site should be properly demarcated by fencing and information board should be placed at entrance
- At soil storage site soil should be covered by tarpaulin or regular water sprinkling should be done to reduce dust emission
- At soil disposal site the disposed soil should be leveled on daily basis and no heap or mound should be left at end of the day

140. **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:

- (i) Use material sources permitted by government;¹⁸
- (ii) Verify suitability of all material sources and obtain approval of PIU; and
- (i) Submit to PIU on a monthly basis documentation of sources of materials. . If contractor is purchasing ready mix concrete, asphalt/macadam and aggregates from third party, contractor will assure that all the parties/ suppliers are having CTE/CTO from RPCB and will collect the copy of these certificates and submit to PIU/consultants

141. **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 dusts and increase in 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:

- (i) Consult with PIU/on the designated areas for stockpiling of soils, gravel, and other construction materials;
- (ii) Damp down exposed soil and any stock piled 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, DGs should have proper stake height as per norms;
- (vii) Ensure all the equipment are having PUC certificates
- (viii) Do regular water sprinkling in dusty areas to reduce dust emission during works
- (ix) Damp down the structures before demolishing to reduce dust emission
- (x) Damp down on regular basis all the access ways

¹⁸CTE and CTO will be required for batching plant, hot mix plant, crushers and DG set etc. if specifically established for this project. If contractor is purchasing raw material or ready mix concrete, asphalt/macadam and aggregates from third party, he has to be assured that third party is having CTE/CTO from RPCB and should collect the copy of these and submit to PIU/consultants. Quarry sites should also have the desired permissions.

- (xi) Maintain all the equipment and vehicles to reduce emission of smoke and keep pollution under control and keep records of periodic maintenance
- (xii) Conduct ambient air quality monitoring periodically as per Environmental Management Plan (EMP).

142. **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:

- (i) Prepare and implement a spoils management plan;
- (ii) Avoid to construct any construction camps and labour camps away from any water body and do not allow to dispose any waste or sullage in to any water body
- (iii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
- (iv) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with PIU on designated disposal areas;
- (v) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- (vi) 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
- (vii) Dispose any wastes generated by construction activities in designated sites;
- (viii) Keep oil tray or pans under the DG set or during maintenance of mechanical equipments to avoid oil spillage resulting soil and water pollution, and
- (ix) Conduct surface water quality Monitoring according to the Environmental Management Plan (EMP)

143. **Noise and Vibration Levels.** Construction works will be conducted along the roads in Laxmangarh urban area, where there are majorly houses and some religious places and small-scale businesses. The sensitive receptors are schools, hospitals, religious places etc. 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:

- (i) 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;
- (ii) Use road cutters instead of breaker/hammer for cutting the road before excavation for pipe laying on roads
- (iii) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
- (iv) 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;
- (v) DGs being used at site should have sound reducing enclosures, preferably silent DGs should be used at site;
- (vi) Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s and equipment;

- (vii) Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
- (viii) 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;
- (ix) Provide all workers appropriate PPEs like ear plug/muff, working in high noise conditions;
- (x) Keep all vehicles and equipment in good conditions to avoid excessive noise generation;
- (xi) 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, hospitals, offices, courts etc) and avoid noisy works in those hours;
- (xii) Avoid noisy works in nights in inhabited areas to avoid any disturbance to habitants; and
- (xiii) Consult in advance with habitants and inform them about the nature and duration of works
- (xiv) Conduct noise monitoring according to the Environmental Management Plan (EMP).

144. **Management Plan for Night works at Project Sites (if required).** Following requirements should be fulfilled for construction works at night hours-

- i. 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.
- ii. Contractor should plan for night works only after directions from PMU/PIU/DSC
- iii. Contractor should submit plan for night works for approval from PIU.
- iv. 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/vyaparmandal of the affected areas and their consents/permissions should be taken prior to start of night works.
- v. 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 equipment and materials for night works.
- vi. Contractor is required to have following equipment/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 equipment 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 equipment 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 equipment 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 equipment 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
- vii. PIU/CMSC 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
- viii. Night works should be stopped early in the morning at least one hour before start of pedestrian/traffic movement
- ix. After completion of night works all the site should be cleaned and maintained obstruction free for day time movement of vehicles and pedestrians
- x. Drivers and workers should be alert and responsive during night works
- xi. All the wages to workers working in night hours should be as per the applicable labour acts

- xii. Avoid any nuisance which may create problems to nearby habitants and work peacefully during night hours
- xiii. Night works should not be conducted near hospitals and during peak seasons such as peak tourist season, students' exam times etc.

145. **Landscape and Aesthetics.** The construction works does not envisage any major cutting of trees, but it 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:

- (i) Prepare and implement spoils management plan;
- (ii) Avoid stockpiling of excess excavated soils;
- (iii) Coordinate with ULB 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.
- (viii) Minimize removal of vegetation and disallow cutting of trees;
- (ix) If tree-removal will be required, obtain tree-cutting permit from the Revenue Department; and
- (x) Plant three native trees for every one that is removed.

146. **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. Although, groundwater is much deeper than the designed trenching depth, and rains are scarce and limited to very short duration during monsoon, 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. These potential impacts are temporary and short-term duration only. However, to ensure that these are mitigated, construction contractor will be required to:

- (i) Prepare and implement a spoils management plan (Appendix 16);
- (ii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
- (iii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with PIU on designated disposal areas;
- (iv) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- (v) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
- (vi) Dispose any wastes generated by construction activities in designated sites; and
- (vii) Conduct periodical surface quality water quality and ground water quality monitoring according to the Environmental Management Plan (EMP).

147. **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:

- (i) Prepare and implement a Traffic Management Plan (**Appendix 17**).
- (ii) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;
- (iii) Schedule transport and hauling activities during non-peak hours;
- (iv) Locate entry and exit points in areas where there is low potential for traffic congestion;
- (v) Keep the site free from all unnecessary obstructions;
- (vi) Drive vehicles in a considerate manner;
- (vii) Coordinate with Traffic Police for temporary road diversions and for provision of traffic aids if transportation activities cannot be avoided during peak hours; and
- (viii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

148. Wherever road width is minimal, there will be temporary loss of access to restrains and vehicular traffic (including 2-wheelers) during the laying of pipes. Under those circumstances, contractor shall adopt following measures:

- (i) Inform the affected local population 1-week in advance about the work schedule
- (ii) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum.
- (iii) 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.

149. **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:

- (i) Prepare and implement spoils management plan (**Appendix 16**);
- (ii) Leave spaces for access between mounds of soil;
- (iii) Provide walkways and metal sheets where required to maintain access across for people and vehicles;
- (iv) Increase workforce in the areas with predominantly institutions, place of worship, business establishment, hospitals, and schools;
- (v) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and
- (vi) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.
- (vii) Notify community/ water users in advance about likely interruptions in water supply.
- (viii) Provide alternate sources of clean water until water supply is restored.
- (ix) Provide all mitigation measures as given in resettlement plan (RP) prepared for the project to mitigate impacts on vendors and shopkeepers

150. **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:

- (i) 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
- (ii) Secure construction materials from local market.

151. **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. Construction contractor will depute experienced EHS personnel and will be required to:

- (i) Comply with all national, state and local labor laws (see **Appendix 6**);
- (ii) Following best practice health and safety guidelines: IFC's General EHS Guidelines¹⁹, WHO Interim Guidance (and its updates) on Water, Sanitation, Hygiene and Waste management for the COVID19 virus (Appendix 29), and Sector Specific (Water and Sanitation) Guidelines²⁰;
- (iii) Ensure that qualified first-aid is provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
- (iv) Provide medical insurance coverage for workers;
- (v) Secure all installations from unauthorized intrusion and accident risks;
- (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:
 - 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
 - c. Provide necessary medicine and facilities to take care of dehydration related health issues
- (vii) Provide supplies of potable drinking water;
- (viii) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;
- (ix) 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;
- (x) 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;
- (xi) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- (xii) Ensure moving equipment is outfitted with audible back-up alarms;
- (xiii) 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
- (xiv) 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.

152. **Community Health and Safety.** Hazards posed to the public, specifically in high-pedestrian areas may include traffic accidents and vehicle collision with pedestrians. Potential

¹⁹<https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

²⁰<https://www.ifc.org/wps/wcm/connect/e22c050048855ae0875cd76a6515bb18/Final%2B-%2BWater%2BAnd%2BSanitation.pdf?MOD=AJPERES>

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.
- (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.

153. Central part of the town is characterized by narrow roads. Particularly, the areas located in old town have very narrow roads with sharp turns and are accessible only to pedestrians. 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 (<750mm) 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

154. **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 safe drinking water, water for other uses, and sanitation facilities for employees;
- (iv) Periodically test the drinking water supplied to workers from external agency and submit test report to PIU
- (v) Ensure conditions of liveability at work camps are maintained at the highest standards possible at all times;
- (vi) Prohibit employees from poaching wildlife and cutting of trees for firewood;
- (vii) Train employees in the storage and handling of materials which can potentially cause soil contamination;
- (viii) Recover used oil and lubricants and reuse or remove from the site;
- (ix) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- (x) Conduct periodical ground water quality monitoring at construction camps/storage yard as per EMP and submit report to PIU
- (xi) Remove all wreckage, rubbish, or temporary structures which are no longer required; and
- (xii) Request PMU to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.

155. **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.

156. **Debris disposal.** There is an existing old and abandoned office building of PHED at proposed one CRMC site at PHED AEN campus. This building is required to be demolished for construction of CRMC at this site. A large amount of debris will be evolved due to this demolition, which will require proper mitigation measures to avoid disturbance and nuisance to working office and visitors to this office. Site for disposal of debris is given by Nagar palika. Prior to the commencement of demolition works, contractor shall identify a debris disposal site in consultation with the PIU and Consultant. Contractor will follow all the prescribed rules²¹ during construction and adhering to following criteria (including but not limited to)-

- (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 activities.
- (ii) The local governing body and community shall be consulted while selecting the site.
- (iii) Contractor shall prepare a construction and demolition waste management plan in pre-construction phase for safe disposal of construction and demolition wastes as per applicable rules and submit to Municipality through PIU for approval
- (iv) Debris disposal site shall be at least 200 m away from surface water bodies²².
- (v) No residential areas shall be located within 100 m downwind side of the site.
- (vi) The site is minimum 250 m. away from sensitive locations like hospitals, religious places, ponds/lakes or other water bodies.

157. Following mitigation measures are suggested for contractor before and during demolition works-

- Structures to be demolished should be wetted through water sprinkling to reduce dust emission.
- Appropriate site for storage and disposal of demolished materials should be selected prior to start of demolition activities with prior permission/approval of PIU/ULB.
- All the safety measures should be adopted during demolition activities.
- Debris should be removed on the same day in covered container and should be disposed at identified disposal site

158. **Traffic diversion and/or road closure-** If traffic diversion and/or road closure is required for the designed works, prior consent from traffic department will be required and prior information to affected areas and public should be disseminated through consultations by CAPC. Proper road signage and traffic aids should be provided at site. 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

²¹Construction and Demolition Waste Management Rules 2016 (

²² 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.

contractor will be required to:

- (i) Prepare and implement a Traffic Management Plan
- (ii) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;
- (iii) Schedule transport and hauling activities during non-peak hours 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 for provision of traffic aids if transportation activities cannot be avoided during peak hours; and
- (vii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.
- (ii) Maintain sufficient access to houses and shopkeepers (commercial establishments) during pipe laying work through metal sheets and temporary bridges
- (iii) Locate entry and exit points in areas where there is low potential for traffic congestion;

159. 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:

- (i) Inform the affected local population 1-week in advance about the work schedule
- (ii) Plan and execute the work in such a way that the period of disturbance/ loss of access are minimum.
- (iii) 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
- (iv) Excavate only that stretch in a day that could be finished in the same day by laying of pipes and backfilling

160. 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:

- (i) Inform the affected local population 1-week in advance about the work schedule
- (ii) Plan and execute the work in such a way that the period of disturbance/ loss of access are minimum.
- (iii) 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
- (iv) Excavate only that stretch in a day that could be finished in the same day by laying of pipes and backfilling

161. **Asbestos Containing Materials.** No Asbestos containing material (ACM) is designed to be used in the subproject construction. There are ACM in the existing water supply infrastructure.

162. 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. RUIDP has decided not to replace the existing pipes including AC pipes and lay new pipes. This will reduce risks of handling

and disposal of AC pipes. Further, 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),²³ 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 recognise 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.

Operation and Maintenance Impacts

163. Operation and Maintenance of the water supply system will be carried out by Nagar Palika through DBO contractor for 10 years O&M period. 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.

164. It has to be ensured that the contractor obtains the desired consents from RPCB for operation of Batching Plant, Hot mix Plant and DG Sets. Contractor will also ensure compliances to all the conditions as mentioned in the CTO.

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

166. Improper disposal of debris removed from trenches could cause inconvenience to public. Debris shall be collected in trucks and transported to the approved disposal site.

167. 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:

- Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
- Complete work in these areas quickly;
- 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.

²³ 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>

168. Biological hazards are among the environmental risks that may adversely impact the health and wellness of the workers and the community. Breakouts of diseases such as diarrhea, flu or pandemics such as the COVID19 shall be avoided. Designs and implementation of treatment systems shall ensure that disease-causing pathogens or viruses are disinfected and will not cause any health issues. The World Health Organization has released an interim guidance on Water, Sanitation, Hygiene and Waste Management for the COVID19 virus (see Appendix 29). Measures on managing wastewater and fecal waste and keeping water supplies safe is critical to avoid the start or spread of any disease.

169. The citizens of the Laxmangarh municipal area will be the major beneficiaries of the improved water supply, as they will be provided with a constant supply of better quality water, piped into their homes. This should improve the environment, should deliver major improvements in individual and community health and well-being. Diseases due to poor quality water, such as diarrhea and dysentery, should be reduced, 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.

VII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Overview

170. 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 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.

171. A three-tier consultation process has been adopted for Phase-IV project: 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 government and utility agencies responsible for provision of services, Laxmangarh Nagar Palika, 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.

Public Consultation

172. The public consultation and disclosure program is a continuous process throughout the project implementation, including project planning, design and construction. Socio-impact assessment (SIA) was conducted in August, 2018. Informal and formal consultations at the project sites at Laxmangarh were also conducted on August 15, 2018. (**Appendix 21**).

Consultation during Project Preparation

173. Institutional consultations were conducted with the Governmental Departments such as Local Self Government Department, Public Works Department, Pollution Control Board, Public Health Engineering Department, Laxmangarh Nagar Palika, etc. The project designals are formulated in consultation with Laxmangarh Nagar Palika and the proposals have been finalized only after certification of Nagar Palika and other stakeholders that the proposals suit the requirements of the ULB.

174. A SIA has been conducted in the town, covering sample households and nearby vendors to understand the basic characteristics of town, health status, and the infrastructure service levels, and also the demand for infrastructure services.

175. Focus-group discussions with residents and other stakeholders were conducted to learn their views and concerns. General public and the vendors along the project activity areas (roads) were also consulted during visits to the project sites.

176. It was observed that people are willing to extend their cooperation as the designed activities are aimed at enhancing 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 advance notice before construction and proper warning signs along the construction area to avoid accidents and inconvenience.

177. A town-level City Level Committee (CLC) has been formed in Laxmangarh City by Government orders. City Level Committee meeting was organized during the detailed design stage to which representatives of primary and secondary stakeholders were invited. City stakeholder committee meeting was organized in Laxmangarh on dtd. 26.05.2018 to discuss the matter of designed Water Supply works in Laxmangarh under the chairmanship of District Collector, Sikar in presence of consultants, RUIDP officials, PHED/ Municipal officials and other invitee members. Designed scope of works and technology was discussed in the meeting. The feedback and concerns of the stakeholders was taken into consideration for finalization of design and scope of works. The project was agreed by the committee for further course of action of RUIDP. Details of CLC meeting, minutes and photographs are attached in **Appendix 22**.

Consultation during construction

178. Prior to start of construction, Laxmangarh Nagar Paalika and PIU with the assistance of Consultants 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.

179. 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. Nagar Palika/PIU with the help of Community Awareness and Participation Consultant (CAPC) will organize public meetings 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.

Information Disclosure

180. Draft and Updated IEEs have already been disclosed on ADB and project websites. Executive summary of the IEE will be translated in the local language and made available at the offices of Nagar Palika, RUIDP PMU and PIU. Copies of summary will be provided to participants of city level workshop to be organized in Laxmangarh. 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 Nagar Palika/RUIDP after approval of the IEE by Government and ADB. Stakeholders will also be made aware of grievance register and redress mechanism.

181. Public information campaigns via newspaper/radio/TV, to explain the project details to a wider population will be conducted. Public disclosure meetings will be conducted at key project stages to inform the public about the progress and future plans. Prior to start of construction, the PIU will issue Notification on the start date of implementation in local newspapers. A board showing the details of the project will be displayed at the construction site for the information of general public.

182. 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 designed detours will be communicated via advertising, pamphlets, radio broadcasts, road signage, etc.

183. Project related information shall be disclosed through public consultation and making relevant documents available in public locations. PMU and PIUs shall provide relevant safeguards information in a timely manner, in an accessible place and in a form and languages understandable to affected person and other stakeholders. For illiterate people, other suitable communication methods will be used.

184. The following documents shall be made available at the offices of project agencies - PMU, PIU and Block level offices for public reference, and shall also be uploaded on respective websites.

- (i). Summary of project and draft IEE (in Hindi and English)
- (ii). Draft IEE Report (in English)
- (iii). Final IEE Report (in English)
- (iv). Updated/amended IEE (in English)
- (v). Corrective action plan prepared during project implementation (English)
- (vi). Semi-annual Environmental Monitoring Reports (English)

185. A concise summary of project and draft IEE report (in Hindi), providing all necessary details of designs, implementation arrangements, subproject locations, likely issues and mitigation and monitoring measures and grievance redress mechanism, shall be made available to the stakeholders at consultation meetings. This should also provide contact information of project agency. This summary shall also be displayed at the notice boards of PMU, PIU and other public places. During project implementation, relevant information about any major changes to project scope will be shared with beneficiaries, affected persons, vulnerable groups, and other stakeholders. Draft IEE has already been posted on ADB and RUDSICO website. Further, the following will be again posted on ADB website. PMU will send written endorsement to ADB for disclosing these documents:

VIII. GRIEVANCE REDRESS MECHANISM

Project Specific Grievance Redress Mechanism

186. A project-specific, three-tier grievance redress mechanism (GRM) covers both environment and social issues. The GRM will be established to receive, evaluate, and facilitate the resolution of affected persons' concerns, complaints, and grievances about the social and environmental performance at project level. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns related to the project. Assessment of the GRM designed and implemented for Rajasthan Urban Sector Development Program (RUSDP)²⁴ the system was effective in timely resolution of grievances in a transparent manner.²⁵ The multichannel, project-specific, three-tier GRM is functional at RUSDP, hence the design of GRM for RSTDSP takes into account the designed institutional structure for RSTDSP and the positive features and learnings from the previous GRM.²⁶

187. **Common GRM.** A common GRM will be in place for social, environmental, or any other grievances related to the project. Implementation of the resettlement plans/RIPPs/DDR/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.

188. Public awareness campaigns within entire ULB/Municipal area will ensure that awareness on grievance redress procedures is generated. The nodal officer- social/environment at field level through community awareness and public participation consultant (CAPPC) will conduct ULB/Municipal area-based awareness campaigns to ensure that poor and vulnerable households are made aware of grievance redress procedures and entitlements. Contractors will provide pamphlets to communities prior to start of works and billboards during construction. The pamphlets and billboards will include relevant environmental and social safeguards, GRM information, and contact details of key personnel from PIU and contractors.

189. Affected persons will have the flexibility of conveying grievances/suggestions by dropping grievance redress/suggestion forms in complaint/suggestion boxes that will be installed by project PIUs or by e-mail, by post, or by writing in a complaints register in ULB offices/complaints register

²⁴ The procedures followed for grievance redress during implementation of RUSDP Phase III included the project GRM and the pilot GRM software application (Smart Check) in Pali, the Sampark portal of Government of Rajasthan, and the Chief Minister's helpline. Complaints received through various channels were mostly minor and pertained to damage to existing water supply pipelines and disruption of water supply during construction, delays in road restoration, and pending new connections. Complaints related to damage to private property (compound walls/steps, etc.) were less in number. The grievances were mostly possible to resolve in coordination with the contractors. Complaints received were immediately referred by the CAPC/PMDSC supervision staff to the PIU Nodal officer (safeguards) and concerned engineer at PIU, who advised them on further action. Follow up with the contractor on complaint resolution was undertaken by PIU Nodal officer CAPC and PMDSC and final feedback sought from complainant upon resolution. Complaints requiring inter-departmental coordination were referred to the PMU for resolution, and feedback provided to complainant. The PMU kept regular track of grievances through Whatsapp and email alerts, ensuring registration and follow-up until resolution.

²⁵ Town-level grievance registration data indicates that a large number of grievances were registered, pointing to the effectiveness of the multi-channel GRM. No major grievance was received for RUSDP Phase III. The GRM helped smoothen the process of project implementation, hence the proposed architecture for the RSTDSP GRM remains similar, with some refinement, taking into account the changes in institutional setup proposed for project implementation.

²⁶ Continued logistics support at field level will be key to successful management of grievance redress under RSTDSP. The target date for establishment of the first level (PIU level) and second level (Zonal level) of GRM is before loan negotiation.

at contractor's work site²⁷ or by sending a Whatsapp message to the PIU²⁸ or by dialling the phone number of town level PIU/CAPPC or by dialling a toll-free number.²⁹ Any aggrieved person can also avail the facilities of online grievance monitoring system 'Rajasthan Sampark' portal to register their grievances which is a parallel mechanism of grievance registration, in addition to the project GRM.³⁰ 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 and feedback provided to the complainant on action/decision taken. The Safeguard and Safety Officer of town/city level PIU will have the overall responsibility for timely grievance redressal on environmental and social safeguards issues and for registration of grievances, related disclosure, with the assistance of project consultants. In case of grievances that are immediate and urgent in the perception of the complainant, the contractor, and officials of PIU with assistance from construction management and supervision consultants (CMSC) and CAPPC on-site will provide the most easily accessible or first level of contact for quick resolution of grievances. Contact numbers and names of the concerned PIU safeguard and safety officer, contractors, CAPPC and CMSC personal will be posted at all construction sites at visible locations.

- i. **1st level grievance.** The contractors, PIU Executive Engineer (EE)/Assistant Engineer (AE) designated as safeguard and safety officer (social and environment), CMSC (safeguard staff) and CAPPC can immediately resolve issues on-site, in consultation with each other and will be required to do so within 7 days of receipt of a complaint/grievance. If required, city level monitoring committee (CLMC)³¹ will be involved in resolution of grievances at the 1st level.
- ii. **2nd level grievance.** All grievances that cannot be redressed within 7 days at field/PIU level will be brought to the notice of Zonal PIU headed by Additional Chief Engineer (ACE). The ACE at zonal PIU will resolve the grievance within 7 days of receipt of complaint/grievance in discussion with the ASO, field level PIU, CMSC, CAPPC and the contractor.
- iii. **3rd level grievance.** All the grievances that are not addressed by Zonal PIU within 7 days of receipt will be brought to the notice of the PMU. Depending on the nature of grievance, the Project Officer (Social/Environment) at PMU will resolve the grievance within 15 days of receipt of grievance with necessary coordination of Zonal PIU and CMSC and guidance/instruction of Additional Project Director (APD-PMU).

²⁷ RUSDP piloted an online application based live GRM counter for resolution of public grievances over and above the usual process of grievance registration and redressal. This app based GRM - "RUIDP Smart Check" is available at Google play store (free of cost) and is operational. The RUIDP Smart Check "app" was launched in Pali town in July 2017 and is proposed to be scaled up in RSTDSP project towns. For persons without access to the application, the traditional channels will continue to be available.

²⁸ It is suggested for each PIU to have a dedicated whatsapp group for registration of grievances and receipt of quick feedback, to be followed by more formal communication.

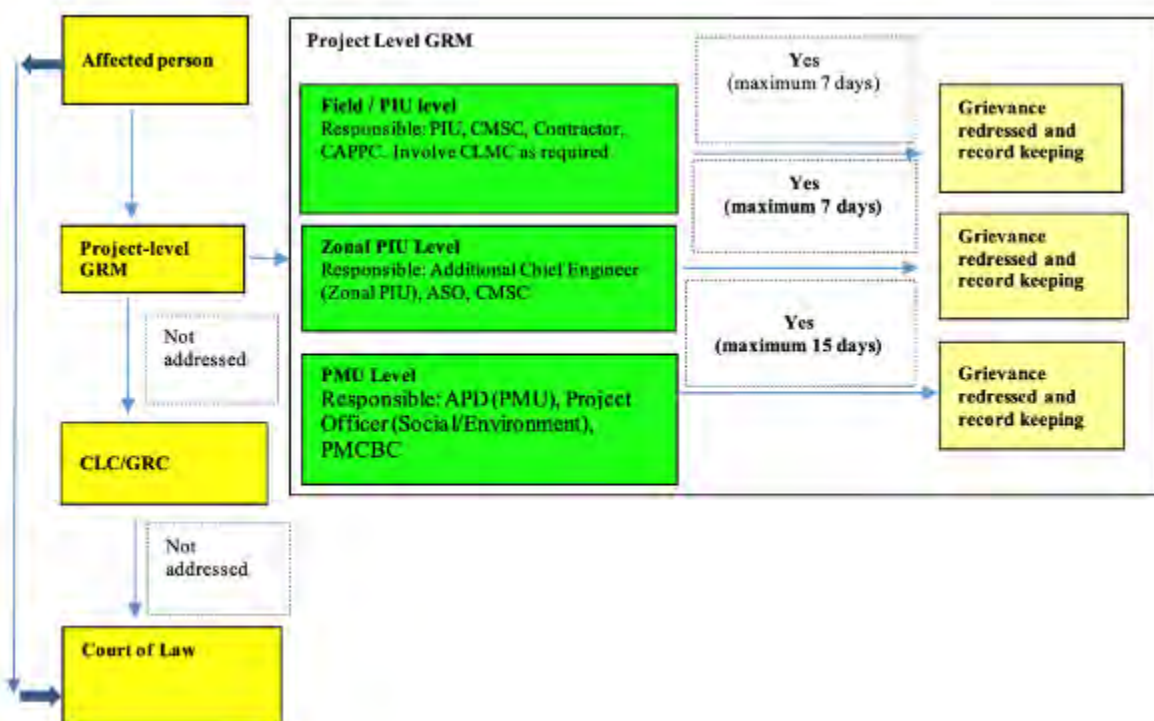
²⁹ Project contractors in all project towns will have a toll-free number with specific working hours for registration of grievances related to RSTDSP.

³⁰ <http://www.sampark.rajasthan.gov.in/RajSamWelcome.aspx>

³¹ The CLMC has been formed at the town/city level for planning and monitoring of work, resolve issues related to departmental coordination etc. It is headed by Commissioner/Executive Officer ULB (Chairman) and city engineer of public health engineering department (PHED), public works department (PWD) and head of PIU acting as Member Secretary.

- iv. Grievances not redressed through this process within/at the project level within stipulated time period will be referred to the CLC/GRC, which has been set up³² In its role as a GRC, the CLC will meet whenever there is an urgent, pending grievance. Other grievances can be discussed during its regular meetings. Zonal PIU will inform the CLC regarding any grievances required to be resolved urgently. The GRC will resolve the grievance within 15 days of receiving the complaint. In case of any indigenous peoples impacts in subprojects, the CLC/GRC must have representation of the affected indigenous people community, the chief of the tribe or a member of the tribal council as traditional arbitrator (to ensure that traditional grievance redress systems are integrated) and an NGO working with indigenous people groups.
- v. The multi-tier GRM for the project is outlined below (Figure 10), each tier having time-bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required. The GRC will continue to function throughout the project duration.

Figure 11: Grievance Redress Mechanism-RSTDSP



³² City Level Committee (CLC)/grievance redress committees (GRCs) has been constituted for each town/city under the Chairmanship of District Collector to provide overall subproject guidance and "to sort out issues and remove hindrances, if any". CLC formed at city-level/district level with members composed of: District Collector as Chairperson, and following as members: ULB Commissioner/Mayor/Chairman; Deputy Mayor/Vice Chairman ULB; Chairman / Secretary Urban Improvement Trust (UIT); Head of Zonal/field level PIU as Member Secretary; one representative each from relevant government departments as appropriate (PWD/PHED/Town Planning Department etc.). All CLCs in their role as GRCs will have at least one-woman member/chairperson. In addition, for project-related grievances, representatives of affected persons, community-based organizations (CBOs), and eminent citizens will be invited as observers in GRC meetings. The concerned Member of Parliament (MP) and Member of Legislative Assembly are also part of the CLC.

Note: APD = Additional Project Director, ASO = Assistant Safeguards Officer, CAPPC = community awareness and public participation consultant, CMSC = construction management and supervision consultants, CLC = city level committee, CLMC = city level monitoring committee, GRC = grievance redress committee, PIU = project implementation unit, PMU = program management unit, PMCBC = project management and capacity building consultant.

190. 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. In case of grievance related to land acquisition, resettlement and rehabilitation, the affected persons will have to approach a legal body/court specially designed under the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (RFCTLARRA), 2013³³.

191. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make an effort in good faith to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism³⁴.

192. **Record-keeping.** The PIU of each town/city will keep records of grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were affected and final outcome. The number of grievances recorded and resolved, and the outcomes will be displayed/disclosed in the PMU office, PIU offices, and on the web, as well as reported in monitoring reports submitted to ADB on a semi-annual basis. The sample grievance registration format is attached as **Appendix 23**.

193. **Periodic review and documentation of lessons learned** The PMU Project Officers (Social and Environment) will periodically review the functioning of the GRM in each town and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address grievances.

194. **Costs.** Contractors are required to allocated budget for pamphlets and billboards as part of the EMP. Costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the concerned PIU at town level while costs related to escalated grievances will be met by the PMU. Cost estimates for grievance redress are included in resettlement cost estimates.

IX. ENVIRONMENTAL MANAGEMENT PLAN

Environmental Management Plan

195. An Environmental Management Plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable level and monitoring the same. This is presented in the following tables, which show the potential environmental impacts, designed

³³ The Authority admits grievance only with reference to the Land Acquisition and R&R issues under the RFCTLARRA, 2013.

³⁴ Accountability Mechanism. <http://www.adb.org/Accountability-Mechanism/default.asp>.

mitigation measures and responsible agencies for implementation and monitoring.

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.

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

197. 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 to monitor implementation of this IEE and EMP. The contractor shall allocate budget for compliance with these EMP measures, requirements and actions.

198. The contractor has submitted to PIU, for review and approval, a site environmental plan (SEP) including (i) designed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEP; and (iv) budget for SEP implementation. No works can commence prior to approval of SEP.

199. The following tables 11 show the potential environmental impacts, designed mitigation measures and responsible agencies for implementation and monitoring.

Table 11: Design Stage Environmental Management Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation/ Monitoring	Cost and Source of Funds
Location impacts of designed components	Nearby community may be affected due to increased pollution during construction and operation	(i) Sites should be selected so that nearby community may have no or minimum impact due to proposed works	DBO Contractor/PIU	No cost required
Work site	Tree cutting	(i) Minimize removal of trees by adopting to site condition and with appropriate layout design of CWR or any other site with trees (ii) Obtain prior permission for tree cutting at CWR site or at any other site that may require tree cutting	DBO Contractor/PIU	Project cost

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation/ Monitoring	Cost and Source of Funds
		finalized during detailed design (iii) Plant and maintain 3 trees for each tree that is removed		
Design of water supply system	Non-compliance or non-adherence with the environmental considerations designed in preliminary designs during detailed design:	Ensure compliance with the following during the detailed design: (i) Adopting conjunctive use approach water source; utilizing feasible surface water sources and groundwater source optimally thereby reducing the existing groundwater abstraction to the extent possible (ii) Locating components and facilities appropriately by avoiding sensitive locations like forests and protected areas (environmentally, socially, and archeologically). (iii) Designing the entire system to maintain optimal flow and terminal pressure, and optimising the overall energy usage. (iv) Avoiding usage of asbestos containing materials. (v) Reducing the incidence of water borne diseases by providing 100% population including urban poor with potable water supplies (vi) Provision of appropriate personal protection equipment to the workers and staff	DBO Contractor / PMU	Project costs
Seismic sensitivity	Damage to infrastructure and potential risks: project area in moderate earthquake risk zone (Zone III)	(i) Designs of project component structures shall comply with relevant codes of design such as Bureau of Indian Standard (BIS) specifications for earthquake resistant design (IS: 1893: Criteria for earthquake resistant design of structures).	DBO Contractor/PIU	Project costs
Groundwater source	Source sustainability and over exploitation of groundwater	(i) Prepare a groundwater harvesting and artificial recharge plan; (ii) Creation of artificial recharge pits in public places / public buildings. Local body	DBO Contractor/PIU	Project costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation/ Monitoring	Cost and Source of Funds
		can issue a notification to this effect. (iii) Household level artificial recharge (like roof top rainwater harvesting) should be encouraged. (iv) Groundwater regulation – options to close / discontinue all the tube wells in houses used for domestic purposes in Laxmangarh in a phased manner once the project is implemented		
	Groundwater contamination	(i) Prepare a source protection plan for tube (ii) Ensure proper construction of tube wells including casing pipes to prevent water contamination from well spaces, and due to flooding (iii) Measures should be taken to control the open defecation, and to close all unsafe latrines (for example pit latrines). (iv) Awareness programs shall be conducted regarding the sanitation practices and its effect on groundwater quality	DBO Contractor and ULB/PIU	Project costs and ULB costs
Clear Water Reservoirs (CWRs)	Hazardous / harmful chemicals	(i) Establish proper handling / storage / application system according to the relevant standards, safety precautions and prevent accidental release / spill (ii) Provide ventilation, lighting, entry and exit facilities; visible and audible alarm facilities to alert chemical/chlorine leak (ii) Personal protection and safety equipment for the operators (masks, oxygen cylinders, gloves, etc.,) (iii) Provide training to the staff in safe handling and application of chemicals, material safety, and standard operating procedures and emergency responses (iv) Develop emergency	DBO Contractor/PIU	Project costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation/ Monitoring	Cost and Source of Funds
Asbestos cement (AC) pipes in existing water supply system: clearing, transfer and disposal; work in narrow streets, and interventions in existing AC pipelines	Health impacts due to air borne asbestos if handled unsafely, cut, drilled or broken into pieces	response procedures (i) Develop ACM Management Plan (AMP) that includes identification of hazards, the use of proper safety gear and disposal methods. Sample AMP is provided in Appendix 15. Adhere to the workflow process suggested in Figure 8. (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 (v) Identify risk of intervention with existing AC pipes. If there is significant risk, implement the AMP strictly that includes identification of hazards, the use of proper safety gear and disposal methods. (vi) Maintain records of AC pipes as per the AMP Refer to the instructions of the Asbestos Expert	DBO Contractor/PMU	Project costs
Preparation of plans and protocols	Various impacts	(i) Preparation of ACM Management Plan (ii) Prepare traffic management plan (iii) Prepare occupational health and safety plan (iv) Prepare spoils management plan	DBO Contractor and PMCBC (for ACM plan)	Approval of plans by PIU

Table 12: 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 with environmental subproject selection criteria	DBO Contractor, PIU and Laxmangarh Nagar Palika	PMU	No costs required
Environmental monitoring of baseline conditions of air, noise, water and soil	To establish base line environmental conditions	Environmental monitoring through NABL accredited laboratory	Construction contractor	Consultants /PIU	Contractor
Legal compliance	Environmental legal noncompliance may attract legal actions Failure to obtain necessary consents Permits, NOCs etc. can result to design revisions and /or stoppage of works	(i)Obtain all NOCs from competent authority etc. before start of construction works Ensure that all necessary approvals for construction to be obtained by contractor are in place before start of construction (ii)Following consents are required- Tree cutting-local authority Storage, handling and transport of hazardous materials- RSPCB Sand mining, quarries, borrow areas- Department of mines and Geology Traffic diversion/road cutting-local authority, traffic police (iii)Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs etc. (intake works) (iv)Include in detailed design drawings and documents all conditions and provisions; if necessary	PIU/Consultants in coordination of Nagar Palika	PMU	Prior to start of civil works responsibility of PIU. No Cost required

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
Utilities	Telephone lines, electric poles and wires, water lines within designed 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 16) and traffic management plan (Appendix 17)	DBO 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 16), and traffic management plan (Appendix 17)	No cost required. Mitigation measures are part of TOR of PMU, PIU and Consultant
Social and Cultural Resources	Ground disturbance can uncover and damage archaeological and historical remains	Develop a protocol for 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.	DBO Contractor and PIU	Chance Finds Protocol	No cost required. Mitigation measures are part of TOR of PIU and Consultant
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	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 landowner/s (not lessee/s) for reuse of excess spoils to agricultural land	No cost required. Mitigation measures are part of TOR of PIU and Consultant and also part of contractual terms

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		disposal to water body which will 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 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 as far as possible 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 PMU and (iii) If additional quarries will be required after construction is started, inform construction contractor to obtain a written approval from PIU.	DBO 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 TOR of PIU and Consultant and also part of contractual terms
Consents, permits, clearances, NOCs, etc.	Failure to obtain necessary consents, permits, NOCs, etc. can result to design	(i) Obtain all necessary consent, permission, clearance, NOCs, etc. prior to award of civil works. Following consents are required- Tree cutting- local authority	DBO Contractor and PIU and Consultant	Incorporated in final design and communicated to contractors.	No cost required. Cost of obtaining all consents, permits, clearances, NOCs,

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
	revisions and/or stoppage of works	Storage, handling and transport of hazardous materials- RSPCB Sand mining, quarries, borrow areas- Department of Mines and Geology Traffic diversion/road cutting- local authority, traffic police (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			etc. prior to start of civil works responsibility of PIU. Mitigation measures are part of TOR of PIU and Consultant
Asbestos materials in existing PHED campus & other Locations	Health impacts due to air borne asbestos if handled unsafely, cut, drilled or broken into pieces	(i) Coordinate and provide support to the asbestos management service provider on the requirement of sampling, testing and disposing existing asbestos material (ii) Coordinate and implement the the construction of the temporary storage per specification of the asbestos management service provider (iii) Provide support to the asbestos management service provider supervising the removal, transport, disposal and documentation of the asbestos materials	DBO Contractor/PIU/CMSC	ACM plan covering all these requirements	Project Cost

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		(iv) Conduct awareness workshops and trainings to stakeholders on the risks of the asbestos materials (v) Maintain records of asbestos materials inventory (vi) Ensure that handling and disposal of asbestos materials are carried out by specially trained service provider/s following Government of India requirements, or in their absence, internationally recognized procedures			

Table 13: 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	Irreversible impact to the environment, workers, and community	- Contractor is required to depute a qualified and experienced EHS officer/supervisor for monitoring of EMP implementation measures - Project manager and all key workers will be required to undergo 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	(i) Plan the work sites properly, and demarcate the sites for	Construction Contractor	(i) Location of stockpiles;	Cost for implementation

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
	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.	stockpiling of, soils, gravel, and other construction materials away from the traffic, vehicle, general worker movement to avoid disturbance of loose 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 contractor's vehicles and equipment should compulsorily have PUC and submit to PIU before deployment at site (vii) Obtain, CTE and CTO for batching plant, hot mix plant, crushers and DG set etc. if specifically established for this project. (viii) If contractor procures any material (such as ready mix concrete, asphalt/macadam, aggregates etc.,) from third party agencies, contractor shall ensure that such agencies have all necessary clearances / permissions as required under the		(ii) Complaints from sensitive receptors; (iii) Heavy equipment and machinery with air pollution control devices; (iv) Certification that vehicles are compliant with Air Act (v) Reports of air quality monitoring	of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		law; these include CTE/CTO from RSPCB, environmental clearance, etc.,; contractor shall collect the copy of these certificates and submit to PIU; PIU will approve the source only after all the certificates are submitted • (ix) Conduct air quality monitoring according to the Environmental Management Plan (EMP).			
Surface water quality	Works in rains/ 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 (ii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets; (iii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with PIU on designated disposal areas; (iv) Inspect all the drainage at construction site/construction camp/labor camp etc. and clear all the drainage lines so that no water stagnation/flooding may occur during heavy rainfall (v) As for a possible avoid trench works and excavation works (pipe laying) during monsoon season to avoid any water logging and accident due to it (vi) If open trenches are not avoidable during monsoon, keep ready all the mitigations measures to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades	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) Effectiveness of water management measures; (v) No visible degradation to nearby drainages, nallahs or water bodies due to civil works	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
		etc. (vii) Inspect and verify all the emergency measures and emergency control system before start of monsoon, keep the emergency response committee on high alert during monsoon/heavy rain fall (ix) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies; (x) Place storage areas for fuels and lubricants away from any drainage leading to water bodies; (xi) Dispose any wastes generated by construction activities in designated sites; and (xii) Conduct surface quality inspection according to the Environmental Management Plan (EMP).			
Ground Water Quality	Contamination of ground water quality due to spillage of oil and lubricants	• Prepare and implement a spills management plan; • Provide impermeable liner on the ground and place layer of mortar or concrete over it in the oil and lubricants storage areas, provide spillage trap in oil and lubricant store, use dip tray and pump to pour oil from oil and lubricant drums; • Dispose any oil contaminated wastes generated by construction activities in scientific manner; and • Conduct ground water quality monitoring according to the Environmental Management Plan (EMP).	Contractor	(i) Areas for storage of fuels and lubricants and waste materials; (ii) Number of oil traps installed in oil and lubricant storage areas; (iii) Records of ground water quality monitoring;	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
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/Consultant 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) Periodical monitoring of noise quality as per EMP	Construction Contractor	(i) Complaints from sensitive receptors; (ii) Use of silencers in noise-producing equipment and sound barriers; (iii) Equivalent day and nighttime noise levels (see Appendix 5 of this IEE)	Cost for implementation of mitigation measures responsibility of contractor.
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.	• Prepare and implement spoils management plan (Appendix 16); • Avoid stockpiling of excess excavated soils; • Coordinate with ULB/PIU 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;	Construction Contractor	• Complaints from sensitive receptors; • 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.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		- 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.			
Existing Infrastructure and Facilities	Disruption of service and damage to existing infrastructure at specified project location	- Obtain from PIU the list of affected utilities and operators if any; - 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 contractor.
Ecological Resources – Terrestrial	Loss of vegetation and tree cover	- Minimize removal of vegetation and disallow cutting of trees; - If tree-removal will be required, obtain tree-cutting permit from the Revenue Department; and - Plant three native trees for every one that is removed as per RUDSICO-EAP Circular.	Construction Contractor	PIU to report in writing the no of trees cut and planted.	Cost for implementation 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 water line works to minimize traffic disturbance/blockades; as the water lines are to be laid in all the road and streets in the town, work planning is crucial to minimize the inconvenience to public due to repeated excavations (ii) Prepare and implement a Traffic Management Plan (Appendix 17) (ii) Duly consider and select sections	Construction Contractor	(i) Traffic route during construction works including number of permanent signage, barricades and flagmen on worksite; (ii) Complaints from sensitive receptors; (iii) Number of signage 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
		for trenchless method of pipelaying based on traffic conditions (iii) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites; (iv) Schedule transport and hauling activities during non-peak hours; (v) Locate entry and exit points in areas where there is low potential for traffic congestion; (vi) Keep the site free from all unnecessary obstructions; (vii) Drive vehicles in a considerate manner; (viii) Coordinate with Traffic Police for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; (ix) 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. (x) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum. (xi) 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.			
Socio-Economic – Income.	Impede the access of residents and	(i) Prepare and implement spoils management plan (Appendix 16)	Construction Contractor	• Complaints from sensitive receptors;	Cost for implementation of mitigation

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
	customers to nearby shops	(ii) Leave spaces for access between mounds of soil; (iii) Provide walkways and metal sheets where required for people; (iv) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools; (v) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and (vi) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.		• Spoils management plan • Number of walkways, signages, and metal sheets placed at project location.	measures responsibility of contractor.
Socio-Economic – Employment	Generation of temporary employment and increase in local revenue	(i) Employ local labour force or to the maximum extent possible. (ii) Comply with labor laws	Construction Contractor	• Employment records; • Records of sources of materials • (iii) Compliance to labor laws (see Appendix 6 of this IEE)	Cost for implementation of mitigation measures responsibility of contractor.
Occupational Health and Safety	Occupational hazards which can arise during work	(i) Comply with all national, state and local core labor laws (see Appendix 6 of this IEE); Following best practice health and safety guidelines: IFC's General EHS Guidelines³⁵ and Sector Specific (Water and Sanitation) Guidelines³⁶ (ii) Develop and implement site-	Construction Contractor	(i) Site-specific OH and S Plan; (ii) Equipped first-aid stations; (iii) Medical insurance coverage for workers; (iv) Number of accidents;	Cost for implementation of mitigation measures responsibility of contractor.

³⁵<https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

³⁶ <https://www.ifc.org/wps/wcm/connect/e22c050048855ae0875cd76a6515bb18/Final%2B-%2BWater%2Band%2BSanitation.pdf?MOD=AJPERES>

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		specific occupational health and safety (OH andS) 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 musk and ear plugs; (c) OH andS Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents; (iii) Conduct work in confine spaces, trenches, and at height with suitable precautions and using standards and safe construction methods; do not adopt adhoc methods; all trenches deeper than 1.5 m shall be provided with safety shoring/braces; and avoid open cutting method for trenches deeper than 3.5 m by adopting trenchless technology (iv) Ensure that qualified first aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site; (v) Provide medical insurance coverage for workers; (vi) Secure all installations from unauthorized intrusion and accident risks; (vii) 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		(v) Supplies of potable drinking water; (vi) Clean eating areas where workers are not exposed to hazardous or noxious substances; (vii) record of H andS 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 disposal. • (xii) Compliance to core labor laws (see Appendix 6 of this IEE)	

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		should take necessary measures during summers including the following: (a) work schedule should be adjusted to avoid peak temperature hours (12 – 3 PM); (b) provide appropriate shade near the workplace; allow periodic resting and provide adequate water, and (c) provide necessary medicine and facilities to take care of dehydration related health issues (viii) Provide supplies of potable drinking water; (vi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances; (ix) Provide H andS 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; (x) 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; (xi) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; (xii) Ensure moving equipment is outfitted with audible back-up alarms; (xiii) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service			

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		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; (xiv) 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. (xv) Conduct regular health check-ups for workers (xvi) Provide periodical awareness camps and special trainings for workers for health issues and risks in construction sites (xviii) Provide proper solid and liquid waste management system in workers' campsite, separate from spoils and debris disposal, as their presence can add to existing waste volume at the project sites.			
Occupational and community health and safety	Hazardous working conditions due to presence of asbestos containing material / AC Pipes in work sites: clearing, transfer and disposal; work in narrow streets, and interventions in existing AC pipelines	(i) implement the ACM Management Plan (AMP) that includes identification of hazards, the use of proper safety gear and disposal methods. Sample AMP is provided in Appendix 15. Adhere to the workflow process suggested in Figure 8. (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	Construction Contractor	(i) Asbestos management plan preparation and implementation (ii) quantity and characteristics of asbestos containing material removed/handled and disposed safely	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
	Health impacts due to air borne asbestos if handled unsafely, cut, drilled or broken into pieces	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 (v) Identify risk of intervention with existing AC pipes. If there is significant risk, implement the AMP strictly that includes identification of hazards, the use of proper safety gear and disposal methods. (vi) Appropriate actions as defined in the Asbestos Management Plan will have to be adhered to (vii) Maintain records of AC pipes as per the AMP			
Community Health and Safety.	Traffic accidents and vehicle collision with pedestrians during material and waste transportation	(i) Trench excavation and pipeline works shall be conducted in a safe manner; if the allowing public movement along the work sites (pedestrians or vehicles as the case may be) is likely to cause safety risks, movement should be blocked temporarily and work shall be conducted; in such areas, conducting night work or working in small stretches to avoid blockage of traffic/movement no more than few hours in due consultation with the local community and ULB shall be planned (ii) All trenches deeper than 1.5 m shall be provided with safety shoring/braces; and avoid open cutting method for trenches deeper	Construction Contractor	(i) Traffic Management Plan; (ii) Complaints from sensitive receptors	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
		than 3.5 m by adopting trenchless technology (iii) Survey the surrounding vulnerable buildings for likely issues in structural stability / differential settlement during the excavation works (iv) Provide prior information to the local people about the (v) Plan routes to avoid times of peak-pedestrian activities. (vi) Liaise with PIU/ULB in identifying high-risk areas on route cards/maps. (vii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. (viii) Provide road signs and flag persons to warn of on-going trenching activities.			
Safety of sensitive groups (children, elders etc.) and other 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; 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	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
Night Works	Public inconvenience due to traffic diversion, disturbance due to excessive noise and access loss, occupational health and safety issues etc.	Prepare a night work protocol and obtain prior approval from PIU, and strictly implement and report on implementation of protocol during the workers; Contractors should have handheld noise level meter for measurement of noise during night hours Contractors should have handheld lux meter for the measurement of illumination during night hours Preferably electrical connection is available for running equipment otherwise soundproof/super silent Diesel Generator set should be available Sound level should not increase as prescribe by CPCB Illumination should be as prescribed in protocol 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 noisy activities like hammering, cutting, crushing, running of heavy equipment should be done in daytime and avoided in nighttime Workers engaged in night works should have adequate rest/sleep in daytime 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	Contractor	Night work plan / protocol submitted by contractor and approved by PIU/Consultant	Contractor

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		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 equipment 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 equipment 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 PIU/CMSC site engineers and contractor's safety personnel should closely monitor the safety of works continuously and noise and illumination levels on hourly basis and maintain photographic and video			

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		graphic records as well as register the observations. Night works should be stopped early in the morning at least one hour before start of pedestrian/traffic movement After completion of night works all the site should be cleaned and maintained obstruction free for daytime movement of vehicles and pedestrians Drivers and workers should be alert and responsive during night works All the wages to workers working in night hours should be as per the applicable labour acts Avoid any nuisance which may create problems to nearby habitants and work peacefully during night hours Night works should not be conducted near hospitals and during peak seasons such as peak tourist season, students' exam times etc.			
Work in narrow streets	will pose high risk to children and elders in the locality	(i) Conduct awareness program on safety during the construction work (ii) Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day (iii) 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 (iv) Trench excavation and pipeline works shall be conducted in a safe manner; if the allowing public			Responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		movement along the work sites (pedestrians or vehicles as the case may be) is likely to cause safety risks, movement should be blocked temporarily and work shall be conducted; in such areas, conducting night work or working in small stretches to avoid blockage of traffic/movement no more than few hours in due consultation with the local community and ULB shall be planned			
Construction camps and worker facilities	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) Provided temporary rest and eating area at all work sites (v) Ensure conditions of livability at work camps are always maintained at the highest standards possible; living quarters and construction camps shall be provided with standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation); thatched huts, and facilities constructed with materials like GI sheets, tarpaulins, etc., shall not be used as accommodation for workers; accommodation shall meet the IFC standards for workers accommodation which include:	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
		provision of safe housing, availability of electricity, plumbing, water and sanitation, adequate fire protection and dormitory/room facilities; accommodation shall be in the range from 10 to 12.5 cubic meters (volume) or 4 to 5.5 square meters (surface) per worker, a minimum ceiling height of 2.10 meters; a reasonable number of workers are allowed to share the same room – (standards range from 2 to 8 workers); workers with accompanying families shall be provided with a proper and safe accommodation (IFC benchmark standards for workers accommodation is provided in Appendix 19) (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 specially children are not allowed in any worksite at any given time.			
Social and Cultural Resources	Risk of archaeological chance finds	Strictly follow the protocol for chance finds in any excavation work; Request PIU or any authorized person with archaeological field training to observe excavation;	Construction Contractor	Records of chance finds	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
		(i) Stop work immediately to allow further investigation if any finds are suspected; (ii) Inform PIU if a find is suspected, and take any action they require ensuring its removal or protection in situ.			
Monsoon preparedness	Disruption of utilities and water logging in trenches	• As for a possible avoid trench works and excavation works (pipe laying) during monsoon season to avoid any water logging and accident due to it • if open trenches are not avoidable during monsoon, keep ready all the mitigations measures to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades etc. • Prepare and implement monsoon preparedness plan as per guidelines for safety during monsoon	Construction Contractor	Monsoon preparedness plan	Cost for implementation of mitigation measures responsibility of contractor.
Submission of EMP implementation report	Unsatisfactory compliance to EMP	• Appointment of supervisor to ensure EMP implementation • 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	• Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and • All excavated roads shall be reinstated to original condition. • All disrupted utilities restored • All affected structures rehabilitated/compensated	Construction Contractor	PIU/Consultant 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
		- The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. - 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. The contractor must arrange the cancellation of all temporary services. - 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 14: Environmental Management Plan of Anticipated Impacts during Operation

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and 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 25.	O & M contractor for 10 years and then Nagar Palika	Nagar Palika Laxmangarh	No costs required
Check for blockage and leakage problems reducing the water losses	It may affect the water supply system	Effectiveness of leak detection and water auditing to reduce the water losses Implementation of regular O&M schedules	O&M contractor for 10 years and then Nagar Palika	Nagar Palika, Laxmangarh	DBO contractor cost

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
Routine maintenance of CWR and other facilities to ensure delivery of safe drinking water	Health impact due to supply of unsafe drinking water in the system	Ensure periodical maintenance of WTP and cleaning of OHSRs, CWRs to ensure delivery of safe drinking water Periodical testing of treated water to ensure treated water quality meets the required standards	O& M contractor for 10 years and then Nagar Palika	Nagar Palika, Laxmangarh	O&M cost of contractor
Asset management	Reduction in NRW Increased efficiency of the system	Preparation of O & M Manual	O&M contractor for 10 years and then Nagar palika	Nagar Palika, Laxmangarh	DBO contractor cost

Table 15: Environmental Monitoring Plan of Anticipated Impacts during Construction

Monitoring field	Monitoring location	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 25	Weekly during construction	Contractor supervising staff, EHS officer and Safeguard specialist	No costs required
Tree cutting and plantation	CWR and pipe laying sites (if any)	Obtain permission from concerned authority for any tree cutting and plant trees in the ratio of 1:3 as per RUDSICO-EAP Circular	Weekly during construction	Supervising staff and safeguards specialist	(As per Table 16)
Ambient air quality	3 locations (CWR Site (2) Pipe laying near sensitive receptor,)	PM10, PM2.5, NO2, SO2, CO	Once before start of construction and quarterly (years 4 times) during construction	Contractor	Cost for implementation of monitoring measures responsibility of contractor (As per Table 16 and Appendix 18)
Ambient noise	3 locations (CWR Sites, Pipe laying near sensitive receptor)	Day time and night time noise levels	Once before start of construction and quarterly (years 4 times) during construction	Contractor	Cost for implementation of monitoring measures responsibility of contractor (As per Table 16 and Appendix 18)
Ground Water Quality	02 locations (CWR sites)	pH, TDS, Total Hardness, Zn, Chloride, Iron, Copper, DO, Manganese, Sulphate, Nitrate, Fluoride, Hg, Cadmium, Cr ⁺⁶ , Arsenic, Lead, Total Alkalinity, Phosphate, Phenolic compound	Once before start of construction and quarterly (years 4 times) during construction	Contractor	Cost for implementation of monitoring measures responsibility of contractor (As per Table-16 and Appendix 18)
Surface Water quality	Surface waters closer to any construction / campsites	pH, Turbidity, Total Hardness, DO, BOD, COD, Chloride, Hg, Iron, TDS, TSS, Calcium, Zn, Cr ⁺⁶ ,	Once before start of construction and quarterly (years 4 times)	Contractor	Cost for implementation of monitoring measures responsibility of contractor

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
		Magnesium, Copper, Manganese, Sulphate, Cyanide, Nitrate, Sodium, Potassium, Fluoride, Cadmium, Arsenic, Lead, Boron, Selenium, Aluminium, Total residual Chlorine	during construction		(Ref. Table-16 and Appendix 18).
Soil quality	2 locations (CWRs sites).	pH, Elect. Conductivity (at 25°C), Moisture (at 105°C), Texture (silt, clay, sand), Calcium (as CaO), Magnesium (as Mg), Permeability, Nitrogen (as N), Sodium (as Na), Phosphate (as PO ₄), Potassium (as K), Organic Matter, oil and grease	Once before start of construction and quarterly (yearly 4-times) during construction	Contractor	Cost for implementation of monitoring measures responsibility of contractor (As per Table 16 and Appendix 18).

Table 16: 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	Parameters as per drinking water standards (IS 10500-2012)	Monthly Once	O and M contractor for 10 years and then Nagar Palika	O&M Contractor/ Nagar Palika
Treated water quality	CWRs	Parameters as per drinking water standards (IS: 10500- 2012)	Monthly once	O and M contractor for 10 years and then Nagar Palika	O&M Contractor/ Nagar Palika
Reduction of NRW	Pipe line networks	As per RUDSICO-EAP norms	Daily/when required	O&M Contractor	DBO contractor Cost
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	Daily/ when required	O&M Contractor	DBO contractor Cost

Institutional Requirements

200. The Local Self Government Department (LGSD) is the executing agency which will be responsible for the overall strategic guidance and ensure the compliance with ADB loan covenants. RUDSICO is the implementing agency responsible for the technical supervision and project implementation. The RUDSICO Board (under the chairmanship of the Honorable Minister), the LGSD and the City Level Monitoring Committees (CLMCs, under the chairmanship of their respective Commissioner / Executive Officer) is designed to monitor the project implementation. The Project Management Unit (PMU) is at state-level and headed by a dedicated Project Director. The Project Implementing Units (PIUs) have two zonal offices (1 in Jaipur and 1 in Jodhpur). Each zonal office will be headed by an Additional Chief Engineer. Urban Local Bodies (ULBs) will be the final custodian and user of the created infrastructure. As primary stakeholders, the ULBs will be involved and engaged in the day-to-day monitoring and implementation.

201. At the PMU level, the Project Director shall be supported by Additional Project Director (Chief Engineer-level) and a Chief Engineer, who shall then be supported by Dy Project Director and a Financial Advisor. There shall be one Project Officer for Social and another Project Officer for Environmental aspects of the project.

202. The PMU shall be supported by the Project Management and Capacity Building Consultants (PMCBC). The PMCBC shall manage preparation/vetting design documents, tendering of contracts, implementation of resettlement, environmental management and gender action plans; setting and managing project performance monitoring systems, planning and managing implementation of training and capacity building as well as institutional strengthening activities besides preparing reports as per ADB requirements. PMCBC shall engage a social safeguard specialist and environmental safeguard specialist at the PMU level for managing all social and environmental safeguard related support services as envisaged in its scope of work. They will be assisted by concerned field level safeguard support staffs of Construction Management and Supervision Consultants (CMSCs) and PIU.

203. PMCBC shall be joined by the following specialists to address site-specific environmental requirements as below:

- i. Environment Specialist Consultant – responsibilities include the review and refinement of the IEEs and the EMPs and ensure inclusion in the bid documents and during construction, monitor the implementation of the EMPs and support in the reporting and documentation requirements.
- ii. Asbestos Management Specialist – provides training and awareness on the risks and safe handling and management of asbestos-containing materials (ACMs) and to coordinate with the Asbestos Management Service Provider in the implementation of the Asbestos Management
- iii. Heritage Management Specialist – provides guidance on the ADB SPS requirement on Physical Cultural Resources in the RSTDSP towns including the conduct of Heritage Impact Assessment, provides support on the statutory clearances to be obtained and the documentation and reporting on the implementation of mitigation measures
- iv. Biodiversity Expert – provides guidance on the ADB SPS requirement on Biodiversity Conservation and Critical Habitat Assessment including the conduct preliminary screening (e.g. IBAT assessment reports), on-site verifications and consultations, recommend specific measures and provide supervisor support during the planning and construction periods
- v. Architect - assists the team leader and structural expert for review and approval of all drawings from architectural and heritage perspective; review and approve the

detailed architectural drawings prepared by the Contractor and promptly address any site-specific issues regarding architectural and heritage aspects.

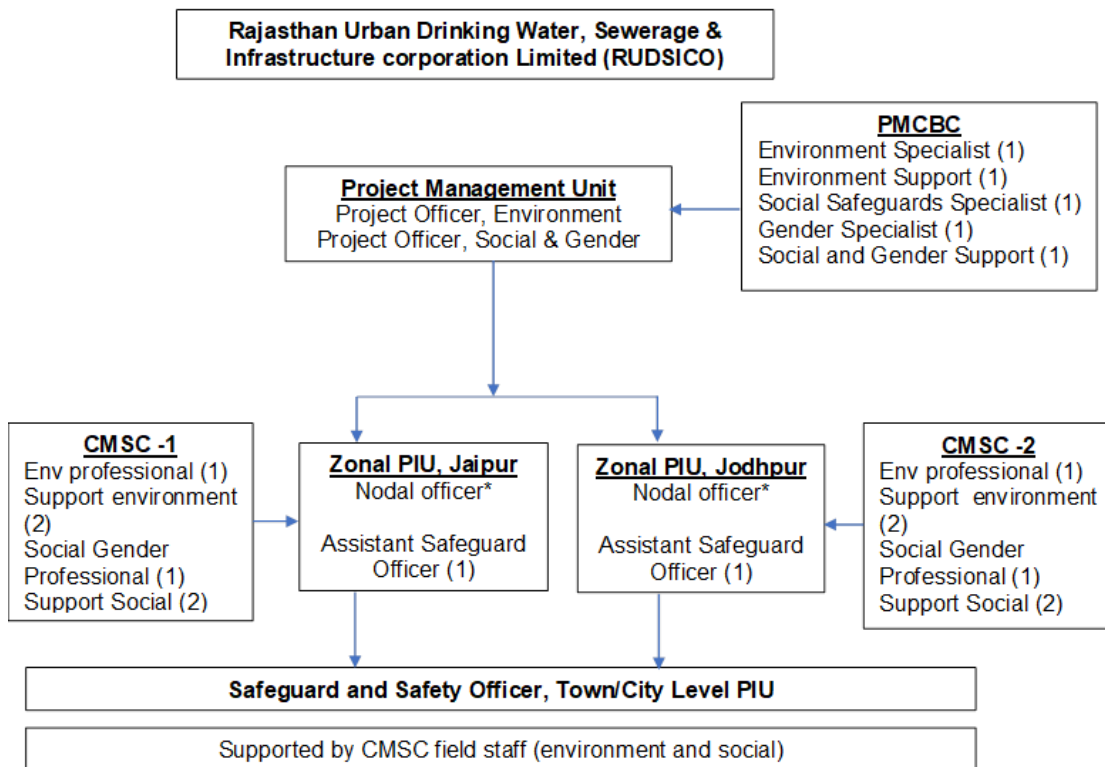
204. There will be two zonal PIUs and a PIU at every town. PIUs at the town-level shall be headed by a Superintending Engineer / Executive Engineer, who shall work as Project Manager and shall sign the contract documents, manage the contract and disburse payments as Drawing and Disbursing Officer.

205. Construction Management and Supervision Consultants (CMSC) - 2 nos catering to Jaipur and Jodhpur units. They shall directly support PIUs in day to day contract management, construction supervision including quality management of ongoing works etc. This shall include work measurement, quantities, verification of bills of contractors etc. In compliance with the EMP, the CMSC shall develop a strategy to overcome the difficulties of construction/traffic management in narrow streets and also prepare detailed plans for detour of traffic during excavation for pipe laying. The CMSC will design and implement mechanism for coordination among all stakeholders such as traffic police, roads department, user committees, etc, for smooth construction execution. Adequate measures shall be taken for working near physical cultural resources involving close coordination with the Department of Archaeology. The CMSC will lead design of surveys and investigations required for the protection of archaeological sites / heritage areas and prepare Archaeological Impact Assessments, or other agreed upon document to be approved by the Department of Archaeology for the archaeologically sensitive locations;

206. Community Awareness and Public Participation Consultants (CAPPC) will closely work in the field (with PIUs) to facilitate creation of project awareness and ensuring public participation for all project works at the community level. This shall mainly involve house connections for water supply and metering. CAPPC shall also undertake various IEC activities to promote and pursue health and hygiene among the communities.

207. Table 17 and 18 summarize the institutional responsibility of environmental safeguards implementation at all stages of the project.

Safeguard Organogram – RSTDSP



*Zonal PIU will be led by a nodal officer of the rank of assistant chief engineer who will also be the nodal person for safeguards and gender compliances in project implementation by town level PIUs. S/he will be supported by ASO in execution of these responsibilities.

Figure 12. Safeguards Implementation - RSTDSP

208. **Project Management Unit.** RUDSICO will establish a state-level PMU, headed by dedicated project director, and housed in EAP division of RUDSICO. For the purpose of project implementation, two Zonal Project Implementation Units (Zonal PIUs), at Jaipur and Jodhpur, headed by Additional Chief Engineers (ACE) will be established. At PMU, there will be two dedicated project officers (i) Project Officer (Environment) and (ii) Project Officer (Social and Gender), who will be responsible for compliance with the environmental, social safeguards and gender in program implementation. Key responsibilities of the Project Officer (Environment) are as follows:

- i. Review REA checklists and assign categorization based on ADB SPS 2009 and EARF
- ii. Submit IEE to ADB for approval and disclosure in ADB website
- iii. Ensure approved IEEs are disclosed in RSTDSP/PMU websites and summary posted in public areas accessible and understandable by local people.
- iv. Ensure EMPs are included in the bid documents and contracts
- v. 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 laws and 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.
- vi. Assist in addressing any grievances brought about through the GRM
- vii. 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.

- viii. Ensure compliance with all government rules and regulations regarding site and environmental clearances as well as any other environmental requirements
- ix. Assist PMU, PIUs, and project consultants to document and develop good practice construction guidelines to assist the contractors in implementing the provisions of IEE and EMP.
- x. Assist in the review of the contractors' implementation plans to ensure compliance with the IEE.
- xi. Review monthly monitoring reports submitted by PIUs, and prepare and submit to ADB semi-annual monitoring reports
- xii. If necessary, prepare Corrective Action Plan and ensure implementation of corrective actions to ensure no environmental impacts;
- xiii. Review and submit Corrective Action Plans to ADB
- xiv. Coordinate with national and state level government agencies
- xv. Coordinate PIUs, consultants and contractors on mitigation measures involving the community and affected persons and ensure that environmental concerns and suggestions are incorporated and implemented

209. The PMU will be supported by three institutional consultants under the supervision and control of PD, PMU: (i) the Project Management and Capacity Building Consultants (PMCBC) will support the PMU; (ii) 2 Construction Management and Supervision Consultants (CMSC) will support the 2 zonal PIUs and town-level PIUs; and (iii) Community Awareness and Public Participation Consultants (CAPPC), will support the zonal PIUs and town-level PIUs.

210. **Zonal Project implementation units (Zonal PIUs).** There are two zonal level PIUs at Jaipur and Jodhpur. Under each zonal PIU, there will be city/town level PIUs, for ease of day-to-day monitoring and management at local level. The Additional Chief Engineer at each Zonal PIU will serve as the Nodal Officer, Safeguards and Gender. Each Zonal PIU will be staffed with an assistant safeguards officer (ASO Environmental and Social Safeguards) who will assist PMU project officer (environment/social) in implementation of the environmental/social safeguards and GESI Action Plan in PIUs under its jurisdiction. Zonal PIUs will undertake internal monitoring and supervision and record observations throughout the project period to ensure that the safeguards and mitigation measures are provided as intended.

211. The zonal level Assistant Safeguards Officer will oversee safeguards implementation by the city/town level PIUs, coordinate public consultations, information disclosure, regulatory clearances and approvals, implementation of resettlement plans, EMP implementation, and grievance redressal. Key safeguard tasks and responsibilities of the zonal PIU Assistant Safeguards Officer (Environment) are as follows:

- i. Coordinate updating/revision of IEEs updated based on detailed design and technical studies (asbestos management, heritage impact assessment, and/or biodiversity assessment);
- ii. Review and submit approved updated/revised IEE to PMU;
- iii. Ensure relevant information in the IEE is disclosed to stakeholders;
- iv. Obtain all necessary clearances, permits, consents, NOCs, etc. Ensure compliance to the provisions and conditions;
- v. Ensure EMP requirements for pre-construction regarding sites for disposal of wastes, camps, storage areas, quarry sites, etc. are complied and communicated by town-level PIUs to contractors in a timely manner;
- vi. Support town-level PIUs in supervising contractor EMP implementation. If necessary, organize an induction course upon mobilization of contractors, preparing them on EMP implementation, environmental monitoring requirements related to mitigation measures, and on taking immediate action to remedy unexpected

- adverse impacts or ineffective mitigation measures found during the course of implementation;
- vii. Coordinate actions required for obtaining rights of way in timely manner;
- viii. Take corrective actions when necessary to ensure no environmental impacts;
- ix. Consolidate monthly environmental monitoring reports by town-level PIUs and submit to PMU;
- x. Formulate timebound corrective actions for non-compliances
- xi. Conduct continuous public consultation and awareness;
- xii. Address any grievances in a timely manner as per the GRM; and
- xiii. Issue clearance for contractor's post-construction activities as specified in the EMP.

212. Town/City Level Project Implementation Unit (PIU). The town-level PIUs shall be responsible for the quality of works executed under the project and will be guided by the zonal PIUs. The city/town PIUs will be responsible for implementation of the IEE. The town-level PIUs will be headed by a Project Manager [Executive Engineer (EE) or Assistant Engineer (AE)] and supported by CMSC field staff. Environment Specialist of CMSC will assist PIU in implementation of environmental safeguard. At each PIU, the Assistant Project Manager will be given additional responsibilities of safeguard tasks and will be designated as Safeguard and Safety Officer (SSO). The SSO will be assisted by the Social and Gender Specialist and Environment Specialist of CMSC in reviewing updated/revised IEEs, etc. They will also be responsible for coordination of field level activities related to safeguards conducted by the DBO contractor and CMSC. Key responsibilities of the town-level Environment Specialist are as follows:

- i. Prepare REA Checklists, No Mitigation Checklists, baseline environmental surveys to support screening and categorization per EARF;
- ii. Submit designed subproject categorization to Zonal PIU and coordinate with PMCBC the preparation of IEE and technical studies;
- iii. Coordinate the conduct of technical studies such as but not limited to inventory of asbestos materials in subproject sites, heritage impact assessment and/or biodiversity assessment;
- iv. Ensure IEEs are updated/revised based on detailed design and recommendations of technical studies;
- v. Oversee day-to-day implementation of EMPs by contractors, including compliance with all government rules and regulations;
- vi. Take necessary action for obtaining rights of way;
- vii. Take corrective actions when necessary to ensure no environmental impacts;
- viii. Submit monthly environmental monitoring reports to Zonal PIUs;
- ix. Conduct continuous public consultation and awareness;
- x. Address any grievances in a timely manner as per the GRM; and
- xi. Issue clearance for contractor's post-construction activities as specified in the EMP.

213. Contractors. The contractor will be required to update the IEE and will be responsible for providing final design (including pipe alignments) to the supervision consultant for finalization/updating of resettlement plan. The contractor shall appoint an Environment, Health and Safety (EHS) Engineer who will be responsible on a day-to-day basis for (i) ensuring implementation of EMP, (ii) coordinating with the Town-level PIUs and environment specialists of project consultant teams; (iii) community liaison,⁴³ consultations with interested/affected people, (iv) field-level grievance redress; and (iv) reporting.

214. The Contractor has submitted environmental management plan (SEMP) to RUDSICO, for review and approval, a site-specific including (i) designed sites or locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program per SEMP; (iv) budget for SEMP implementation. No works can commence prior to approval of SEMP.

215. A copy of the EMP or approved SEMP will be kept on-site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP or SEMP constitutes a failure in compliance and will require corrective actions. The EARF and the IEEs specify responsibilities in EMP implementation during design, construction and O&M phases.

216. **RUDSICO** will ensure that bidding and contract documents include specific provision requiring Contractors to comply with: (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste and (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS, to employees and local communities surrounding the project sites.

Table 17: Safeguards Management Roles and Responsibilities

Implementation Arrangements	Roles and Responsibilities
Executing Agency: LSGD through RUDSICO	• Negotiate, sign, and execute the program. • Allocate and release government counterpart funds on time. • Facilitate obtaining timely Government-level approvals for smooth implementation of the program. • Monitor program implementation progress and ensure timely actions for completion of the project. • Plan, implement, and monitor public relations activities; gender mainstreaming initiatives and community participation activities, with the support of PIUs.
RUDSICO Board (like SLEC) Chairman: Minister of Urban Development Department, GoR Members: Hon'ble Minister, LSGD Secretary, LSGD – Vice Chairman Principal Secretary, PHED - Director Principal Secretary, PWD - Director Secretary, Finance (Budget) Department -Director Director, Department of Local Bodies Executive Director, RUDSICO Project Director, RUDSICO Independent Director Independent Director	• Provide strategic guidance. • Provide policy decisions to support smooth program implementation. • Facilitate inter-departmental coordination and cooperation. • Support RUDSICO with government/ministerial level approvals. • Overall project review (physical, financial, safeguards) • Approvals/Decisions as per approved SOP (Standard Operating Procedures – laying delegation of powers, Administrative and Financial Approval of works and services)
RUDSICO (with approval of RUDSICO board, as needed)	• Required support to review and monitor the physical and financial progress of the subprojects. • Provide additional technical support from RUDSICO Office (along with PMCBC) to PIUs for speedy resolution of implementation related issues such as variations, deviations, time and cost control, among others. • Provide backup technical support for review and finalization of DPRs, bid documents, bidding and award of contracts. • Review, appraise and put up matters to RUDSICO Board for approval, as described under “Delegation of Powers” • Overall Liaison, Monitoring and Reporting to DEA and ADB as per agreed requirements

	Pursue GoR, through LSGD for approval of Policy, Rules, Guidelines, Government Orders for use in the state
Program Management Unit Program Director: Project Director, RUDSICO Additional Project Director, RUDSICO <u>PMU Staff</u> 2 Zonal Additional Chief Engineers (Jaipur and Jodhpur). The Office of ACE to have Two EE, Two AE, Computer Operator, Support staff Dy. PD(T) (Procurement, Tendering, Contracts, Consultancies) at RUDSICO HQ Dy. PD(A) (Administration, Institutional) at RUDSICO HQ SE's (Asset Management, NRW, Safeguards, Resettlement) at RUDSICO HQ Financial Advisor at RUDSICO, Jaipur HQ Senior Accounts Officer at RUDSICO, Jaipur HQ PMU at HO supported by: Project Officers (7 Nos. EE level with POs for Procurement and contracts; NRW Reduction; Contract Management and O&M, Social Safeguards, Environmental Safeguards, Capacity Building etc.) Accounts officers Assistant Project Officers – on each with PO – AE level, Assistant Account Officer IT Cell (project Management and Monitoring, GIS, MIS etc.) with MIS Expert Statistical Unit Legal Unit Administration and Establishment	Program and Financial Management - Overall responsibility of the investment program and financial management and administering program procedures and guidelines. - Oversee design of all projects (in individual tranches as needed). - Finalize the DPRs for ULBs/implementing agencies and obtain approval from ADB and government. - Establish project management and monitoring systems (Command and Control Center) - Undertake project appraisals based on technical, financial, economic and safeguards compliance as agreed by GoR/RUDSICO and ADB. - Provide overall technical and implementation guidance to the PIUs as required. - Facilitate approval of various implementation related requests from the Project Implementation management and Field Units - Sign key documents including withdrawal applications and audit reports. - Timely submission of any withdrawal applications. - Act as focal point for communication with the ADB. - Ensure compliance with loan covenants, ADB's guidelines, procedures and policies. - Facilitate ADB program review missions. - Represent the program at Tripartite Review Meetings. Safeguards compliance - Review and monitor safeguards compliance by PIUs and support corrective actions as necessary. - Submit semi-annual safeguard monitoring reports to ADB - Guide PIUs as and when necessary on safeguards compliance, and arrange capacity building for PIUs - Capacity Building and Institutional - Allocate funds for capacity building and arrange required disbursements - Approve and Monitor Capacity Building Plan - Pursue reforms with GoR - Supervise and Monitor PMCB Consultants and approve their invoices
Project Implementation Units 2 zonal PIUs (1 in Jaipur, 1 in Jodhpur)	Project Management Responsible for implementation management of sub-projects.

<u>PIU Staff</u> Project Manager (SE level) Executive Engineer / Assistant Engineer (2 or 3) at each town for monitoring and supervision support Assistant Accounts Officer Computer Operator Support Staff Supported by Contract Management Officer (SE/EE of cluster shall invariably function as contract management officer) - No new position – CMSC and CAPP Consultants (2 support engineers of CMSC at each town as per CMSc consultancy, 2 community mobilizers for each town – as per CAPP consultancy) besides required consultancy professionals reporting to EE)	- Responsible for day-to-day implementation, monitoring and reporting. Safeguards Compliance (with CAPP) - Ensure compliance with safeguard frameworks and plans - Facilitate consultation with stakeholders and disclose program information in consultation with PMU. - Address grievances (may be through Grievance Redressal Mechanism) Coordinate land acquisition actions, if required. - Submit quarterly safeguard monitoring reports to PMU. Advance Project Preparation - Prepare/supervise and monitor preparation of DPRs and bidding documents for future tranches.
ULBs	- Nodal Officers to be a part of PIU and discharge the assigned functions and part of project planning and implementation - Establish liaison with local communities, resolve local grievances for smooth implementation of the project - Support CAPP in awareness creation, connection modalities to household consumers etc.
Asian Development Bank	- Approve and monitor safeguards documents and implementation compliance. - Field review missions. - Facilitate knowledge sharing. - Provide training in program management and ADB procurement procedures to PMU/PIU staff. - Support LS GD, RUDSICO, PIUs etc. through various capacity building activities.

Table 18: Institutional Roles and Responsibilities for Environmental Safeguards Implementation

Responsible Agency	Responsibility		
	Pre-Construction Stage	Construction Stage	Post-Construction
PMU (Project Officer; Environment),	(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) Ensure approved IEEs are disclosed in RSTDSP/PMU websites and summary posted in public areas accessible and understandable by local people.	(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	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
	(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 laws and 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) Ensure 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. (xi) Assist in the review of the contractors' implementation plans to	corrective actions to ensure no environmental impacts; (iii) Review and submit Corrective Action Plans to ADB (iv) Organize capacity building programs on environmental safeguards (iv) Coordinate with 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 (ix) Coordinate PIUs, consultants and contractors on mitigation measures involving the community and affected persons and ensure that environmental concerns and suggestions are incorporated and implemented	

Responsible Agency	Responsibility		
	Pre-Construction Stage	Construction Stage	Post-Construction
	ensure compliance with the IEE.		
PIU, Assistant Safeguard Officer	(i) Ensure IEE is included in bid documents and contract agreements. Ensure cost of EMP implementation is provided. (iv) Disclose of approved EIAs/IEEs. (v) Obtain all necessary 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) Organize an induction course for the training of contractors, preparing them on EMP implementation, environmental monitoring requirements related to mitigation measures, and on taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation.	(i) oversee day-to-day implementation of EMPs by contractors, including compliance with all government rules and regulations. (ii) take necessary action for obtaining rights of way; (iii) oversee implementation of EMPs, including environmental monitoring by contractors; (iv) take corrective actions when necessary to ensure no environmental impacts; (v) submit monthly environmental monitoring reports to PMU, (vi) conduct continuous public consultation and awareness; (vii) address any grievances brought about through the grievance redress mechanism in a timely manner as per the IEEs; and	(i) Conducting environmental monitoring, as specified in the EMP. (ii) Issuance of clearance for contractor's post-construction activities as specified in the EMP.
Consultant – 1.PMCBC-Environmental Safeguard Specialist – 1 no. Asbestos Expert – 1no. Heritage Expert – 1no. Biodiversity Expert – 1no.	(i) Review IEE/EMP submitted by CMSC and revise report to submit to PMU (ii) Assist PMU and 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. (iv) Assist in determining adequacy of cost for EMP implementation. (v) Assist in addressing any concern related to IEE and EMP. (vi). Conduct specific assessment requirements	(i) Monitor EMP implementation (ii) Assist in addressing any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.	

Responsible Agency	Responsibility		
	Pre-Construction Stage	Construction Stage	Post-Construction
Consultant-2. CMSC-2 nos. Environmental safeguards professional	(i) Update initial environmental assessment for designed project using REA checklists and submit to PIU/PMCBC (ii) Assist in summarizing IEE and translating to language understood by local people.	i. Monitoring of Implementation of EMP at site by contractor ii. Recommend corrective action measures for non-compliance by contractors iii. Assist in the review of monitoring reports submitted by contractors iv. (iv) Assist in the preparation of monthly monitoring reports v. conduct continuous public consultation and awareness;	(i) Assist in the inspection and verification of contractor's post-construction activities.
Contractors (EHS Engineer)	(i) Review the IEE and provide information about changes needed as per revised design and scope of works to ESS of PMCBC for final revision of IEE (ii) Prepare EHS plan and take approval from CMSC/PIU and Ensure EMP implementation cost is included in the methodology. (iii) Undergo EMP implementation orientation by ESS of supervision consultant prior to start of works (iv) Provide EMP implementation orientation to all workers prior to deployment to worksites (v) Seek approval for camp sites and sources of materials. (vi) 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) Comply 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. 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/SO are timely informed of any foreseeable activities related to EMP implementation.	(i) Ensure EMP post-construction requirements are satisfactorily complied (ii) Request certification from PIU

Training Needed

217. The following Table 19 presents the outline of capacity building program to ensure EMP implementation. The estimated cost is Rs.475,000 (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 PMCBC

Table 19: 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 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, 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	All staff and consultants involved in the Town subproject All contractors prior to award of contract At PIU, Laxmangarh	INR 50,000 (Lump sum)	PMU cost
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 and consultants involved in the project All contractors prior to award of contract or during mobilization stage. At PIU Laxmangarh	Lump sum INR25,000 (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 and consultants involved in the project All contractors All NGOs At PMU Jaipur	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)

Summary of Capacity Building cost for EMP Implementation

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

Monitoring and Reporting

218. Prior to commencement of the work, the contractor will either submit a compliance report to PIU ensuring that all identified pre-construction environmental impact mitigation measures as detailed in the EMP will be undertaken or will provide EMP for the designed works with his Service Improvement Plan (SIP) covering all the requirements designed in this IEE. PIU with the assistance of the ASO and ESS of Consultants will review the report and thereafter PMU will allow commencement of works.

219. During construction, results from internal monitoring by the contractor will be reflected in their monthly EMP implementation reports to the PIU and Assistant Construction Manager of Consultants. 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.

220. Quarterly report shall be prepared by CMSC and PIU, and submitted to PMU for review and further actions.

221. Based on monthly reports and measurements, PMCBC will draft six-monthly reports, and submit to PMU for their review and further submission to ADB (Appendix 26). Once concurrence from ADB is received, the report will be disclosed in the project website.

222. ADB will review project performance against the project 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.

EMP Implementation Cost

223. 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. There are some of the provisions in bid documents like compliance of the requirements of health and safety during construction works as per applicable labor laws, labor insurance, equipment fitness, provision of labor welfare facilities, healthcare facilities etc. which are unanimously bound to contractor bidding for the project therefore it is understood that costs for such requirements are bound to contractor and no need to consider as cost of EMP implementation. 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. Following **Table-20** gives the major cost of implementation of EMP during construction.

Table 20: 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	Ha.	0.05	137200	6860	Civil works contract
	Subtotal (A)					6860	

	Particulars	Stages	Unit	Total Number #	Rate (INR)	Cost (INR)	Costs Covered By
B.	Monitoring Measures#						
1	Air quality monitoring**	Pre-construction/ Construction (Quarterly)	Each	27	4920	132840	Civil works contract
2.	Noise levels monitoring**	Pre-construction/ Construction (Quarterly)	Each	27	1980	53460	Civil works contract
3	Ground Water**	Pre-construction/ Construction (Quarterly)	Each	18	6720	120960	Civil works contract
4	Soil Testing**	Pre-construction/ Construction (Quarterly)	Each	18	5880	105840	Civil works contract
	Subtotal (B)					413100	
C.	Capacity Building						
1.	Introduction and sensitization to environment issues	Pre-construction	lump sum			100000	PMU Cost
2.	EMP implementation	Construction	lump sum			50000	PMU Cost
3.	Plans and Protocols	Construction	lump sum			25000	PMU Cost
			lump sum			25000	Civil works contract
4.	Experiences and best practices sharing	Construction/ Post-Construction	lump sum			100000	PMU Cost
5.	Contractors Orientation to Workers on EMP implementation	Prior to dispatch to worksite	Lump sum			25000	Civil works contract
	Subtotal (C)					3,25,000	
D.	Civil Works						
	Barricading						
1	GI Sheet	Construction	Sqm	27054	101	2732454	Civil works contract
2	Barricading using 40 mm dia M.S. pipe ("B" class) and fixing suitably two rows of 100mm wide PVC Tape	Construction	m	150303	38.50	5786666	Civil works contract
	Barricading using 40 mm dia M.S. pipe ("B" class) with Nut and bolt	Construction	m	15030	50	751500	Civil works contract
3.	Sprinkling of Water for Dust Suppression	Construction	KL	2000	111	222000	Civil works contract
A.	Sub Total (D)					9492620	
D	Asbestos Management	Inventory, Testing,	Lump sum		7,000,000	7,000,000	Civil works contract

	Particulars	Stages	Unit	Total Number #	Rate (INR)	Cost (INR)	Costs Covered By
		Overall Supervision for Asbestos Removal Storage, Transportation, Disposal / Treatment, Documentation and Reporting					
E	Grievance Redressal Mechanism Resolutions		Lump sum		350,000	350,000	Civil works contract
	Total (A+B+C+D+E)				INR	17587580	

* In preliminary design 5-7 trees are required to be cut (accordingly 3 times trees taken in budget), being DBO contract, contractor will be required to revise it. Compensatory plantation measures to be followed by contractor

** CWR-2 locations, Pipelines/working locations on quarterly basis

Computation of total number of samples for environmental monitoring as per **Appendix 18**.

Table 21: Details of Environmental Monitoring Locations

Town	Project components where environmental monitoring is required	Total numbers of environmental monitoring required in one quarter	Total numbers of environmental monitoring required in year (tree quarters leaving quarter of monsoon)	Project duration	Total number of environmental monitoring required during project duration
Laxmangarh	CWRs-2 WS networks-1 Total- 3	Air- 3 Noise- 3 Surface Water- 0 Ground Water- 2 Soil- 2	Air- 9 Noise- 9 Surface Water- 0 Ground Water- 6 Soil- 6	3 years	Air- 27 Noise- 27 Surface Water- 0 Ground Water- 18 Soil- 18

X. CONCLUSION AND RECOMMENDATION

224. This IEE is updated to incorporate updated Asbestos Management Plan and to reflect decrease in water supply network length from 162.64 km to 161.04 km. No change in location of any subproject component took place since the last IEE update to this IEE update. The process described in this document has assessed the environmental impacts of all elements of the Laxmangarh water supply 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 pipeline 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.

225. Laxmangarh is a town in Sikar district that is located in the semi-arid region of the state where the average temperature during winter season ranges between 10°C and 17°C and the summer season temperature range 32°C to 36°C. Also, Sikar District where Laxmangarh Town is located, has seen an average rainfall of 459.8mm in the period 1901 – 1970 which has increased at an average of 20% during the period 2012-2016.

226. In general, it should be noted that the air quality as reported under the National Air Monitoring Program covering 21 monitoring stations located across Rajasthan revealed that the air quality in the urban areas in between “moderate” to “poor” category and suggests a link between air quality and vehicular emissions, uncontrolled burning of wastes and construction activities carried out without any mitigation measures. Groundwater levels in Sikar District where Laxmangarh Town is located has seen a fall in 85% of the wells analyzed during the decadal period May 2006 – May 2015. In terms of Groundwater Quality, Sikar District has seen a high nitrate, chloride and flouride concentration in its wells. Noise levels are at permissible levels in the town.

227. However, it should be noted in Laxmangarh Town, no environmental monitoring is carried out regularly by state or central-level agencies. Hence, as part of the Contractor’s pre-construction activities, it has been suggested that the Contractor determine the baseline environmental data during the Service Improvement Plan (SIP) period.

228. The subproject is formulated to address gaps in water supply infrastructure in a holistic and integrated manner. The main objective of the project is to improve water efficiency, security, and provide safe drinking water; this will have an important effect on public health. Investments under this subproject include: (i) Construction of 2 nos of CWR of 250 KL and 100 KL at PHED Campus at Bad ke Balaji. HW and A.EN. PHED Campus (ii) Designed Distribution-150km of diameter between 75mm to 280mm (iii) Provision for SCADA system. (iv) Provision for House connections-9007 (v) Rehabilitation of Tubewells -34 Nos. (vi) Rehabiliattion of 3 CWRs of 900 KL total capacity and 8 Nos. of OHSR of 3880 KL total capacity (vii) Electrical and Mechanical works and (viii) Construct 2 CRMC and 1 MCC.

229. Presently source of Laxmangarh town is ground water. The town is benefited from 34 no. of tube wells at various locations in the city. Presently, about 70-80% area of municipality limit is covered under the drinking water supply scheme by PHED. Remain area which is newly developed and newly added to the municipality area remains unconnected with piped scheme.

230. At present, an intermittent water supply system is running in the town with actual service level 45-50 LPCD at consumers’ end, which is less than standard of 135 LPCD. The supply duration is about 1 to 1.5 hours with low pressure. TWs and OWs are connected to direct distribution and cannot be considered as sustainable source as they have very low discharge yield. A package “Fatehpur-Laxmangarh Water Supply project” was sanctioned by PHED and under execution. Laxmangarh will get deficit water (excluding GW) from this project of PHED Rajasthan source as Khumbha Ram Lift Canal.”Treated water will be available from “Fatehpur-Laxmangarh Water Supply Project” of PHED up to Laxmangarh Town BadkeBalaji and AEN Campus H/w of Laxmangarh town.WTP of this scheme is at Dhannasar

231. Both the CWRs are designed in available Govt. land of PHED, where 4 trees are present which may be required to be cut, for which mitigation measures will be required by contractor during construction works. No habitations exist and no wild life reported on both the sites.

232. The Water Supply transmission and distribution networks will traverse through different city roads within ROW. Therefore, no impacts shall be envisaged regarding location. These works will require advance permission from concerned authority for road cutting and traffic diversion etc. No wildlife reported in project impact areas and no tree cutting will be required as per preliminary design and if any tree cutting will be required during execution mitigation measures shall be

adopted.

233. 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. RUIDP has decided not to replace the existing pipes including AC pipes and lay new pipes. This will reduce risks of handling and disposal of AC pipes. Further, 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.

234. Anticipated impacts of water supply during operation and maintenance will be related to detection and repair of leaks, pipe bursts. 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.

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

236. The Environmental Management Plan designed in the project includes mitigation measures for identified impacts, training and capacity building activities, a monitoring plan to ensure that the environmental standards are maintained throughout the project construction period and a reporting plan to ensure that the project is implemented as per environmentally sound engineering and construction practices. The details of cost estimate (budgetary provision) for mitigating the anticipated impacts by designed subproject component is approx. INR 17,587,580 (in words Rupees One Crore Seventy Five Lacs Seven Thousand Five Hundred and Eighty) This indicative cost includes INR 7,000,000 (USD 100,000) for asbestos management (identification, inventory, removal, transport, temporary storage, disposal/treatment, and overall supervision of contractor related to asbestos materials).

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

238. The EMP was included in the bid and contract documents to ensure compliance with the conditions set out in this document. The contractor has submitted to PIU, for review and approval, an updated EMP / site environmental management plan (SEMP) including (i) designed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; and (iii) monitoring program as per EMP. The EMP is made binding on all contractors operating on the site and was 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. No works are allowed to commence prior to approval of SEMP. A copy of the EMP/approved SEMP will be kept on site during the construction period at all times.

239. 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 implementation. The project's grievance redress mechanism will provide the citizens with a

platform for redress of their grievances, and describes the channels, timeframe, and mechanisms for resolving complaints about environmental performance.

240. Stakeholders were involved in developing the IEE through face-to-face discussions, on site meetings, and a city level consultation workshop, which was conducted for larger public participation in the project. Views expressed by the stakeholders were incorporated into the IEE and the planning and development of the project. The IEE will be made available at public locations and will be disclosed to a wider audience via the PMU and ADB websites. The consultation process will be continued during project implementation to ensure that stakeholders are engaged in the project and have the opportunity to participate in its development and implementation. The project's grievance redress mechanism will provide the citizens with a platform for redress their grievances, and describes the informal and formal channels, time frame, and mechanisms for resolving complaints about environmental performance.

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

242. There is no environmental impact due to decrease in length of water supply network from 162.64 km to 161.04 km. No separate environmental assessment is required.

243. Therefore, as per ADB SPS, after the impact assessment of the project; up to this third IEE update; no significant impact was identified and the project continues to be in environmental category "B" and does not require further environmental impact assessment.

244. **Recommendations.** The following are the status of compliance of recommendations applicable to the subproject to ensure no significant impacts:

Recommendations already complied during current IEE update

- Obtain all statutory clearances at the earliest time possible and ensure conditions/provisions are incorporated in the detailed design
- Include this IEE in bid and contract documents- complied, IEE is part of bid and contract documents
- Update/revise this IEE based on detailed design and/or if there are unanticipated impacts, change in scope, alignment, or location
- Conduct safeguards induction to the contractor upon award of contract
- Strictly supervise EMP implementation
- Ensure contractor appointed qualified EHS officers prior to start of works
- Documentation and reporting on a regular basis as indicated in the IEE
- Continuous consultations with stakeholders
- Timely disclosure of information and establishment of grievance redressal mechanism (GRM)
- Involvement of contractors, including subcontractors, in first-level GRM
- Commitment from PMU, PIUs, project consultants, and contractors to protect the environment and the people from any impact during project implementation
- Update the asbestos management plan per site-specific conditions; ACM Management Plan updated by ACM Expert.

Recommendations which are not applicable to this project

- Update and implement the recommendations from the biodiversity assessment report;- There are no impact on biodiversity (endangered, threatened or protected) due to project activities, therefore further biodiversity assessment is not required for this project

Appendix 1: Rapid Environmental Assessment (REA) Checklist

Water Supply

Instructions:

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

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

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

Country/Project Title: India/Rajasthan Secondary Towns Development Sector Project (RSTDSP)/Laxmangarh Water Supply subproject, Distt. Sikar, Rajasthan

Sector Division: Urban Development

SCREENING QUESTIONS	Yes	No	Remarks
Water Supply			
A. Project Siting Is the project area...			
Densely populated?	√		Old areas of Laxmangarh is densely populated
Heavy with development activities?		√	No developmental activities are present in the town except increasing habitations
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?		√	Underground water shall be utilized for water supply
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	No such impacts are envisaged
Hazard of land subsidence caused by excessive ground water pumping?		√	

Social conflicts arising from displacement of communities?		√	
Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		√	Existing tube wells shall be utilized as water source for proposed water supply therefore no conflicts may arise for ground water
Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	√		Ground water shall be used as water source and mineral constituents are required to be checked before supplying to consumers
Delivery of unsafe water to distribution system?	√		Unsafe water may be delivered if efficient maintenance of water supply distribution system is not done during operation phase
Inadequate protection of intake works or wells, leading to pollution of water supply?		√	No intake works are proposed
Over pumping of ground water, leading to salinization and ground subsidence?		√	Only required and sanctioned water will be extracted from tube wells
Excessive algal growth in storage reservoir?	√		Excessive algal growth may occur if storage reservoirs are not maintained regularly
Increase in production of sewage beyond capabilities of community facilities?		√	Presently sewerage system is under execution in the town keeping in mind the proposed 135 LPCD water supply to full population
Inadequate disposal of sludge from water treatment plants?		√	No WTP is proposed
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		√	Low noise pumps are proposed in pumping stations, no WTP is proposed
Impairments associated with transmission lines and access roads?	√		Temporary impairments may be anticipated along the new transmission line routes during construction stage and mitigation measures will be required
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	√		Contractor has to take precautions in handling and usage of chlorine to avoid any health hazard, no other hazardous chemicals are expected to be used during construction works
health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project construction and operation?	√		Contractor has to take precautions in handling and usage of chlorine to avoid any health hazard
Dislocation or involuntary resettlement of people		√	All works are proposed in Govt. lands therefore dislocation or involuntary resettlement of people is not anticipated
disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	No such impact is envisaged
Noise and dust from construction activities?	√		Noise and dust risk will be envisaged during construction works. 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?	√		Construction work during monsoon shall be carried out with due care so that silt run off due to construction operation is prevented. No construction will be allowed during rains.
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?	√		WTP is not proposed in the project, only ground water shall be used after adequate chlorination
Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?	√		Not envisaged. Non corrosive materials pipe will be used for distribution networks
Accidental leakage of chlorine gas?	√		Accidental leakage of chlorine gas may take place during chlorination. Utmost care should be taken
Excessive abstraction of water affecting downstream water users?		√	Water for the project is proposed only ground water as source
Competing uses of water?		√	Not applicable. only ground water shall be used for water supply services
Increased sewage flow due to increased water supply	√		Sewerage system is under execution in separate project keeping in mind 135 lpcd water demand for whole town
large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	Most of the unskilled workers will be hired locally, some of skilled workers will be brought from outside but numbers will not so large to have impacts on social infrastructure and services
Social conflicts if workers from other regions or countries are hired?		√	Outside workers will remain in labor camps and no social conflicts will envisaged
risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?		√	No explosives shall be used in project. Fuel and other chemicals will be used in very less quantities which will not have significant impact on community health and safety. Safe handling of fuels and chemicals will be ensured by contractor.
community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	√		Community safety risk may be there during construction during excavation for pipe laying, equipment and vehicle operation etc. for which mitigation measures will be required by contractor

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: India/Rajasthan Secondary Towns Development Sector Project (RSTDSP), Laxmangarh, Rajasthan
Sector : Urban Development
Subsector: Water Supply
Division/Department: SARD/SAUW

Screening Questions		Score	Remarks ³⁷
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
	Would 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	
Materials and Maintenance	Would 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 hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	
Performance of project outputs	Would 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	

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.

Result of Initial Screening (Low, Medium, High): low risk
 Other Comments: no any

³⁷If 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.

Appendix 2: Drinking water standards

Group	National Standards for Drinking Water ^a			WHO Guidelines for Drinking-Water Quality, 4 th Edition, 2011 ^b	Applicable Per ADB SPS ^{c, d}
	Parameter	Unit	Max. Concentration Limits ^d		
Physical	Turbidity	NTU	1 (5)	-	1 (5)
	pH		6.5 – 8.5	none	6.5 – 8.5
	Color	Hazen units	5 (15)	none	5 (15)
	Taste and Odor		Agreeable	-	Agreeable
	TDS	mg/l	500 (2,000)	-	500 (2,000)
	Iron	mg/l	0.3	-	0.3
	Manganese	mg/l	0.1 (0.3)	-	0.1 (0.3)
	Arsenic	mg/l	0.01 (0.05)	0.01	0.01
	Cadmium	mg/l	0.003	0.003	0.003
	Chromium	mg/l	0.05	0.05	0.05
	Cyanide	mg/l	0.05	none	0.05
	Fluoride	mg/l	1 (1.5)	1.5	1 (1.5)
	Lead	mg/l	0.01	0.01	0.01
	Ammonia	mg/l	0.5	none established	0.5
Chemical	Chloride	mg/l	250 (1,000)	none established	250 (1,000)
	Sulphate	mg/l	200 (400)	none	200 (400)
	Nitrate	mg/l	45	50	45
	Copper	mg/l	0.05 (1.5)	2	0.05 (1.5)
	Total Hardness	mg/l	200 (600)	-	200 (600)
	Calcium	mg/l	75 (200)	-	75 (200)
	Zinc	mg/l	5 (15)	none established	5 (15)
	Mercury	mg/l	0.001	0.006	0.001
	Aluminum	mg/l	0.1 (0.3)	none established	0.1 (0.3)
	Residual Chlorine	mg/l	0.2	5	0.2
Micro Germs	E-coli	MPN/100ml	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample
	Total Coliform	MPN/100ml			
Physical	Turbidity	NTU	1 (5)	-	1 (5)
	pH		6.5 – 8.5	none	6.5 – 8.5
	Color	Hazen units	5 (15)	none	5 (15)
	Taste and Odor		Agreeable	-	Agreeable
	TDS	mg/l	500 (2,000)	-	500 (2,000)
	Iron	mg/l	0.3	-	0.3
	Manganese	mg/l	0.1 (0.3)	-	0.1 (0.3)
	Arsenic	mg/l	0.01 (0.05)	0.01	0.01
	Cadmium	mg/l	0.003	0.003	0.003
	Chromium	mg/l	0.05	0.05	0.05
	Cyanide	mg/l	0.05	none	0.05
	Fluoride	mg/l	1 (1.5)	1.5	1 (1.5)
	Lead	mg/l	0.01	0.01	0.01
	Ammonia	mg/l	0.5	none established	0.5
Chemical	Chloride	mg/l	250 (1,000)	none established	250 (1,000)

Group	National Standards for Drinking Water ^a			WHO Guidelines for Drinking-Water Quality, 4 th Edition, 2011 ^b	Applicable Per ADB SPS ^{c, d}
	Parameter	Unit	Max. Concentration Limits ^d		
	Sulphate	mg/l	200 (400)	none	200 (400)
	Nitrate	mg/l	45	50	45
	Copper	mg/l	0.05 (1.5)	2	0.05 (1.5)
	Total Hardness	mg/l	200 (600)	-	200 (600)
	Calcium	mg/l	75 (200)	-	75 (200)
	Zinc	mg/l	5 (15)	none established	5 (15)
	Mercury	mg/l	0.001	0.006	0.001
	Aluminum	mg/l	0.1 (0.3)	none established	0.1 (0.3)
	Residual Chlorine	mg/l	0.2	5	0.2
Micro Germs	E-coli	MPN/100ml	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample
	Total Coliform	MPN/100ml			

^a Bureau of India Standard 10500: 2012.

^b Health-based guideline values.

^c Per ADB SPS, the government shall achieve whichever of the standards is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the executing agency of the government will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

^d Figures in parenthesis are maximum limits allowed in the absence of alternate source.

Appendix 3: Compliance with Environmental Criteria for Subproject Selection

Components	Criteria	Design Considerations (if criterion is not met)	Compliance
All subprojects			
	Subproject will avoid potentially significant adverse impacts that are diverse, irreversible or unprecedented (ADB SPS Category A for environment).		Being complied, the proposed components of subproject are proposed in already developed area and all impacts are predictable and mitigation measures are part of project design
	Comply with all requirements of ADB SPS 2009 and follow procedures set in this environmental assessment and review framework (EARF)		Being complied
	Comply with relevant national, and local laws, rules and regulations regarding EIA, environmental protection, pollution prevention (water, air, noise, solid waste, etc.) wildlife protection, core labor standards, physical cultural resources, health and safety, and other laws in specific sectors as indicated below		Being complied
	Does not include and/or involve any activities listed in ADB's Prohibited Investment Activities List ³⁸		Being complied
	Reflect inputs from public consultations	Refer to ADB SPS requirements on meaning consultations ³⁹	Being complied
Location	Avoid 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	If cannot be avoided, prepare Resettlement Plan.	Being complied

³⁸ADB SPS Appendix 5

³⁹Per ADB SPS, meaningful consultation is defined as “a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues”

Components	Criteria	Design Considerations (if criterion is not met)	Compliance
	alignment to avoid resettlement impacts		
	Avoid or minimize the cutting of trees	If tree is to be cut, consider 1:3 replacement	Being complied
Biodiversity	Avoid locating subprojects in critical habitats, such as, but not limited to, wildlife/bird sanctuaries, national parks, tiger reserves, elephant reserves, conservation reserves or core zone of biosphere reserves. Appendix 1 provides preliminary analysis using the International Biodiversity Assessment Tool (IBAT) key biodiversity areas, protected areas, IUCN red list species and likelihood of critical habitats per town. Should not directly affect environmentally protected areas, core zones of biosphere reserves and highly valued habitat	If criteria is not met, this is potential for Category A therefore alternate location should be considered. A Biodiversity Expert shall assess and confirm critical habitat qualification. Appendix 2 provides a Biodiversity Assessment Report prepared for a sample subproject (Abu Road water and sewerage subproject).	Being complied
	If work is proposed with the aim of improving the conservation or management of designated subproject sites (e.g. improved drainage), this must only be undertaken: (i) after a comprehensive study and development of management plans and criteria; and (ii) with the direct involvement and approval of national and local bodies responsible for the subproject site.		Being complied
Physical Cultural Resources	Should not result in the destruction/damage of or encroachment onto physical cultural resources (PCR) ⁴⁰ such as archaeological monuments; heritage sites and movable or immovable objects, sites, structures, group of structures, and natural features and landscapes that have	If location is within 300 m of notified protected monuments/ sites and there is no alternative, permissions from the ASI or State Department of Archaeology to be obtained prior to finalization of detailed engineering design. If	Being complied

⁴⁰ Physical cultural resources as defined as “movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings and may be above or below ground or under water. Their cultural interest may be at the local, provincial, national, or international level.”

Components	Criteria	Design Considerations (if criterion is not met)	Compliance
	archaeological, paleontological, historical, architectural, religious, aesthetic or other cultural significance.	potential physical cultural resources are found within or adjacent to project sites, a Heritage Impact Assessment is required to be conducted by a competent expert.	
Existing Facilities to be rehabilitated or expanded	Conduct environmental audit of existing facilities ⁴¹ per ADB SPS	For non-compliances, provide corrective action for each area of concern including cost and schedule to be included in the subproject EMP.	Being complied
Associated Facilities ⁴²	Analyse environmental impacts and risks to be included in the IEE		Being complied
Asbestos-containing materials (ACM) including, but not limited to, pipes, roofing, ceilings, insulation materials, excess pipes stored in PHED campuses, walls, etc.	Avoid handling or removing any ACM. Ensure asbestos concrete (AC) pipes facilities containing asbestos will not be disturbed and left in-situ. Appendix 15 provides asbestos management plan.	If ACM is suspected, asbestos verification by a competent expert is required and an asbestos management plan (AMP) prepared. Appendix 4 provides a sample AMP prepared for a sample subproject (Sardarshahar water and sewerage subproject). RUDSICO-EAP shall include AMP in all contracts. Contractor should be certified to handle ACM.	Being complied
	When designing subproject infrastructure that involves excavation in urban areas the relevant authorities must be consulted to ascertain the location of any ACM prior to any subproject activity. Locations of new infrastructure must then be designed to avoid excavating or disturbing any ACM.		Being complied
Right-of-way	Locate water supply pipelines within the right of way (ROW) of other linear structures (roads, irrigation canals) as far as possible, to reduce new land acquisition.		Being complied

⁴¹ ADB SPS Appendix 4 para 12 on Existing Facilities

⁴² ADB SPS Appendix 1 para 6 defines associated facilities as “not funded as part of the project (funding may be provided separately by the borrower/client or by third parties), and whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project”

Components	Criteria	Design Considerations (if criterion is not met)	Compliance
	Ensure that pipelines ROW do not require land acquisition from individual farmers that is a significant proportion of their total land holding (>10%).		Being complied
Water Supply			
Sustainability	Utilize water sources at sustainable levels of abstraction only (i.e. without significant reductions in the quantity or quality of the source overall)	Water source sustainability or the relevant clearance from PHED should be provided in the subproject's IEE.	Being complied
Quality (raw water, treated water)	Ensure that water supply to consumers comply with the national drinking water standards at all times and confirm this by regular monitoring at WTPs and in domestic premises.		Being complied
	Avoid using water sources that may be polluted by upstream users	Baseline raw water quality to be included in the IEE.	Being complied
	Avoid water-use conflicts by not abstracting water that is used for other purposes (e.g. irrigation)	If there are other users, permits or clearance for the allocation should be provided in the IEE.	Being complied
Location	Locate all new facilities – Water Treatment Plants (WTP), Tube Wells (TW), etc. within 100m from houses, shops or any other premises used by people, thus establishing a buffer to reduce the effects of noise, dust and the visual appearance of the site.		Being complied
	Locate WTP at sites where there is no risk of flooding or other hazards that might impair functioning of the WTP or present a risk if damage to the WTP or the surrounding area		Being complied
Design	Ensure that the water supply system improvements are combined with improvements in sewerage to deal with the increased discharge of domestic wastewater.		Being complied

Appendix 4: Ambient Air Quality, Vehicle, Diesel Generator Emissions Standards

Table-1: Ambient Air Quality Standards

Parameter	Location ^a	India Ambient Air Quality Standard ($\mu\text{g}/\text{m}^3$) ^b	WHO Air Quality Guidelines ($\mu\text{g}/\text{m}^3$)		Applicable Per ADB SPS ^e ($\mu\text{g}/\text{m}^3$)
			Global Update ^c 2005	Second Edition 2000	
PM ₁₀	Industrial Residential, Rural and Other Areas	60 (Annual) 100 (24-hr)	20 (Annual) 50 (24-hr)	-	20 (Annual) 50 (24-hr)
	Sensitive Area	60 (Annual) 100 (24-hr)	20 (Annual) 50 (24-hr)	-	20 (Annual) 50 (24-hr)
PM ₂₅	Industrial Residential, Rural and Other Areas	40 (Annual) 60 (24-hr)	10 (Annual) 25 (24-hr)	-	10 (Annual) 25 (24-hr)
	Sensitive Area	40 (Annual) 60 (24-hr)	10 (Annual) 25 (24-hr)	-	10 (Annual) 25 (24-hr)
SO ₂	Industrial Residential, Rural and Other Areas	50 (Annual) 80 (24-hr)	20 (24-hr) 500 (10-min)	-	50 (Annual) 20 (24-hr) 500 (10-min)
	Sensitive Area	20 (Annual) 80 (24-hr)	20 (24-hr) 500 (10-min)	-	20 (Annual) 20 (24-hr) 500 (10-min)
NO ₂	Industrial Residential, Rural and Other Areas	40 (Annual) 80 (24-hr)	40 (Annual) 200 (1-hr)	-	40 (Annual) 80 (24-hr) 200 (1-hr)
	Sensitive Area	30 (Annual) 80 (24-hr)	40 (Annual) 200 (1-hr)	-	30 (Annual) 80 (24-hr) 200 (1-hr)
CO	Industrial Residential, Rural and Other Areas	2,000 (8-hr) 4,000 (1-hr)	-	10,000 (8-hr) 100,000 (15-min)	2,000 (8-hr) 4,000 (1-hr) 100,000 (15-min)
	Sensitive Area	2,000 (8-hr) 4,000 (1-hr)	-	10,000 (8-hr) 100,000 (15-min)	2,000 (8-hr) 4,000 (1-hr) 100,000 (15-min)
Ozone (O ₃)	Industrial Residential, Rural and Other Areas	100 (8-hr) 180 (1-hr)	100 (8-hr)	-	100 (8-hr) 180 (1-hr)
	Sensitive Area	100 (8-hr) 180 (1-hr)	100 (8-hr)	-	100 (8-hr) 180 (1-hr)
Lead (Pb)	Industrial, Residential,	0.5 (Annual) 1.0 (24-hr)	-	0.5 (Annual)	0.5 (Annual) 1.0 (24-hr)

Parameter	Location ^a	India Ambient Air Quality Standard ($\mu\text{g}/\text{m}^3$) ^b	WHO Air Quality Guidelines ($\mu\text{g}/\text{m}^3$)		Applicable Per ADB SPS ^e ($\mu\text{g}/\text{m}^3$)
			Global Update ^c 2005	Second Edition 2000	
	Rural and Other Areas				
	Sensitive Area	0.5 (Annual) 1.0 (24-hr)		0.5 (Annual)	0.5 (Annual) 1.0 (24-hr)
Ammonia (NH_3)	Industrial Residential, Rural and Other Areas	100 (Annual) 400 (24-hr)			100 (Annual) 400 (24-hr)
	Sensitive Area	100 (Annual) 400 (24-hr)			100 (Annual) 400 (24-hr)
Benzene (C_6H_6)	Industrial Residential, Rural and Other Areas	5 (Annual)			5 (Annual)
	Sensitive Area	5 (Annual)			5 (Annual)
Benzo(o)pyrene (BaP) particulate phase only	Industrial Residential, Rural and Other Areas	0.001 (Annual)			0.001 (Annual)
	Sensitive Area	0.001 (Annual)			0.001 (Annual)
Arsenic (As)	Industrial Residential, Rural and Other Areas	0.006 (Annual)			0.006 (Annual)
	Sensitive Area	0.006 (Annual)			0.006 (Annual)
Nickel (Ni)	Industrial Residential, Rural and Other Areas	0.02 (Annual)			0.02 (Annual)
	Sensitive Area	0.02 (Annual)			0.02 (Annual)

^a Sensitive area refers to such areas notified by the India Central Government.

^b Notification by Ministry of Environment and Forests, Government of India Environment (Protection) Seventh Amendment Rules, 2009

^c WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide. *Global update 2005*. WHO. 2006

^d Air Quality Guidelines for Europe Second Edition. WHO 2000.

^e Per ADB SPS, the government shall achieve whichever of the ambient air quality standards is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the executing agency of the government will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS

Table 2: Vehicle Exhaust Emission Norms**1. Passenger Cars**

Norms	CO (g/km)	HC+ NOx (g/km)
1991 Norms	14.3-27.1	2.0(Only HC)
1996 Norms	8.68-12.40	3.00-4.36
1998 Norms	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)
Bharat Stage-VI (Petrol)	1.0	0.16 (Combined)

2. Heavy Diesel Vehicles

Norms	CO (g/kmhr)	HC (g/kmhr)	NOx (g/kmhr)	PM (g/kmhr)
1991 Norms	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
Bharat Stage-VI (Diesel)	0.5	0.17 (HC+NOx)		0.0045

Source: Central Pollution Control Board

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

**Emission limits for New DG sets up to 800 KW
(As per Environment (Protection) (Third Amendment) Rules, 2013)**

TABLE

Power Category	Emission Limits (g/kW-hr)			Smoke Limit (light absorption coefficient, m ⁻¹)
	NO _x +HC	CO	PM	
Upto 19 KW	≤ 7.5	≤ 3.5	≤ 0.3	≤ 0.7
More than 19 KW upto 75 KW	≤ 4.7	≤ 3.5	≤ 0.3	≤ 0.7
More than 75 KW upto 800 KW	≤ 4.0	≤ 3.5	≤ 0.2	≤ 0.7

Note:

1. The abbreviations used in the Table shall mean as under: NO_x – Oxides of Nitrogen; HC – Hydrocarbon; CO – Carbon Monoxide; and PM – Particulate Matter.
2. Smoke shall not exceed above value throughout the operating load points of the test cycle.
3. The testing shall be done as per D2 – 5 mode cycle of ISO: 8178- Part 4.
4. The above mentioned emission limits shall be applicable for Type Approval and Conformity of Production (COP) carried out by authorised agencies.
5. Every manufacturer, importer or, assembler (hereinafter referred to as manufacturer) of the diesel engine (hereinafter referred to as 'engine') for genset application manufactured or imported into India or, diesel genset (hereinafter referred to as 'product'), assembled or imported into India shall obtain Type Approval and comply with COP of their product(s) for the emission limits which shall be valid for the next COP year or, the date of implementation of the revised norms specified above, whichever earlier.
Explanation. - The term 'COP year' means the period from 1st April to 31st March.
6. Stack height (in metres), for genset shall be governed as per Central Pollution Control Board (CPCB) guidelines.

DIESEL GENERATOR SETS : STACK HEIGHT

The minimum height of stack to be provided with each generator set can be worked out using the following formula :

$$H = h + 0.2 \times \sqrt{\text{KVA}}$$

H = Total height of stack in metre

h = Height of the building in metres where the generator set is installed

KVA = Total generator capacity of the set in KVA

Based on the above formula the minimum stack height to be provided with different range of generator sets may be categorised as follows:

For Generator Sets	Total Height of stack in metre
50 KVA	Ht. of the building + 1.5 metre
50-100 KVA	Ht. of the building + 2.0 metre
100-150 KVA	Ht. of the building + 2.5 metre
150-200 KVA	Ht. of the building + 3.0 metre
200-250 KVA	Ht. of the building + 3.5 metre
250-300 KVA	Ht. of the building + 3.5 metre

Similarly for higher KVA ratings a stack height can be worked out using the above formula.

Source : Evolved By CPCB
[Emission Regulations Part IV:COINDS/26/1986-87]

Appendix 5: Ambient Air Quality Standards in Respect of Noise

Receptor/ Source	India National Noise Level Standards ^a (dBA)		WHO Guidelines Value For Noise Levels Measured Out of Doors ^b (One Hour LA _{eq} in dBA)		Applicable Per ADB SPS ^c (dBA)	
	Day	Night	07:00 – 22:00	22:00 – 07:00	Day time	Night time
Industrial area	75	70	70	70	70	70
Commercial area	65	55	70	70	65	55
Residential Area	55	45	55	45	55	45
Silent Zone	50	40	55	45	50	40

^a Noise Pollution (Regulation and Control) Rules, 2002 as amended up to 2010.

^b Guidelines for Community Noise. WHO. 1999

^c Per ADB SPS, the government shall achieve whichever of the ambient air quality standards is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the executing agency of the government will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

Noise Limits for Diesel Generator Sets

Noise Limit for Generator Sets run with Diesel

1. Noise limit for diesel generator sets (upto 1000 KVA) manufactured on or after the 1st January, 2005

The maximum permissible sound pressure level for new diesel generator (DG) sets with rated capacity upto 1000 KVA, manufactured on or after the 1st January, 2005 shall be 75 dB(A) at 1 metre from the enclosure surface.

The diesel generator sets should be provided with integral acoustic enclosure at the manufacturing stage itself.

The implementation of noise limit for these diesel generator sets shall be regulated as given in paragraph 3 below.

2. Noise limit for DG sets not covered by paragraph 1.

Noise limits for diesel generator sets not covered by paragraph 1, shall be as follows:-

2.1 Noise from DG set shall be controlled by providing an acoustic enclosure or by treating the room acoustically, at the users end.

2.2 The acoustic enclosure or acoustic treatment of the room shall be designed for minimum 25 dB (A) insertion loss or for meeting the ambient noise standards, whichever is on the higher side (if the actual ambient noise is on the higher side, it may not be possible to check the performance of the acoustic enclosure/acoustic treatment. Under such circumstances the performance may be checked for noise reduction upto actual ambient noise level, preferably, in the night time). The measurement for Insertion Loss may be done at different points at 0.5 m from the acoustic enclosure/ room, then averaged.

2.3 The DG set shall be provided with proper exhaust muffler with insertion loss of minimum 25 dB (A).

2.4 These limits shall be regulated by the State Pollution Control Boards and the State Pollution Control Committees.

2.5 Guidelines for the manufacturers/ users of Diesel Generator sets shall be as under:-

01. The manufacturer shall offer to the user a standard acoustic enclosure of 25 dB (A) insertion loss and also a suitable exhaust muffler with insertion loss of 25 dB(A).
02. The user shall make efforts to bring down the noise levels due to the DG set, outside his premises, within the ambient noise requirements by proper citing and control measures.
03. Installation of DG set must be strictly in compliance with the recommendations of the DG set manufacturer.
04. A proper routine and preventive maintenance procedure for the DG set should be set and followed in consultation with the DG set manufacturer which would help prevent noise levels of the DG set from deteriorating with use.

3.0 Limits of Noise for DG Sets (upto 1000 KVA) Manufactured on or after the 1st January, 2005

3.1 Applicability

01. These rules apply to DG sets upto 1000 KVA rated output, manufactured or imported in India, on or after 1st January, 2005.
02. These rules shall not apply to –
 - a) DG sets manufactured or imported for the purpose of exports outside India; and
 - b) DG sets intended for the purpose of sample and not for sale in India.

3.2 Requirement of Certification

Every manufacturer or assembler or importer (hereinafter referred to as the "manufacturer") of DG set (hereinafter referred to as "product") to which these regulations apply must have valid certificates of Type Approval and also valid certificates of Conformity of Production for each year, for all the product models being manufactured or assembled or imported from 1st January, 2005 with the noise limit specified in paragraph 1.

3.3 Sale, import or use of DG sets not complying with the rules prohibited

No person shall sell, import or use of a product model, which is not having a valid Type Approval Certificate and Conformity of Production certificate.

Appendix 6: Salient Features of Major 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 and 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) Construction and Demolition Waste Management Rules 2016- This Rule stipulate that-

- Every waste generator shall segregate construction and demolition waste and deposit at collection centre or handover it to the authorized processing facilities
- Shall ensure that there is no littering or deposition so as to prevent obstruction to the traffic or the public or drains.
- Large generators (who generate more than 20 tons or more in one day or 300 tons per project in a month) shall submit waste management plan and get appropriate approvals from the local authority before starting construction or demolition or remodeling work,
- Large generators shall have environment management plan to address the likely environmental issues from construction, demolition, storage, transportation process and disposal / reuse of C & D Waste.
- Large generators shall segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar,
- Large generators shall pay relevant charges for collection, transportation, processing and disposal as notified by the concerned authorities;

(xvi) Solid Waste Management Rules 2016- As per this Rule responsibility of Solid Waste Generator is as below.

- segregate and store the waste generated in three separate streams namely bio-degradable, non biodegradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorized waste pickers or waste collectors as per the direction or notification by the local authorities from time to time;
- store separately construction and demolition waste, as and when generated, in his own premises and shall dispose off as per the Construction and Demolition Waste Management Rules, 2016; and
- No waste generator shall throw, burn or bury the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.

(xvii) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) 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. Salient features of this Act are given below.

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 than 1.6mtrs 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 7: Groundwater Quality Test Reports

OFFICE OF THE JUNIOR CHEMIST, PHED., LAB.,SIKAR (RAJASTHAN)

NO.: LAB/TECH./CHE. REP./2017-18/ 807
TO
Assistant Engineer
PHED. Sub Division, Lachhmangarh
Subject : Report of the Chemical Examination of Water.

DATE : 25/10/2017

DISTRICT : SIKAR
NAME OF BLOCK: Lachhmangarh
NAME OF SAMPLE TAKER : Sh. K. C. Meena, Junior Chemist & Sh. Babulal, LA
DATE OF EXAM. : 24.10.2017

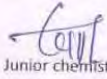
REFERENCE : Samples were collected by Junior Chemist & lab. Staff Sikar. DATED :
DATE OF RECEIPT: 17.8.2017

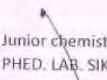
LAB SAMPLE NO.	NAME OF VILLAGE/CITY	SOURCE & LOCATION	Code No.	DATE OF COLLECTION	pH	Total Alkalinity (as CaCO ₃)	Hardness (as CaCO ₃)	Hardness (as CaCO ₃)	Hardness (as CaCO ₃)	Magnesium Hardness (as CaCO ₃)	Nitrates (as NO ₃)	Fluoride (as F)	Chloride (as Cl)	Total Dissolved Solids	Residual Chlorine
950	Lachhmangarh	SR, Bad Ka Balaji		14.8.2017	8.5	640	70	30	40	64	2.3	140	1405	NIL	
951	Lachhmangarh	CWR, Bad Ka Balaji		14.8.2017	8.7	640	60	20	40	59	2.2	150	1365	0.1	
952	Lachhmangarh	CWR(New), PHED Campus		14.8.2017	8.1	500	110	50	60	182	1.8	180	1400	1.0	
953	Lachhmangarh	CWR(Old), PHED Campus		14.8.2017	8.1	540	120	60	60	228	1.7	220	1615	1.0	

Note :- All results Except pH are in mg/L

NO.: LAB/TECH./CHE. REP./2017-18/
COPY TO : 1. Chief Chemist, PHED. Rajasthan, Jaipur.

DATE :


 Junior chemist
 PHED. LAB. SIKAR


 Junior chemist
 PHED. LAB. SIKAR

Appendix 8: Biodiversity Assessment Report - Laxmangarh

Biodiversity Assessment –Laxmangarh Town Water Supply Subproject

A. Introduction

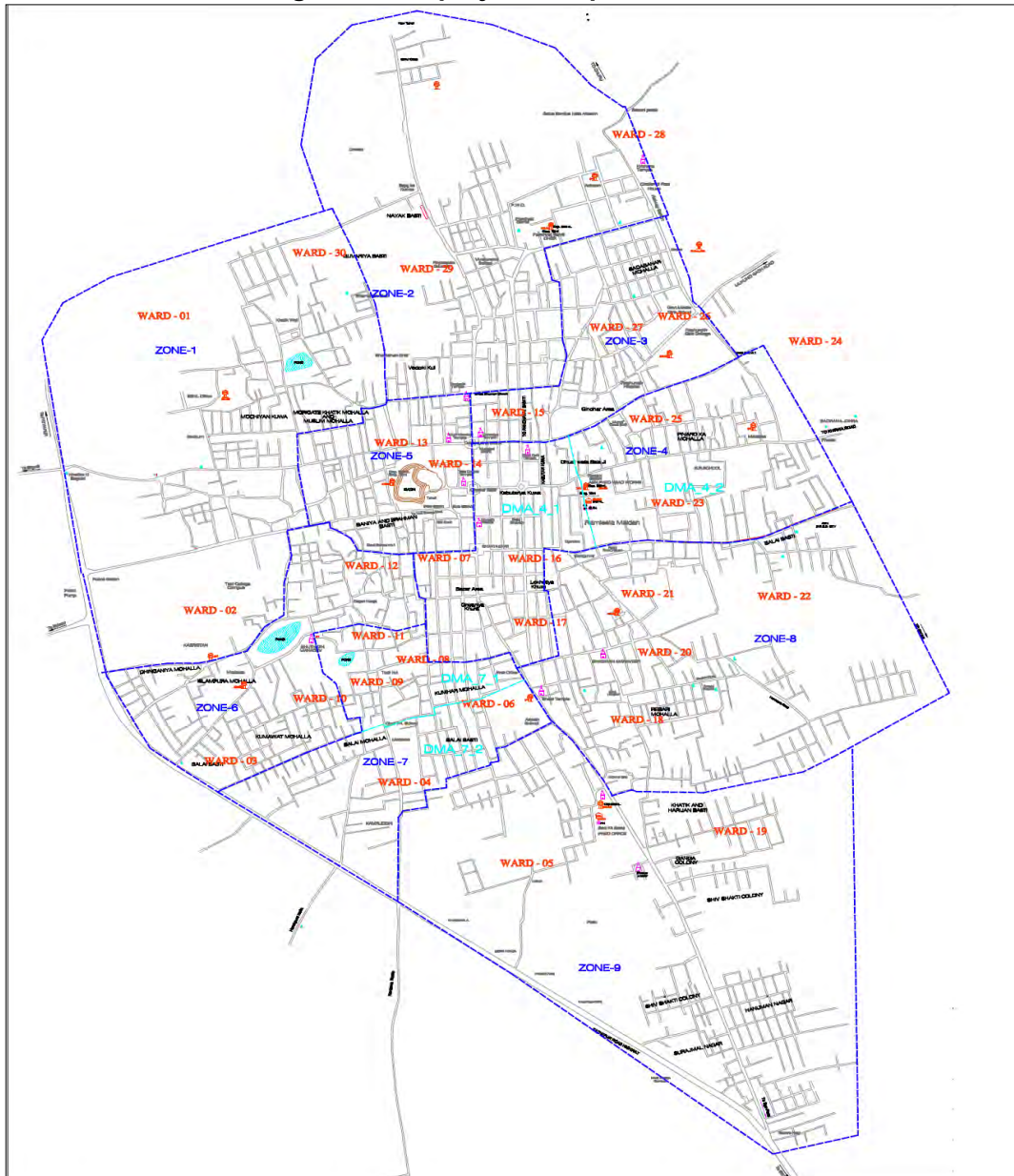
This detailed biodiversity assessment is carried out for the proposed Laxmangarh Town Water Supply Subproject located in Laxmangarh Town, Sikar district of Rajasthan State in India. This subproject is included in the Rajasthan Secondary Towns Development Sector Project (RSTDSP) to be financed by ADB. The assessment has been carried out to identify critical habitats and anticipated impacts from the subproject implementation. The assessment is based on the desk review and analysis of the secondary information collected through various sources and supported by the results of the proximity report generated by the Integrated Biodiversity Assessment Tool (IBAT). The findings and assessment will be further strengthened following field assessments and consultations with key stakeholders involving forest and wildlife officials from the state before project implementation.

B. Project Description

The subproject is located in Laxmangarh Town of Sikar District of Rajasthan State. All the project components are planned and will be located inside the municipality limits. The components under this subproject include (i) Construction of 2 no. of new Clear Water reservoir of 250 KL and 100 KL at Bad Ke Balaji HW and AEN PHED Campus; respectively. (ii) A distribution network of 150 km length along the roads (iii) Refurbishments of existing pump houses at Bad ke Balaji HW and PHED Campus, OHSRs at BSNL Office, Panchayat samiti, Balika School, AEN Head Work, Garh, Kabristan, Bad ke Balaji and Saytanarayana and (iv) Construction of 2 CRMC and 1 MCC at PHED AEN Campus and PHED Campus Bad ke Balaji and also rehabilitation of 34 nos. of tubewells at different locations.

The CWR and other infrastructure for the water supply project will be developed in existing campus on land in possession of Nagar Palika. The location of subproject components on Laxmangarh Town map is given in Figure-1.

Figure 1: Subproject component in town area



C. Establishing project area of influence (PAI)

The project area of influence (PAI) is established on basis of location on project components of proposed project. The scope of work covering all components and associated facilities under the subproject in Laxmangarh Town are considered as a project area of influence (PAI). The critical habitat assessment has been conducted within the boundaries of PAI which has been established using ecological units and/or physical features within the landscape such as roads, railway line or seasonally stream and village settlement. The established PAI for water supply system and facilities in Laxmangarh Town is given in Figure -2.

Figure 2: Map showing boundary of PAI Laxmangarh Town subproject



The boundaries of PAI for subproject has been based on physical/topographical features surrounding Laxmangarh Town. In the east direction of the town there is Railway track running from North to South direction is taken as boundary of PAI. Village road from Narodara to NH -11 and a seasonal stream are physical feature considered for boundary of study area on South direction of the city. On west direction the limits of study area are established with boundary of Bihad forest (a social forest area), to cover the waste water reservoir in the social forest area. In north direction of the town merging point of bypass from NH-65 and alignment of NH-11 is established as outside limit of the town area and PAI of subproject.

D. Biodiversity Assessment

Biodiversity assessment in the project influence area has been conducted as per the International Finance Corporation's (IFC) Performance Standard No 6 of 2012, within updated version in June 2019 on the Guidance Note for the Performance Standard. The process of biodiversity assessment based on presence of protected or designated areas and the potential presence of Critical Habitat in the study area. The Critical Habitat assessment is based on presence of Threatened species (Critically Endangered (CR), Endangered (EN) species, and to a lesser extent Vulnerable (VU) species as defined by the IUCN.

D.1 Key Biodiversity Area

The project areas have been screened to determine presence of Key Biodiversity Areas (KBAs) using the Integrated Biodiversity Assessment Tool (IBAT)⁴³. As per the Proximity report generated by IBAT, there are neither protected area nor any key biodiversity areas within the buffer of 10km radius of the subproject components. The nearest protected area is Tal Chappar Wildlife Sanctuary; which is approx. 50 km away (nearest aerial distance) from the Laxmangarh town area. However, there are 38 International Union for the Conservation of Nature (IUCN) Red List threatened species. The key findings of the IBAT report are presented in the subsequent sections.

D.2 Protected Area

The IBAT analysis has recorded two nationally protected area and one key biodiversity area (KBA) in 50 km buffer of subproject area. The details of these areas are given in Table-1:

Table 1: List of Protected areas and KBA in subproject area

S.No.	Name	Aerial distance and Direction w.r.t. subproject	Remarks
Protected Area (National)			
1	Bandh Baratha Wildlife Sanctuary	Over 150 Km distance on South Direction	The potential impact due to subproject are insignificant on these area
2	Sariska Tiger Reserve National Park	Over 100 Km distance on Southeast Direction	
Key Biodiversity Area (KBA)			
1	Sariska Tiger Reserve	Over 100 Km distance on Southeast Direction	-

The KBA of Sariska Tiger Reserve is identical to Sariska Tiger Reserve National Park area. However, the nearest KBA and IBA is Tal Chappar Wildlife Sanctuary area, which is located on west of subproject town at an aerial distance of approx. 50 km. The details of the protected area are given in following section.

⁴³ IBAT is a multi-institutional programme of work involving BirdLife International, Conservation International, IUCN and UNEP-WCMC. IBAT provides a basic risk screening on biodiversity. It draws together information on globally recognised biodiversity information drawn from a number of IUCN's Knowledge Products: IUCN Red List of Threatened Species, Key Biodiversity Areas (priority sites for conservation) and Protected Planet/The World Database on Protected Areas (covering nationally and internationally recognised sites, including IUCN management categories I–VI, Ramsar Wetlands of International Importance and World Heritage sites).

D.3 Tal Chappar Wildlife Sanctuary

The area is nationally notified protected area under Wildlife Protection Act 1972, located on South west direction of the project town at an approx. 50 km nearest aerial distance. Figure-3 shows map of the Tal Chappar Wildlife Sanctuary area.

Tal Chapper sanctuary is located on Nokha- Sujangarh state Highway in the Sujangarh Tehsil of Churu District of Rajasthan State. The area of 7.19 sq.km within the Lat. 27°79'77.77" and Long. 74°43'71.30" was notified on 19th September 1962 as Wildlife Sanctuary for Black Buck (*Antilope cervicapra*). Tal Chapper sanctuary with almost flat tract and interspersed shallow low lying areas has open grassland with scattered Acacia and prosopis trees which give it an appearance of a typical Savanna. Some small hillocks and exposed rocks of slate and quartzite are found in the western side of the sanctuary. Area between hillocks and the sanctuary constitutes the watershed area of the sanctuary.

The salt pans located on the South-western boundary of the protected area. The migratory birds visit this area during winter starting from month of September. Birds commonly seen in the sanctuary are harriers, Eastern Imperial Eagle, Tawny Eagle, Short-toed Eagle, sparrow, and Little Green Bee-eaters, Black Ibis and Demoiselle Cranes, which have habitat in protected area by month of end March. The other bird species like skylark, crested lark, Ring Dove, brown dove and blue jay are seen throughout the year in the protected area. Desert fox and desert cat can also be spotted along with typical avifauna such as partridge and sand grouse.

Figure 3: Map showing Tal Chappar Wildlife Sanctuary and its distance from Project Town Laxmangarh



A. Critically Endangered / Endangered Species:

A total of 38 IUCN red list (CR, EN & VU) species reported within 50km radius. Out of these 38 IUCN red list species, 19 species are classified as Critically Endangered (CR) and Endangered (EN). Birds are common species which includes 27 species (CR-7, EN-8 & VU-12), 7 mammals (EN-2, VU-5), 2 reptile (EN-1, VU-1) and 2 plants (VU-2). Table-2 lists the species designated by the International Union for the Conservation of Nature (IUCN) as Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) having recorded ranges that include the study area.

Table 2: List of species designated by IUCN threatened species as CR, EN & VU

S.No.	Scientific Name	Common Name	IUCN Red List category
	Birds		
1	<i>Ardeotis nigriceps</i>	Great Indian Bustard	CR
2	<i>Leucogeranus leucogeranus</i>	Siberian Crane	CR
3	<i>Vanellus gregarius</i>	Sociable Lapwing	CR
4	<i>Gyps bengalensis</i>	White-rumped Vulture	CR
5	<i>Sarcogyps calvus</i>	Red-headed Vulture	CR
6	<i>Gyps tenuirostris</i>	Slender-billed Vulture	CR
7	<i>Gyps indicus</i>	Indian Vulture	CR
8	<i>Oxyura leucocephala</i>	White-headed Duck	EN
9	<i>Sypheotides indicus</i>	Lesser Florican	EN
10	<i>Sterna acuticauda</i>	Black-bellied tern	EN
11	<i>Haliaeetus leucoryphus</i>	Pallas's Fish-eagle	EN
12	<i>Neophron percnopterus</i>	Egyptian Vulture	EN
13	<i>Aquila nipalensis</i>	Steppe Eagle	EN
14	<i>Falco cherrug</i>	Saker Falcon	EN
15	<i>Leptoptilos dubius</i>	Greater Adjutant	EN
16	<i>Antigone antigone</i>	Sarus crane	VU
17	<i>Aquila heliaca</i>	Eastern imperial eagle	VU
18	<i>Aquila rapax</i>	Tawny eagle	VU
19	<i>Aythya ferina</i>	Common pochard	VU
20	<i>Clanga hastata</i>	Indian spotted eagle	VU
21	<i>Ciconia episcopus</i>	Asian woollyneck	VU
22	<i>Clanga clanga</i>	Greater spotted eagle	VU
23	<i>Columba eversmanni</i>	Yellow-eyed pigeon	VU
24	<i>Leptoptilos javanicus</i>	Lesser adjutant	VU
25	<i>Marmaronetta angustirostris</i>	Marbled teal	VU
26	<i>Rynchops albicollis</i>	Indian skimmer	VU
27	<i>Saxicola macrorhynchus</i>	White-browed bushchat	VU
	Mammals		
28	<i>Manis crassicaudata</i>	Indian Pangolin	EN
29	<i>Panthera tigris</i>	Tiger	EN
30	<i>Lutrogale perspicillata</i>	Smooth-coated otter	VU
31	<i>Melursus ursinus</i>	Sloth bear	VU
32	<i>Panthera pardus</i>	Leopard	VU
33	<i>Tetracerus quadricornis</i>	Four-horned antelope	VU
34	<i>Rusa unicolor</i>	Sambar	VU
	Reptile		
35	<i>Geoclemys hamiltonii</i>	Spotted pond turtle	EN
36	<i>Crocodylus palustris</i>	Mugger	VU
	Plant		
37	<i>Anacyclus pyrethrum</i>	Atlas daisy	VU
38	<i>Oryza malampuzhaensis</i>	Asian Rice	VU

E. Critical Habitat Assessment Process:

Habitats that are critical to the survival of International Union for the Conservation of Nature (IUCN) designated Critically Endangered or Endangered species, migratory species, congregatory species and endemic or restricted range species are classified as critical habitats.

The screening of Critical Habitat in the area has been conducted based on species which enlisted in red list of IUCN. The presence of habitat of these species in the area will designate Critical Habitat. There are five criterion set out in updated Performance Standard No 6 Guidance note (IFC 2019) to consider the area as Critical Habitat. The five criterion for Critical Habitat determination is:

Criterion 1: Critically Endangered and Endangered Species

Criterion 2: Endemic and Restricted range Species

Criterion 3: Migratory and Congregatory Species

Criterion 4: Highly Threatened or Unique Ecosystems

Criterion 5: Key Evolutionary Processes

Out of these five criteria, first three criteria are related to species and threshold of species enlisted in the IUCN Red list representing the risk of extinction of species at global level. While the criterion 4 & 5 are related to ecosystems and evolutionary processes. The brief description of criteria is mentioned in below sections.

E.1 Criterion 1: Critically Endangered and Endangered Species

Species threatened with global extinction and listed as CR and EN on the IUCN Red List of Threatened Species shall be considered as part of Criterion 1. Critically Endangered species face an extremely high risk of extinction in the wild. Endangered species face a very high risk of extinction in the wild.

As described in footnote 11 of Performance Standard 6, the inclusion in Criterion 1 of species that are listed nationally/regionally as CR or EN in countries that adhere to IUCN guidance shall be determined on a project-by-project basis in consultation with competent professionals.

Thresholds for Criterion 1 are the following:

- a) Areas that support globally important concentrations of an IUCN Red-listed EN or CR species ($\geq 0.5\%$ of the global population AND ≥ 5 reproductive units of a CR or EN species).
- b) Areas that support globally important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds.
- c) As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species.

E.2 Criterion 2: Endemic and Restricted range Species

For purposes of this Guidance Note, the term endemic is defined as restricted range. Restricted range refers to a limited extent of occurrence (EOO).

- For terrestrial vertebrates and plants, restricted range species are defined as those species that have an EOO less than 50,000 km².

- For marine systems, restricted range species are provisionally being considered those with an EOO of less than 100,000 km².
- For coastal, riverine, and other aquatic species in habitats that do not exceed 200 km width at any point (for example, rivers), restricted range is defined as having a global range of less than or equal to 500 km linear geographic span (i.e., the distance between occupied locations furthest apart).

The threshold for Criterion 2 is the following:

- a) Areas that regularly hold $\geq 10\%$ of the global population size and ≥ 10 reproductive units of a species.

E.3 Criterion 3: Migratory and Congregatory Species

Migratory species are defined as any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem).

Congregatory species are defined as species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis. Examples include the following:

- Species that form colonies.
- Species that form colonies for breeding purposes and/or where large numbers of individuals of a species gather at the same time for non-breeding purposes (for example, foraging and roosting).
- Species that utilise a bottleneck site where significant numbers of individuals of a species occur in a concentrated period of time (for example, for migration).
- Species with large but clumped distributions where a large number of individuals may be concentrated in a single or a few sites while the rest of the species is largely dispersed (for example, wildebeest distributions).
- Source populations where certain sites hold populations of species that make an inordinate contribution to recruitment of the species elsewhere (especially important for marine species).

Thresholds for Criterion 3 are the following:

- a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle.
- b) Areas that predictably support ≥ 10 percent of the global population of a species during periods of environmental stress.

E.4 Criterion 4: Highly Threatened or Unique Ecosystems

The IUCN is developing a Red List of Ecosystems, following an approach similar to the Red List for Threatened Species. The client should use the Red List of Ecosystems where formal IUCN assessments have been performed. Where formal IUCN assessments have not been performed, the client may use assessments using systematic methods at the national/regional level, carried out by governmental bodies, recognized academic institutions and/or other relevant qualified organizations (including internationally recognized Non-Government Organizations (NGOs)).

The thresholds for Criterion 4 are the following:

- a) Areas representing $\geq 5\%$ of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN.
- b) Other areas not yet assessed by IUCN but determined to be of high priority for conservation by regional or national systematic conservation planning.

E.5 Criterion 5: Key Evolutionary Processes

The structural attributes of a region, such as its topography, geology, soil, temperature, and vegetation, and combinations of these variables, can influence the evolutionary processes that give rise to regional configurations of species and ecological properties. In some cases, spatial features that are unique or idiosyncratic of the landscape have been associated with genetically unique populations or subpopulations of plant and animal species. Physical or spatial features have been described as surrogates or spatial catalysts for evolutionary and ecological processes, and such features are often associated with species diversification. Maintaining these key evolutionary processes inherent in a landscape as well as the resulting species (or subpopulations of species) has become a major focus of biodiversity conservation in recent decades, particularly the conservation of genetic diversity. By conserving species diversity within a landscape, the processes that drive speciation, as well as the genetic diversity within species, ensures the evolutionary flexibility in a system, which is especially important in a rapidly changing climate.

For illustrative purposes, some potential examples of spatial features associated with evolutionary processes are as follows:

- Landscapes with high spatial heterogeneity are a driving force in speciation, as species are naturally selected based on their ability to adapt and diversify.
- Environmental gradients, also known as ecotones, produce transitional habitat, which has been associated with the process of speciation and high species and genetic diversity.
- Edaphic interfaces are specific juxtapositions of soil types (for example, serpentine outcrops, limestone, and gypsum deposits), which have led to the formation of unique plant communities characterized by both rarity and endemism.
- Connectivity between habitats (for example, biological corridors) ensures species migration and gene flow, which is especially important in fragmented habitats and for the conservation of metapopulations. This also includes biological corridors across altitudinal and climatic gradients and from “crest to coast.”
- Sites of demonstrated importance to climate change adaptation for either species or ecosystems are also included within this criterion.

F. Critical Habitat Assessment in PAI

A critical habitat assessment has been carried out using the above mentioned five criterion of Performance Standard No 6 Guidance note (IFC 2019).

F.1 IBAT study output for habitat analysis (Criteria 1-3)

A habitat analysis carried out for the Critically Endangered (CR) and Endangered species (EN) reported in the project area of influence (50km) shows that it is likely that the 38 species identified in IBAT are mostly located inside the ecological areas and not within the project area of influence (PAI). Details of the habitat analysis in the PAI is presented in Table-3.

Table 3: Habitat Analysis in PAI – Laxmangarh Subproject

S. No.	Common Name (Species Name)	IUCN Category	Habitat Preferences	Likelihood of Occurrence in PAI
Birds				
1	Great Indian Bustard (<i>Ardeotis nigriceps</i>)	CR	Grassland - Subtropical/Tropical Dry	None: Possible range extend in State of Rajasthan. The species occurs in the Indian Subcontinent, with strongholds in the Thar desert in the north-west and the Deccan tableland of the Peninsula. Mainly found in Western Rajasthan with small population in in Gujarat, Maharashtra, Andhra Pradesh and Karnataka. https://www.iucnredlist.org/species/22691932/134188105#geographic-range
2	Siberian Crane (<i>Leucogeranus leucogeranus</i>)	CR	Grassland, Wetlands (inland), Artificial/Terrestrial	None: Possible habitat range has extinct from State of Rajasthan, migratory bird was visiting Wetlands in Eastern parts of the State. https://www.iucnredlist.org/species/22692053/134180990 ;
3	Sociable Lapwing (<i>Vanellus gregarious</i>)	CR	Desert, Wetlands (inland), Grassland, Artificial/Terrestrial	None; The species occurs in the north-west part of India, as non-breeding habitat, mainly in Great Rann of Kutch. https://www.iucnredlist.org/species/22694053/130586388#habitat-ecology
4	White-rumped vulture (<i>Gyps bengalensis</i>)	CR	Forest, Grassland, Shrubland, Savanna, Artificial/Terrestrial	Yes, the species habitat in South Asia and South-east Asia. Habitat reported in North India including Rajasthan state. https://www.iucnredlist.org/species/22695194/118307773
5	Red-headed Vulture (<i>Sarcogyps calvus</i>)	CR	Forest, Grassland, Shrubland, Savanna, Artificial/Terrestrial	Yes; distributed in parts of Rajasthan State, habitat extend mainly in North India. https://www.iucnredlist.org/species/22695254/118371885
6	Slender-billed Vulture (<i>Gyps tenuirostris</i>)	CR	Forest, Savanna, Shrubland, Grassland, Artificial/Terrestrial	None; The species habitat occurs in Himalayas covering North to Northeast state of India. Habitat range extinct from other parts of Country.

S. No.	Common Name (Species Name)	IUCN Category	Habitat Preferences	Likelihood of Occurrence in PAI
				https://www.iucnredlist.org/species/22729460/117367614
7	Indian Vulture (<i>Gyps indicus</i>)	CR	Forest, Grassland, Shrubland, Savanna, Artificial/Terrestrial	Yes; possibility of habitat in Rajasthan, species breeds in south-east Pakistan and peninsular India south of the Gangetic plain, north to Delhi, east through Madhya Pradesh, south to the Nilgiris, and occasionally further south. https://www.iucnredlist.org/species/22729731/117875047
8	White-headed Duck (<i>Oxyura leucocephala</i>)	EN	Wetlands (inland), Artificial/Aquatic & Marine, Marine Coastal/Supratidal	None: Habitat range in South Asia is limited to Pakistan and rarely reported in India. https://www.iucnredlist.org/species/22679814/119403602
9	Egyptian Vulture (<i>Neophron percnopterus</i>)	EN	Rocky areas (eg. inland cliffs, mountain peaks), Wetlands (inland), Grassland, Shrubland, Savanna, Artificial/Terrestrial	Yes; extend of migratory bird species breeding habitat during winter in India including Rajasthan state. https://www.iucnredlist.org/species/22695180/154895845
10	Steppe Eagle (<i>Aquila nipalensis</i>)	EN	Rocky areas (eg. inland cliffs, mountain peaks), Grassland, Savanna	Yes; extend of migratory bird species non-breeding habitat during winter in India including Rajasthan state. https://www.iucnredlist.org/species/22696038/155419092
11	Saker Falcon (<i>Falco cherrug</i>)	EN	Marine Intertidal, Wetlands (inland), Grassland, Shrubland, Artificial/Terrestrial	Yes; extend of migratory bird species non-breeding habitat during winter in India including Rajasthan state. https://www.iucnredlist.org/species/22696495/110525916
12	Greater Adjutant (<i>Leptoptilos dubius</i>)	EN	Forest, Wetlands (inland), Artificial/Terrestrial, Grassland	None; in India species breeding habitat extend is limited in Assam and Bihar state only. https://www.iucnredlist.org/species/22697721/93633471
13	Black-bellied Tern (<i>Sterna acuticauda</i>)	EN	Wetlands (inland)	None: breeding range extend into parts of India excluding Rajasthan State. https://www.iucnredlist.org/species/22694711/110488626

S. No.	Common Name (Species Name)	IUCN Category	Habitat Preferences	Likelihood of Occurrence in PAI
14	Lesser Florican (<i>Sypheotides indicus</i>)	EN	Grassland, Artificial/Terrestrial	Yes; possibility of habitat in Rajasthan state as species breeds in Gujarat, Rajasthan, Maharashtra, Madhya Pradesh & Andhra Pradesh. https://www.iucnredlist.org/species/22692024/110438391
15	Pallas's Fish-eagle (<i>Haliaeetus leucoryphus</i>)	EN	Wetlands (inland)	None; breeding habitat of the bird species is mainly in northern India (apparent strongholds in Assam and Uttarakhand). The species resident habitat is found near water reservoir. https://www.iucnredlist.org/species/22695130/131934599
16	Sarus crane (<i>Antigone antigone</i>)	VU	Grassland, Artificial/Terrestrial, Wetlands (inland), Artificial/Aquatic & Marine	None; habitat extend of the bird species resident is mainly in Uttar Pradesh State and nearby areas of surrounding states, breeding habitat during winter extended in adjoining areas of Rajasthan state. https://www.iucnredlist.org/species/22692064/93335364
17	Eastern imperial eagle (<i>Aquila heliaca</i>)	VU	Forest, Wetlands (inland), Grassland, Shrubland, Artificial/Terrestrial	None; in India species non-breeding habitat extend is limited in Northern parts only. https://www.iucnredlist.org/species/22696048/155464885
18	Tawny eagle (<i>Aquila rapax</i>)	VU	Forest, Grassland, Shrubland, Savanna, Artificial/Terrestrial	Yes; habitat extend of the bird species resident is mainly in central India including Rajasthan state https://www.iucnredlist.org/species/22696033/131671001
19	Common pochard (<i>Aythya ferina</i>)	VU	Marine Neritic, Wetlands (inland), Marine Coastal/Supratidal, Artificial/Aquatic & Marine	None; the migratory bird specie's non-breeding habitat extend during winter season is limited in eastern and northern parts of India https://www.iucnredlist.org/species/22680358/155473754
20	Asian woollyneck (<i>Ciconia episcopus</i>)	VU	Marine Intertidal, Forest, Artificial/Terrestrial, Artificial/Aquatic & Marine, Grassland, Wetlands (inland), Marine Neritic	Yes; the species is found patchily across South Asia and South East Asia, range extends throughout India https://www.iucnredlist.org/species/22727255/110064997

S. No.	Common Name (Species Name)	IUCN Category	Habitat Preferences	Likelihood of Occurrence in PAI
21	Greater spotted eagle (<i>Clanga clanga</i>)	VU	Forest, Wetlands (inland), Shrubland, Artificial/Aquatic & Marine, Grassland	Yes; the species non-breeding habitat is found across South Asia and South East Asia, range extends throughout northeast and Northern India https://www.iucnredlist.org/species/22696027/110443604
22	Yellow-eyed pigeon (<i>Columba eversmanni</i>)	VU	Desert, Caves and Subterranean Habitats (non-aquatic), Wetlands (inland), Shrubland, Artificial/Terrestrial	None; in India species non-breeding habitat extend is limited in north-west parts including parts of Rajasthan State. https://www.iucnredlist.org/species/22690097/110099638
23	Indian skimmer (<i>Rynchops albicollis</i>)	VU	Wetlands (inland)	Yes; the species is found patchily across India; range extends throughout Rajasthan State. https://www.iucnredlist.org/species/22694268/110600990
24	White-browed bushchat (<i>Saxicola macrorhynchus</i>)	VU	Desert, Grassland, Shrubland	None; the species is endemic to the north-west Indian subcontinent, distribution recorded in Punjab, Haryana, Uttar Pradesh, Rajasthan and Gujarat. Recent records of this species from Tal Chhapar in Churu district of Rajasthan State. https://www.iucnredlist.org/species/22710160/110578039
25	Indian spotted eagle (<i>Clanga hastata</i>)	VU	Forest, Wetlands (inland), Artificial/Terrestrial	None; the species has widespread range of habitat covering almost whole country, except western part of Rajasthan and Northern Gujarat. Last reported in 2014 from Tal Chhapar in Churu district of Rajasthan State. https://www.iucnredlist.org/species/22729779/95021573#geographic-range
26	Lesser adjutant (<i>Leptoptilos javanicus</i>)	VU	Forest, Savanna, Wetlands (inland), Marine Intertidal, Marine Coastal/Supratidal, Artificial/Terrestrial, Artificial/Aquatic & Marine	None; the non-resident habitat range of species is covering parts of Rajasthan state; however the resident and breeding habitat is mostly in Assam, [Choudhury 2000], West Bengal and Bihar, [Mishra et al. 2004]. Last reported from Keoladeo National Park in 1989. https://www.iucnredlist.org/species/22697713/110481858

S. No.	Common Name (Species Name)	IUCN Category	Habitat Preferences	Likelihood of Occurrence in PAI
27	Marbled teal (<i>Marmaronetta angustirostris</i>)	VU	Wetlands (inland), Marine Coastal/Supratidal, Artificial/Aquatic & Marine	None; the non-resident habitat range of species is North-West India i.e. area of Rajasthan and Punjab State near Pakistan border. https://www.iucnredlist.org/species/22680339/110054350
Mammals				
28	Indian Pangolin (<i>Manis crassicaudata</i>)	CR	Forest, Savanna, Shrubland, Artificial/Terrestrial, Grassland	Yes; species is distributed in South Asia through much of India including Rajasthan https://www.iucnredlist.org/species/12761/123583998
29	Tiger (<i>Panthera tigris</i>)	EN	Forest, Shrubland, Grassland	None; the habitat of species is isolated and limited to nationally protected areas. In subproject area vicinity mainly reported from Sariska Tiger Reserve National Park, which is over 100 km away. https://www.iucnredlist.org/species/15955/50659951
30	Smooth-coated otter (<i>Lutrogale perspicillata</i>)	VU	Artificial/Aquatic & Marine, Wetlands (inland), Forest, Grassland, Marine Coastal/Supratidal, Marine Neritic, Marine Intertidal, Shrubland	Yes; species is distributed in South Asia through much of India including Rajasthan https://www.iucnredlist.org/species/12427/21934884
31	Sloth bear (<i>Melursus ursinus</i>)	VU	Forest, Savanna, Shrubland, Grassland, Artificial/Terrestrial	None; the habitat of species is fragmented and isolated to nationally protected areas. In subproject area vicinity mainly reported from Sariska Tiger Reserve National Park, which is over 100 km away. https://www.iucnredlist.org/species/13143/166519315
32	Leopard (<i>Panthera pardus</i>)	VU	Forest, Desert, Rocky areas (eg. inland cliffs, mountain peaks), Grassland, Savanna, Shrubland	None; Leopard range widespread in inside and outside Protected Areas of India. https://www.iucnredlist.org/species/15954/160698029
33	Four-horned antelope (<i>Tetracerus quadricornis</i>)	VU	Forest, Shrubland	None; species habitat is extended most parts of India including Rajasthan https://www.iucnredlist.org/species/21661/50195368

S. No.	Common Name (Species Name)	IUCN Category	Habitat Preferences	Likelihood of Occurrence in PAI
34	Sambar (<i>Rusa unicolor</i>)	VU	Forest, Artificial/Terrestrial, Savanna, Shrubland, Grassland, Wetlands (inland)	None; the habitat extend is throughout India except North India and western parts of Rajasthan and Gujarat state. https://www.iucnredlist.org/species/41790/85628124
Reptile				
35	Spotted pond turtle (<i>Geoclemys hamiltonii</i>)	VU	Wetlands (inland), Artificial/Aquatic & Marine	None; the habitat is extended to the lowlands of the Indus, Ganga and Brahmaputra River basins and from Ponds with water throughout the year in Rajasthan. In project state last reported from water reservoir of Keoladeo National Park Bharatpur. https://www.iucnredlist.org/species/9029/152050337
36	Mugger (<i>Crocodylus palustris</i>)	VU	Wetlands (inland), Marine Neritic, Artificial/Aquatic & Marine	None; the species habitat extends in India to waterbodies including rivers, in Rajasthan State mainly in River Chambal. https://www.iucnredlist.org/species/5667/3046723
Plant				
37	Atlas daisy (<i>Anacyclus pyrethrum</i>)	VU	Rocky areas (eg. inland cliffs, mountain peaks), Forest, Grassland, Shrubland	Yes; the plant species is native to India and extend of occurrence in Rajasthan State. https://www.iucnredlist.org/species/202924/121743450
38	Asian Rice (<i>Oryza malampuzhaensis</i>)	VU	Particularly found in forest reserves either in marshy fields or along the margins of streams or rivulets in the forest interiors	None; the species is endemic to the Kerala region in India. https://www.iucnredlist.org/species/112680709/113899465

F.2 Assessment output based on Criteria 4 & 5:

The ecosystem within the project area of influence has not been assessed to date under IUCN assessment for the extinction threat to species. The ecosystem within the PAI is not considered to be highly threatened, as main land use is of residential, commercial & industrial in urban or agricultural in the surrounding locality. Further, there are no key evolutionary processes⁴⁴ within the PAI, as the key indicator for evolutionary process areas is presence of a high number of endemic or range restricted species. Therefore, the project area of influence does not meet the thresholds set out in Criterion 4 & 5.

F.3 Protected Areas:

As per ADB's SPS 2009; the designated⁴⁵ or proposed protected areas at national and international level should be considered as Critical Habitat. In the PAI for subproject in Laxmangarh Town there is no national protected area and no international designated site or proposed and notified protected area. The nearest national protected area is Tal Chappar Wildlife Sanctuary, which is approx. 50 km away from the PAI boundary established for critical habitat assessment study.

G. Impacts & Mitigation Measures

The project components are proposed to be implemented within the developed areas of Laxmangarh Town and on land under municipal limits. The project area is approx. 50 km (nearest aerial distance) away from the boundary of Tal Chappar Wildlife Sanctuary. The protected area of Tal Chappar has also been established as an IBA site due to migratory birds visit the area during winter season.

The species of vulture and eagle reported from Tal Chappar wildlife sanctuary or passing by may visit the project area mainly in Laxmangarh Bihad or wetland from wastewater; due to extend range of habitat or in search of food during migration period. The availability of these species in the PAI need to be confirmed with local community and district forest and wildlife department.

Implementation of subproject for water supply will result in increase in waste water in reservoir. It is generally known that birds generally migrate in winter season to the water reservoir made of waste water. This will add chances to increase in food sources and settler and nesting ground for local and migratory birds.

Construction workers may hunt, birds or carry out other activities that will negatively impact wildlife. No construction or labour camps, batching plants, and quarrying activities will be allowed within or near the forest area. The contractor will clearly brief the construction workers on strict forestry rules on illegal harvesting of forest products and poaching of wildlife. Contractor will ensure supply of all necessary food items; cooking fuel and proper housing is provided to prevent illegal hunting and tree felling.

The operation of various construction equipment is likely to generate significant noise. Noise disturbance may cause migration of the birds to other areas which may increase the probability of habitat loss. Setting of construction camp near forests or protected area may generally disturb surrounding fauna.

The impacts on avifauna can be mitigated by following measures:

⁴⁴ The evolutionary processes often occur in an isolated habitat and ecosystem due to physical or biological barriers, for example habitat on islands or valley.

⁴⁵ As per ADB's SPS the sites which are of international designation, such as Ramsar and UNESCO sites should be considered as Critical Habitat.

- Project improvement proposals are restricted to available land with minimal tree cutting.
- Adequate measure is included in the design for development of green belt development and horticulture plantation scheme at water treatment plant area.
- Noise generating equipment like DG set, compressors will have acoustic enclosures. Noise generating activities should not be permitted during night.
- Workers should be warned about wild life protected areas and possible movement.
- project staff and work crews should not be allowed to have fire-arms and animal traps etc.;
- construction facilities such as workers camp, construction camp, batching plant should be located at least 1 km away from any the forest stretches (Laxmangarh Bihad).
- employment agreements should specify heavy penalties for illegal hunting, trapping and wildlife trading – all other ancillary works should also agree not to participate in such activities.
- Strict anti-poaching surveillance measures need to be implemented, especially during project construction phase.

The anticipated impacts on ecological system due to project and proposed mitigation measures for EMP are provided in Table -4.

Table 4: Impact-mitigation measures for EMP

Field	Anticipated Impact	Mitigation Measure	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
Design					
Site selection for project component implementation	Disruption of biodiversity & damage to habitat due to project infrastructure at specified location	(i) Avoid or no land acquisition in forest area or in notified wildlife area	PIU/PMU	PMU	No cost required Mitigation measures are part of project design
Water in wastewater drain and tree cutting	Sources of food and water for birds in the area	(i) Green belt and landscaping development plan at location of water treatment plant	PIU/PMU	PMU	No cost required mitigation measures are part of project design
Permission	Failure to obtain necessary permits for tree cutting can result to design revisions and/or stoppage of works	(i) Ensure all permission before start of construction in place (ii) Removal of trees after verification and approval from concerned agency (iii) Plantation of three trees against every single tree removed	PIU/PMU	PMU	No cost required mitigation measures are part of project design
Construction					
Construction camp location	Impacts on forest resources for establishing construction camp and plants.	(i) Prior approvals for establishing construction facilities from PMU with submission of location details (ii) Construction facilities such as workers camp, construction camp, batching plant should be located at least 1 km away from the forest stretches	Construction Contractor	PMU	Cost for implementation of mitigation measures responsibility of contractor
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	(i) Impact due to noise generated from project activities (ii) Contamination of water and soil due to construction waste disposal in forest area	(i) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers to reduce impact to surrounding sensitive receptor; and (ii) Prepare and implement construction waste management plan	Construction Contractor	PMU	Cost for implementation of mitigation measures responsibility of contractor

Field	Anticipated Impact	Mitigation Measure	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		(iii) Disposal of waste at designated sites and approval from local authorities (iv) Conduct surface quality monitoring according to the EMP.			
Construction Workers	Involvement in illegal hunting, trapping and wildlife trading	(i) Awareness training to workers on wildlife presence in the project area and protection of wildlife. (ii) Reporting to PMU on slighting of wild animals in the project area. (iii) Employment agreements should specify heavy penalties for illegal hunting, trapping and wildlife trading – all other ancillary works should also agree not to participate in such activities. (iv) Strict anti-poaching surveillance measures need to be implemented, especially during project construction phase	Construction Contractor	PMU	Cost for implementation of mitigation measures responsibility of contractor
Operational Stage					
Project area development	Failure of water treatment plant, plantation of non-fruit bearing trees, Contamination of water source or agriculture fields due to increased quantity of untreated wastewater	(i) Regular monitoring of quality of rejected water before discharge or reuse for plantation and irrigation purposes (ii) Tree plantation and landscaping in the project area as per approved plan with preference to local species	O&M Contractor	Laxmangarh Nagar Palika	Contractor' s O&M cost

H. Conclusion

ADB SPS's requires that project will not be developed in critical habitat area or will not adversely affect the identified critical habitat. The below mentioned criteria should be considered for assessment of impacts on biodiversity, if project development in an identified critical habitat:

- There should be no measurable adverse impacts, or likelihood of such impacts on the critical habitat which could deteriorate its high biodiversity value or the ability to function of ecology of the area.
- The project is not anticipated to lead to a reduction in the population of any recognized endangered or critically endangered species or a loss in area of the habitat concerned such that the persistence of a viable and representative of host ecosystem be compromised.
- Any lesser impacts are mitigated.

This assessment study for Critical Habitat indicates that within the PAI there are no known species which would qualify the area as Critical Habitat for Criterion 1 - 3. Further, within the PAI there is no chance that migratory bird species may visit in the area of wetlands/pond. The presence of birds in area need to be confirmed with local community and divisional forest & wildlife department. However, the PAI does not qualify as Critical Habitat under Criteria 4 and 5.

The implementation of project component is not anticipated to trigger in a population reduction of any recognized endangered or critically endangered species or a loss in area of the habitat for wildlife. The construction activities of the project may lead to some impacts on biodiversity and ecosystem in the area, these impacts can be mitigated with application of measures in design and construction phase.

I. Recommendation

Following are the recommendations to support and reconfirm the identified potential adverse impacts and suggested mitigation measures for biodiversity due to project implementation:

- i. PIU should conduct consultation before start of work with local community in subproject area and district forest and wildlife department to know presence of IUCN red list species as mentioned (refer Table -3) in this assessment report.
- ii. Local biodiversity expert is deployed by PMU to further verify the presence of IUCN red list species in the subproject area and no IUCN red list species was observed in PAI.
- iii. On confirmation of enlisted species in the subproject area, same will be reported to PIU and do not start of works on site until clearance from PIU.
- iv. Update Environmental management plan based on findings/verification of IUCN species in the subproject area, and
- v. The finding/presence of IUCN red list species in the subproject area are confirmed in course of construction work, PIU shall stop the work and coordinate with forest department for the translocation of species.

Appendix 9: Sample chance find protocol

Introduction

Project town being a heritage town, there are possibility of any chance finds (artefacts) recovery during excavations. Contractors working at heritage towns must take additional care not to destroy or damage historic features during excavations. There may be many buried historic features in heritage towns such as – idols, toys, wells, ancient drains, remains of buildings, other walls, grain pits, etc. Every care must be made not to destroy these during excavations.

Excavator drivers need to be instructed to be aware of hitting buried features and that they must be investigated before continuing work. When features are encountered during mechanical excavation, work should stop and the PIU/Consultants engineers must be informed immediately so that they can be inspected at the first opportunity.

When historic features such as walls, brick constructions and other features are encountered during excavation the excavation must be stopped immediately and the PIU/Consultants must be informed immediately.

- 1.1 **Contractors' instruction:** As soon as contractor recovers any chance find during any excavation works for pipe laying, they should immediately inform PIU/Consultant present in town about the chance find recovery. Immediately stop the excavation activity near point of recovery. After PIU/consultants engineers come at site, contractor should follow cleaning and photography in supervision of PIU/Consultant engineers.
- 1.2 **Cleaning** - When a feature/chance find is discovered it must be defined by careful cleaning. Roots must be removed and dirt must be carefully cleaned away. The section or trench base should also be cleaned back for a little distance around the feature.
- 1.3 **Record photography** – When the feature is clean good photography should be taken – vertical and face-on shots and a few general shots of the feature, also showing its position in relation to surrounding features, buildings, etc. The photographed should be catalogued (date, location, direction of shot)
- 1.4 **Drawn record** -When features/chance finds are revealed a drawn record should also be made.
 - a. General location record – measuring its position and orientation within the protected site / in relation to surrounding structures
 - b. Record drawings – detail drawings made in plan and section/profile. The extent (edges) of the feature should be drawn and the level of the existing ground surface and the top and base of the feature should be recorded. These levels should be marked on the drawings. The drawings should include detail of the construction of the feature. Perspective sketches could also be made if necessary. Explanatory notes can also be put on the drawings.
- 1.5 **Reporting finds** - When finds are made these should be reported to PIU/Consultants. Photographs and record drawings should be sent.
- 1.6 **Discovery of historic objects** - When clearance and excavation takes place artifacts and historic objects are sometimes found. These should be recovered and kept in a safe place. The place of discovery should be recorded and each find given a number and tag tied to the find with the same number on it. A list of the finds should be kept (with the find No. And place of discovery and date of discovery recorded).
- 1.7 **PIU/Consultants responsibility-** PIU/Consultants should inform in written to the State Archaeological Department at the earliest with photographs and request to Archaeology Department to visit the site and hand over the chance finds to them.

Appendix 10: Salient features of the IGNP canal (Source of surface water)

Indira Gandhi Nahar Project is an excellent example of courageous fight of man against oddness of nature. Aim of this ambitious project is to irrigate the thirsty desert land of Western Rajasthan with Himalaya's water and provide drinking water to crores of inhabitants of this area.

Origin of this canal is from Harike barrage situated in Punjab. From Harike, 204 Km. long Indira Gandhi Feeder off-takes, which has 170 Km. length in Punjab & Haryana and balance 34 Km. in Rajasthan. This canal enters in Rajasthan at Hanumangarh. From tail of Indira Gandhi Feeder 445 Km. long Indira Gandhi Main Canal starts which passes through Sri Ganganagar and Bikaner districts and ends at Mohangarh in Jaisalmer. The Project has been envisaged for utilization of 7.59 MAF water out of Rajasthan's share in surplus water of Ravi- Beas rivers.

Objectives of Project

- To provide irrigation facilities in desert area to meet the increasing demand of agricultural products.
- To provide water for drinking and industrial uses.
- Drought proofing of the area and improving living conditions.
- To meet the needs of drinking water, fodder etc. for the animal wealth in the region.
- To provide opportunities for employment and overall development of the area.

Status of Project

For administrative convenience, project has been divided in two stages. The 393 Km. long canal portion (Feeder 204, Main canal 189) from Harike barrage to Pugal in Bikaner distt. i.e. up to 620 RD of Main Canal, with its distribution system (excluding Sahwa lift) is called stage-I. Original work of this stage has been completed and major portion of this stage (except Kanwar Sain lift) has been transferred to Water Resources Deptt. for operation and maintenance.

At present, work of stage-II of Indira Gandhi Nahar Project is under progress. The area downstream to RD 620 of Main canal with its distribution system (including Sahwa lift) is in stage-II. Length of main canal in this stage is 256 Km., which extends from Pugal to Mohangarh. Work of Main canal was completed in 1986.

As per project estimate of year 1993 and decisions taken by State Govt. in year 1995 & 1997 total Culturable Command Area (CCA) of project was 19.63 lac hectare (5.53 lac hectare in stage-I + 14.10 lac hectare in stage-II). In view of reduced availability of water for irrigation in project, State Govt. in year 2005 took decision to complete canal construction works in 16.17 lac hectare culturable command area. This area has been opened for irrigation after completion of canal construction works. However CADWM works in lift schemes of Stage –II is remaining, where works for development of pressure irrigation system has been started.

Pressure Irrigation system in lift schemes of IGNP Stage-II

For efficient and optimum use of water available in project, it has been decided to establish sprinkler irrigation system in lift schemes of stage-II. A pilot project of sprinkler irrigation was taken up in 27449 hectare in the year 2007-08, in which all works to be executed by department has been completed. All Water User Associations (W.U.A.) proposed in this area has been constituted and irrigation with sprinklers has been started in most of the area. To establish sprinkler irrigation system in remaining area of stage-II lift schemes, sanction has been received from Ministry of

Water resources, Government of India for inclusion of project costing Rs.1658.81 crores under Command Area Development and Water Management Programme, under which 50% cost will be received as Central assistance. Pressure irrigation works under this project has been started in 3 canals of Ch. Kumbha Ram Lift Scheme and 4 other works has been in Ch. Kumbha Ram Lift, Dr.Karni Singh Lift and PannalalBarupal lift schemes.

SCADA System

SCADA system has been installed in project for effective control on water regulation and distribution in canals through latest techniques. Quantity of water flowing in Main Canal and other important canals of-taking from main canal is available at main controlling places of project. This is also available on Internet. Extension of this system on some new locations is under process.

Benefits

With completion of most of the construction work as above, IGNP has benefited the state as under-

- Irrigation is being done every year in this area, where, earlier it was very difficult to arrange even drinking water.
- Drinking water from this canal is being supplied to various villages, towns & cities of Bikaner, Jodhpur, Sri Ganganagar, Hanumangarh, Jaisalmer, Jodhpur, Churu, Nagaur and Barmer.
- Water for Power generation is being supplied to various power projects of Suratgarh, Barsingsar, Guda, Ramgarh, Giral, Rajwest etc. and various Industries.
- Elimination of drought conditions.
- Remarkable improvement in socio-economic conditions of the people and increase in all economic activities.
- Rise in ground water table.

Source :

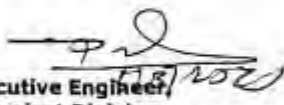
<http://water.rajasthan.gov.in/content/water/en/indiragandhinahardepartment/AboutUs.html#>

Appendix 11: Surface Water Allocation Letter from Executive Engineer, PHED**OFFICE OF THE EXECUTIVE ENGINEER, PHED, LAXMANGARH****S.No: 417****Dated: 04.03.2020****Chief Engineer
RUIDP, Jalpur****Sub: Surface water allocation for Laxmangarh town.**

Sir,

In reference to the above cited subject Laxmangarh town is covered under Fatehpur-Laxmangarh Water Supply Project of Laxmangarh town and source of water is from Kumbha Ram Lift Canal. The project is in execution stage and water starts getting in town. Water allocation for Laxmangarh town for year 2041 is 12.03 MLD.

Submitted for your information.


**Executive Engineer,
Project Division
PHED, Laxmangarh(Sikar)**

Appendix 12: Feasibility report of tube wells


 Government of Rajasthan
 Office of The Incharge Hydrogeologist (S&R),
 Ground Water Department, Sikar

Phone 01573-257877
 Fax-01572-257877
 E-mail: Hydrokarit@gmail.com
 Date 30/08/2019

NO. 525
 TO
 ✓ Executive Engineer
 PHED, Division Lachmangarh

FEASIBILITY REPORT FOR SOURCE : Three Phase T/W

Sr No	Name of Village / Town	Tehsil / Block	Location of Source	Expected Water level in Meters	Depth Recommended in mts. with Size in inch	Casing Recommended in mts. with size in inch	Expected discharge in LPH	Hydrogeological Formation	Type of Rig Recommended	Chemical Parameters of Nearby Source				Remarks	
										FDS	CL	NO ₃	F		
1	GHASOLI	Lachmangarh	Near Govt School	55-60 (444)	110-120 (200)	115-120 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	—
2	KAJAS	Lachmangarh	Idgar Masjid ke pas	45-50 (444)	140-150 (200)	25-100 (200)	8000 (2000)	Alluvium/L to Sc	Rotary/DTH	—	—	—	—	—	T/W
3	GAJOD	Lachmangarh	Nayko si dhara	55-60 (444)	140-150 (200)	90-100 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	T/W
4	KHICHADO BISHAM	Lachmangarh	SC Bani kankali darga	45-50 (444)	140-150 (200)	25-100 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	T/W
5	SINGODHARA	Lachmangarh	Public QW	55-60 (444)	140-150 (200)	90-100 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	T/W
6	MADHOPUR (BALAJI)	Lachmangarh	Motiyan jhota	55-60 (444)	140-150 (200)	90-100 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	T/W
7	KHORI	Lachmangarh	Nayak dora	55-60 (444)	125-130 (200)	90-100 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	T/W
8	MIRAJWAS	Lachmangarh	Mokdara jhota	55-60 (444)	140-150 (200)	100-110 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	T/W
9	SINGOLA NAGRA	Lachmangarh	Sardara madhrala ke pas	55-60 (444)	140-150 (200)	90-100 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	T/W
10	WARSAR	Lachmangarh	Nasara jhota	55-60 (444)	140-150 (200)	115-120 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	T/W
11	KALSAR	Lachmangarh	Near to Kalsar	55-60 (444)	140-150 (200)	90-100 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	T/W
12	GONDARWAS	Lachmangarh	Anand ke pas	40-45 (444)	135-140 (200)	85-90 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	T/W
13	KUMAR SAWAR	Lachmangarh	Gomaya rasta sagara	55-60 (444)	140-150 (200)	100-110 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	T/W
14	MAHOLI	Lachmangarh	Maoli ke pas	55-60 (444)	140-150 (200)	100-110 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	T/W
15	KALAKA	Lachmangarh	Kalaka ke pas	55-60 (444)	140-150 (200)	100-110 (200)	8000 (2000)	Alluvium/Qz to Sc	Rotary/DTH	—	—	—	—	—	T/W

Date 30/8/19

INCHARGE HYDROGEOLOGIST
GARY N. BIRKAC

INCHARGE HYDROGEOLOGIST
GWD (5N/3) SICKER

Appendix 13: Location details of tube wells

Appendix 14: Preliminary audit note on existing facilities

Environmental Audit of Existing Water Supply System at Laxmangarh Town, District-Sikar, Rajasthan

I. Introduction

1. Under the ADB funded Rajasthan Secondary Town Development Sector Project (RSTDSP), it is proposed to develop water supply system (water supply distribution and transmission network, Construction of Clear Water Reservoir and rehabilitation of existing infrastructure of water supply system) in Laxmanagarh, District-Sikar, Rajasthan. Presently about 70-80% area of municipality limit is covered under the drinking water supply scheme by PHED. Remaining areas which is newly developed and newly added to the municipality area is remain unconnected with piped scheme. Presently source of Laxmangarh town is ground water. The town is benefited from 34 no. of tube wells at various locations in the city. Out of this, 12 tube wells are connected to Clear Water Reservoir (CWR) at AEN Head Works whereas 11 tube wells are connected to CWR at Bad ke Balaji Head Works. 34 TWs considered as GW source. Water collected from 34 nos tube wells are collected at CWRs at AEN office and Public Health Engineer Department (PHED) Campus at Bad Ke Balaji. Further it is it transferred to Elevated Storage Reservoir (ESR) available at various locations in the town. Presently, about 70-80% area of municipality limit is covered under the drinking water supply scheme by PHED. Remain area which is newly developed and newly added to the municipality area remains unconnected with piped scheme. Currently water supply service in Laxmangarh town is unreliable coupled with quality issues and huge distribution losses. At present, an intermittent water supply system is running in the town with actual service level 100 LPCD at consumers' end, which will improved to 135 LPCD after full commissioning of Fatehpur-Laxmangarh water supply project of PHED. At present it is partially commissioned and water is received at both the Headworks at Bad Ke Balaji and A.En. campus. After commissioning of this project, water will be provided 12m Head with continuous supply.

All the TWs and OWs are connected to direct distribution and cannot be considered as sustainable source as they have very low discharge yield. A package "Fatehpur-Laxmangarh Water Supply project" was sanctioned by PHED and under execution. Laxmangarh will get deficit water (excluding GW) from this project of PHED Rajasthan source as Kumbha Ram Lift Canal." The work of pipeline system from canal off take point to A. En. HW and Bad ke Balaji HW has been completed. 500 mm DI pipe has been laid from canal off take to A. En HW and Bad ke Balaji HW. Presently Total water abstracted from Tube Wells is 4.14 MLD (34 TWs) and availability of 12.06 MLD (2041) water allocation from the "Fatehpur-Laxmangarh Water Supply Project". Treated water will be available from "Fatehpur-Laxmangarh Water Supply Project" of PHED up to Bad ke Balaji and A.En. Campus H/w of Laxmangarh town. WTP of this scheme is at Dhannasar.

II. Description of the existing Water Supply Components at Laxmangarh

Location	1. Bad Ke Balaji Campus Latitude: 27° 48' 46.71" N Longitude: 75° 1' 53.73 " E 2. A.En.Campus Latitude: 27° 91' 21.57" N Longitude: 75° 1' 50.46 " E
Start of operation (year)	1980
Owned by	Public Health Engineering Department
Contact person and designation	Mr. R.P Gaur (Executive Engineer, PHED) 8005855942, 8279108269
Capacity	Details is given in point no. III.



Initial Environmental Examination

July 2023

India: Rajasthan Secondary Towns Development Sector Project

Subproject : Water Supply Project in Laxmangarh City, District - Sikar, Rajasthan
Part 2 of 3 : Appendix 14 (continued) and Appendices 15 - 19

Prepared by Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited, Government of Rajasthan for the Asian Development Bank. This is an updated version of the initial environmental examination report originally posted in November 2021 available on (<https://www.adb.org/projects/documents/ind-42267-031-iee-29>).

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Asian Development Bank

Figure 1: Flow Diagram of Existing Water Supply System in Laxmangarh

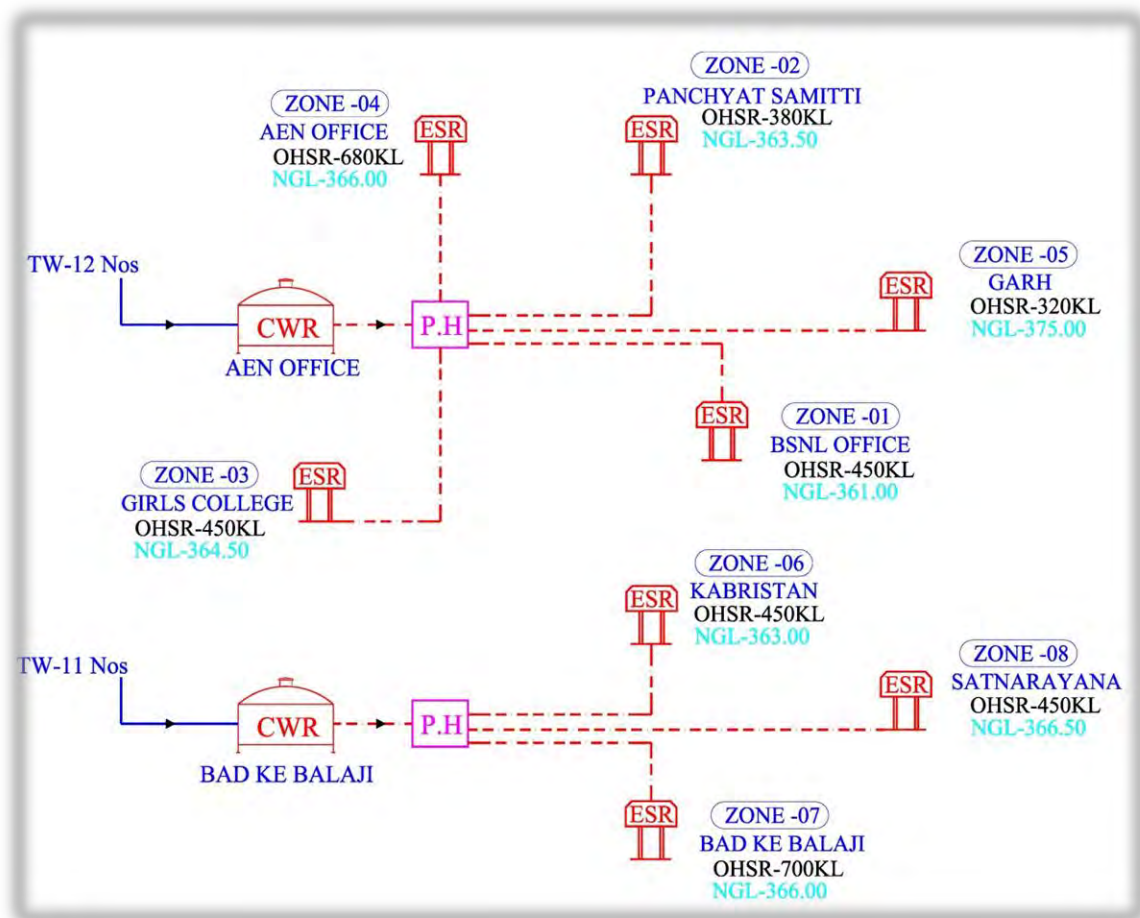




Figure 2: Existing Water Supply distribution and component Map (Composite Map) of Laxmangarh



Figure 3: Showing existing component of Water supply at Bad Ke Balaji Campus, Laxmangarh



Figure 4: Showing existing component of water supply at A.En. PHED campus, Laxmangarh

III. Description of Existing Water Supply system:

1. Clear Water Reservoir (CWRs): Presently in Laxmangarh town five clear water reservoirs are available. Details of CWR are mentioned below:

Table 1: Details of the clear water reservoir

Sr.No.	Location	Capacity (In KL)	Year of Construction	Remarks
1	RCC CWR at A.En office Head Works	360	1990	Considered
2	RCC CWR at A.En office Head Works	215	1970	Excluded as in bad condition
3	RCC CWR at A.En office Head Works	260	2011	Considered
4	RCC CWR at Bad ke balaji Head Works	285	1970	Excluded as in bad condition
5	RCC CWR at Bad ke balaji Head Works	280	2011	Considered

2. Pumping Machinery

For transferring water from CWR to OHSR/GLRs, pumping machinery are used. Due to uneven topographical condition gravity based system is not feasible for transmission mains. At present two pump houses exists for pumping of water to zonal OHSR's from various CWRs. All the machinery is installed in the year of 2011. Therefore cannot be considered in this scheme.

(i) Present condition of the Pump

Duty of all the pumps will not suit the revised demand of the Laxmangarh. Hence these pumps are recommended to be phased out.

(ii) Service Reservoirs

There are 8 No's of OHSR located in Laxmangarh town. The capacity of the OHSRs is 320KL to 700 KL. Location of Existing OHSR and its capacity, staging height are furnished below.

Table 2: Details of existing OHTs

S.No.	Location	Capacity of OHRs in KL	Staging in mtr.	Year of construction	Remarks
1	BSNL office	450	18	2011	Considered
2	Panchayat Samiti	380	18	1990	Considered
3	Balika school	450	18	2011	Considered
4	Aen. Head work	680	18	1990	Considered
5	Garh	320	15	1990	Considered
6	Bhootnath	450	18	2011	Considered
7	Bad ka Balaji	700	18	1990	Considered
8	Saytanarayana	450	18	2011	Considered

Present condition of all the ESRs at various locations is moderate and can be considered. Provision of minor special repairs with replacement of Valve etc. has been taken in the proposal.

3. Tube wells details:

Presently source of Laxmangarh town is ground water. The town is benefited from 34 no. of tube wells at various locations in the city. Out of this, 12 TWs are connected to CWR at A.En Head Works whereas 11 TWs are connected to CWR at Bad ke Balaji HW. 34 TWs considered as GW source.

Table 3: Water Source details of Laxmangarh

S.No.	Source Details	Source location	Receiving end detail	Status of source in scheme
1	8 Nos of TW 9KLD@ 20 hours pumping = 1.44 MLD (Sustainable)	4 on khirwa road, 1 behind balika school, 1 inside A.En campus, 1 in Ramleela maidan, 1 near panchayat samiti campus	CWR at A.En campus HW	Considered in scheme
2	4 Nos of OW 5KLD@ 20 hours pumping = .400MLD (Not sustainable)	1 at balai basti, 1 at A.En campus, 1 near Satnarayan temple, 1 near rathi rest house	CWR at A.En campus HW	Considered in scheme
3	11 Nos of TW 9KLD @ 20 hours pumping= 1.98 MLD (sustainable)	4 on fatehpur road near modi college, 3 on hamirpura road, 2 on moud near bad ke balaji campus, 1 at parsiya mandir, 1 at bad ke balaji campus.	CWR at Bad ke balaji campus HW	Considered in scheme
4	34 No. TW and 6 OWs have very low discharge (not sustainable)	Located at various positions in the town	Connected to direct in supply	Not considered

4. Distribution System:

Entire town has been divided into 8 water supply distribution zones with gravity fed from zone OHSRs. The existing distribution system (103.12 km) with AC, PVC and CI pipes are very old with heavy leakages due to breakages and joints leakages due to ageing and hence need to be phased out.

Table 4: Existing Distribution Network of WS in Laxmangarh

S.No.	Dia (mm)	Material	Type	Length (m)
1	80	AC	Distribution	65146.71
2	90	PVC	Distribution	532.08
3	100	AC	Distribution	19495
4		PVC	Distribution	510
5	125	AC	Distribution	5907
6		PVC	Distribution	929
7	150	AC	Distribution	5950
8		CI	Distribution	618
9	200	AC	Distribution	2419
10		CI	Distribution	283
11		PVC	Distribution	175
12	250	AC	Distribution	644
13		CI	Distribution	130
14	300	AC	Distribution	80
15		CI	Distribution	115
16	350	CI	Distribution	195
Total Existing Distribution				103128.8

5. Present LPCD supplied

At present, an intermittent water supply system is running in the town with actual service level 100 LPCD at consumers end and heavy losses in the existing distribution network about 30-35%, which will improved to 135 LPCD after full commissioning of Fathpur-Laxmangarh water supply project of PHED. At present it is partially commissioned and water is received at both the Headworks at Bad Ke Balaji and A.En. campus. After commissioning of this project, water will be provided 12m Head with continuous supply.

6. Area covered/ uncovered

Presently about 70-80% area of municipality limit is covered under the drinking water supply scheme by PHED. Remain area which is newly developed and newly added to the municipality area is remain unconnected with piped scheme.

7. Metering

Presently due to faulty/damaged water meter 100 % metering is not achieved.

8. Service Connection

Details of service connection are as below:

Sr. No.	Domestic	Non Domestic	Central Govt.	State Gov.
1	7610	387	4	75

III. Compliance with Applicable National and State Laws, Rules, and Regulations

<u>Law, Rules, and Regulations</u>	<u>Description and Requirement</u>	<u>Water Supply System</u>
		Y = compliant (if applicable, specify expiration date of permit/clearance) N = non-compliant ⁴⁶ N/A = not applicable (state justification)
<u>EIA Notification</u>	<u>The EIA Notification of 2006 states that environmental clearance is required for certain defined activities/projects.</u>	N/A
<u>Manufacture, Storage, and Import of Hazardous Chemical Rules, 1989</u>	<u>Storage of chlorine</u>	N/A <u>Chlorine is being used as disinfectant in water supply before distribution. No chlorine is being stored at the site.</u>
<u>Drinking Water Specification IS: 10500, 2012</u>	<u>Drinking water (TWs, OWs and CWRs) comply with the requirements of IS</u>	<u>Complied</u> <u>Residual chlorine testing is being done regularly at both the headworks and detail analysis of water is done once in a month at district headquarter Sikar as per norms of IS.</u>
<u>Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments</u>	<u>Consent to operate from RSPCB</u>	N/A
<u>Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.</u>	<u>Consent to operate from RSPCB</u>	N/A
<u>Environment (Protection) Act, 1986 and CPCB Environmental Standards</u>	<u>Emissions and discharges from the facilities to be created, refurbished, or augmented shall comply with the notified standards.</u>	N/A
<u>Noise Pollution (Regulation and Control) Rules, 2002 amended up to 2010</u>	<u>Applicable ambient noise standards with respect to noise for different areas/zones</u>	No source of noise
<u>National Institute of Occupational Safety and Health (NIOSH) Publication No. 2002-149</u>	<u>Compliance with NIOSH Guidance for Controlling Potential Risks to Workers</u>	N/A
<u>Forest (Conservation) Act, 1980 and Forest Conservation Rules, 2003 as amended</u>	<u>As per Rule 6, every user agency, who wants to use any forest land for non-forest purposes shall seek approval of the central government.</u>	N/A

⁴⁶Compliant = There is sufficient and appropriate evidence to demonstrate that the particular regulatory requirement has been complied with; non-compliant = clear evidence has been collected to demonstrate the particular regulatory requirement has not been complied with.

<u>Law, Rules, and Regulations</u>	<u>Description and Requirement</u>	<u>Water Supply System</u>
		Y = compliant (if applicable, specify expiration date of permit/clearance) N = non-compliant ⁴⁶ N/A = not applicable (state justification)
<u>Ancient Monuments and Archaeological Sites and Remains Rules of 1959</u>	<u>No development activity is permitted in the “protected area,” and all development activities likely to damage the protected property are not permitted in the “controlled area” without prior permission of the Archaeological Survey of India (ASI). Protected property includes the site, remains, and monuments protected by ASI or the State Department of Archaeology.</u>	<u>N/A</u>
<u>The Child Labor (Prohibition and Regulation) Act, 1986</u>	<u>No child below 14 years of age will be employed or permitted to work in any of the occupations set forth in the Act’s Part A of the Schedule or in any workshop wherein any of the processes set forth in Part B of the Schedule are present.</u>	<u>No children are engaged.</u>

IV. Institutional Arrangement

<u>Parameter</u>	<u>Water Supply System</u>
Operations	Continuous operation; involves mechanical and electrical operation;
Public health engineer on-site	J.En., A.En. and Ex.En.
Estimated number of technical employees on-site per shift	Pump Operator- 5 Nos. Fitter- 01 Nos. Assistant- 12 Nos. Junior Engineer- 01 Nos.
Frequency of water quality monitoring	Monthly
In-house laboratory for water quality analyses (Yes/None). If none, provide name of third-party laboratory.	In-house laboratory is available at the District headquarter at Sikar, Rajasthan; Testing is being done as per IS.

Appendix 15: Updated Asbestos Containing Material (ACM) Management Plan

A. Background of Asbestos

1. Asbestos is a collective name given to a group of minerals that occur naturally as fiber bundles and possess high tensile strength, flexibility, heat resistance, non-biodegradability with chemical and physical durability. Asbestos is hydrated silicates with complex crystal structures. It is found in two configurations: chrysotile (derived from serpentine minerals) and amphibole is a naturally occurring mineral with long thin fibers. Asbestos includes the mineral fibers chrysotile, amosite, crocidolite, tremolite, anthophyllite, actinolite and any of these materials that have been chemically treated or altered. The most abundant asbestos used in the world is chrysotile. The use of ACM propagated due to its economic viability.

2. Asbestos has been used in products, such as insulation for pipes (steam lines for example), floor tiles, building materials, and in vehicle brakes and clutches. Heavy exposures tend to occur in the construction industry and in ship repair, particularly during the removal of asbestos materials due to renovation, repairs, or demolition. Workers are also likely to be exposed during the manufacture of asbestos products (such as textiles, friction products, insulation, and other building materials) and during automotive brake and clutch repair work. In the construction industry, asbestos is found in installed products such as sprayed-on fireproofing, pipe insulation, floor tiles, cement pipe and sheet, roofing felts and shingles, ceiling tiles, fire-resistant drywall, drywall joint compounds, and acoustical products. Because very few asbestos containing products are being installed today, most worker exposures occur during the removal of asbestos and the renovation and maintenance of buildings and structures containing asbestos.

3. **Health Hazards of Asbestos.** Asbestos is well recognized as a health hazard and its use is now highly regulated by both OSHA and EPA. Asbestos fibers associated with these health risks are too small to be seen with the naked eye. Breathing asbestos fibers can cause a buildup of scar-like tissue in the lungs called asbestosis and result in loss of lung function that often progresses to disability and death. Asbestos also causes cancer of the lung and other diseases such as mesothelioma of the pleura which is a fatal malignant tumor of the membrane lining the cavity of the lung or stomach. Epidemiologic evidence has increasingly shown that all asbestos fiber types, including the most commonly used form of asbestos, chrysotile, causes mesothelioma in humans.

4. Asbestos fibers enter the body when a person inhales or ingests airborne particles that become embedded in the tissues of the respiratory or digestive systems. Exposure to asbestos can cause disabling or fatal diseases such as asbestosis, an emphysema-like condition; lung cancer; mesothelioma, a cancerous tumor that spreads rapidly in the cells of membranes covering the lungs and body organs; and gastrointestinal cancer. The symptoms of these diseases generally do not appear for 20 or more years after initial exposure.

5. Worker exposure to asbestos hazards are addressed in specific OSHA standards for the construction industry, general industry and shipyard employment sectors. These standards reduce the risk to workers by requiring that employers provide personal exposure monitoring to assess the risk and hazard awareness training for operations where there is any potential exposure to asbestos. Airborne levels of asbestos are never to exceed legal worker exposure limits. There is no "safe" level of asbestos exposure for any type of asbestos fiber. Asbestos exposures as short in duration as a few days have caused mesothelioma in humans. Every occupational exposure to asbestos can cause injury of disease; every occupational exposure to asbestos contributes to the risk of getting an asbestos related disease. Permissible Exposure Limit (PEL) for asbestos is 0.1

fibers per cubic centimeter of air as an eight hour time weighted average (TWA), with an excursion limit (EL) of 1.0 asbestos fiber per cubic centimeter over a 30 minutes period.

6. Where there is exposure, employers are required to further protect workers by establishing regulated areas, controlling certain work practices and instituting engineering controls to reduce the airborne levels. The employer is required to ensure exposure is reduced by using administrative controls and provide for the wearing of personal protective equipment. Medical monitoring of workers is also required when legal limits and exposure times are exceeded.

B. Purpose of ACM Management Plan

7. The purpose of this Asbestos Management Plan (AMP) is to identify, use appropriate methodology and scientifically handling /disposal of the Asbestos Containing Materials (ACM) in order to comply with the applicable National legislation and International standards in sync with norms of ADB's SPS 2009. ADB has mandated as per Appendix-5- prohibit the investment activities list - production of, trade in, or use of un-bonded asbestos fibers is deliberated. As per SPS 2009 Safeguard Requirement 1, it is emphasized "that the borrower/ client will provide workers with a safe and healthy working environment" in the work areas with accounted risks inherent to the work zone and defined safety instructions and standard operating procedures identifying roles and responsibilities.

C. Regulatory Frameworks for Asbestos Containing Materials

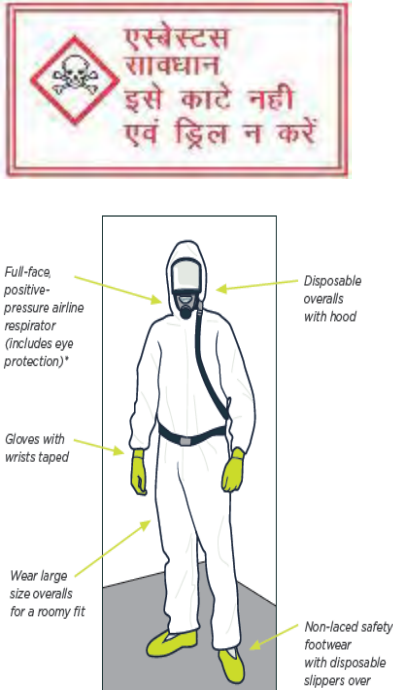
8. In India, there are several legislations that regulate the use and handling of asbestos as applicable, namely:

- The Supreme Court of India – Banned ACM use in January 21 2011.
- National Green Tribunal - In pursuant to the above order, in 2015, NGT issued an order- "that there is no asbestos mining presently operational anywhere in the country and the operations of the mines of associated minerals with asbestos has also been halted."
- Environmental (Protection) Act (1986) - Environmental monitoring.

9. Different standards applicable to the project is given in **Table-1** below-

Table.1: REGULATORY FRAMEWORK, STANDARDS AND PROTOCOL

Government of India Laws, Regulations and standards on Asbestos Applicable to the projects	Requirements for the project
IS 11768: 1986/ 2005: Recommendations for disposal of asbestos waste material	The standard emphasis that every employer who undertakes work which is liable to generates asbestos containing waste, shall undertake adequate steps to prevent and /or reduce the generation of airborne dust during handling, storing, transportation and final disposal of final disposal of asbestos and asbestos containing products. • The crux is waste avoidance: the practice inculcated should focus the on minimal waste generation. • Waste Collection: In the project circumstance, the waste is referred to the damaged powered asbestos which will be collected in the Permissible plastic bags to be disposed off to the nearest TSDF facilities.

IS 12081: Pictorial Warning to be implemented on equipment containing Asbestos Contaminated Products.	The objective of the caution is to make the person handling to take all pre-cautionary measures and make them aware of all the possible risk. 
IS 11451: Safety and Health Requirements related to Occupational Exposure to Asbestos contaminated Products.	In the project the norms pertaining to limiting number of hours working with ACM will be 8.0 hrs/48 hrs a week and the medical examination has to be periodic, the environmental monitoring has to be done as per the protocol. The safety at work place shall be enforced.
IS 11768: Waste Disposal Procedure for Asbestos Containing Products.	The protocol pertaining to disposal of the waste is emphasized, the collection of ACM powered will be in permissible plastic bags, which will be twisted tight at the neck so that the wear and tear due to abrasion will be minimum and the transportation of the asbestos waste has to be done by the authorized vendor to the approved landfill site that in the project case id TSDF.
Sampling of asbestos fiber (as per BIS-11450) has to be done regularly using personal sampler and determined using phase contrast microscope.	The Sampling and analysis protocol is emphasized. Details are given as above.

D. Inventory of ACMs in Laxmangarh

10. Site visit of Laxmangarh town was conducted on 07.10.2022 along with SCE of CMSC-II Supt. Engineers, Contractor (L&T) safety staff. During visit no asbestos containing materials were present/ found throughout all sites. Photographs of site visit at different worksites/ subproject component is given and enclosed as **Annexure-3**.

11. Further; for the assessment of presence of AC pipes in existing water supply networks, Office of the PIU was requested to provide information for the same from PHED vide letter no.

RUIDP/PIU/Lxg/120 dated 18.11.2021. Details of existing AC pipeline has been provided by Assistant Engineer, Public Health Engineering Department (PHED), Laxmangarh, District-Sikar, Rajasthan informed vide their letter no. 757-759 dated 11.01.2023 that total 44.378 kms AC pipes are present/ operational of different diameters (ranging from 80-250mm dia.) in the existing water supply system in the town as per record (refer **Annexure-2**). Therefore this 44.378 km AC pipe line is the only matter of concern for Laxmangarh, which need ACM management plan.

E. Provisions in the RSTDSP Project Regarding ACMs

12. Under RSTDSP projects, improvement in water supply system has been planned in the entire municipal areas of town. There is provision of replacement of entire AC pipes (irrespective of size, condition, diameter and age) and lay pipeline of HDPE/PVC/uPVC as per contract specifications. Now, as the production and use of AC pipes is banned Pan-India, old/used AC pipes are of no use, therefore it is general practice that old AC pipes are not removed from the existing underground position and left in-situ and new proposed pipes are laid parallel to old AC pipes. Nevertheless, there are possibilities (like where there is not sufficient space to lay new pipes parallel to existing old AC pipes e.g. in narrow lanes and old city areas); that existing AC pipes are needed to be removed from their existing underground position to lay new pipe lines. In all such cases (though exceptional) mitigation measures will be required for handling, storage and disposal of ACMs in a safe manner to avoid health hazards to workers and nearby habitants. Following mitigation measures are suggested for the same.

F. ACM Removal procedures

13. ACM removal has to be checked in sync with the design and emphasis has to be laid to avoid the removal of ACM, in case it is unavoidable, then all the requisite safety measures are to be adopted as given below:

- Inform the Asbestos Expert/ HSE Expert prior to removal.
- Isolate the area with access to only trained staff/ employees under supervision of Asbestos/ HSE Expert.
- Exhibit all warnings
- Undertaken Asbestos fiber Monitoring
- The trained Employees have to be deputed for removal of ACM.
- The removal ACM material has to be check with the status and extent of damage.
- Efforts should be made to remove the ACM as minimal as possible.
- The ACM removal has to be manual; it should neither be cut nor drilled.
- All removal operation should be undertaken with ACM in wet condition.
- The removed ACM will then be labeled and placed on permissible plastic sheet. It should not be put on ground directly.
- The dimension of plastic sheet should be larger than the ACM placed.
- If the ACM pipe is not damaged as about 4.0ft and above, the ACM will be subjected for in-situ disposal.
- If the ACM is damaged and broken then it has to be packed in permissible plastic bags and disposed off to TSDF.
- Prior to disposal it can be stored in isolated room-showing board of-Hazardous waste storage room.
- The hazardous waste to be disposed off to TSDF should not be stored over 90 days after the removal date of ACM at site.
- All the safety procedures and safety gears should be worn by all the employees engaged in

the ACM Removal operation.

- The Asbestos fiber monitoring, soil monitoring has to be undertaken during the operation as well.
- The process of removal of ACM will be completed after the removed ACM and its suitably disposed off either in -situ or to the isolated room prior to disposal at TSDF.
- Post ACM Removal asbestos fiber monitoring has to be undertaken to ensure the work zone is safe to resume further operations.

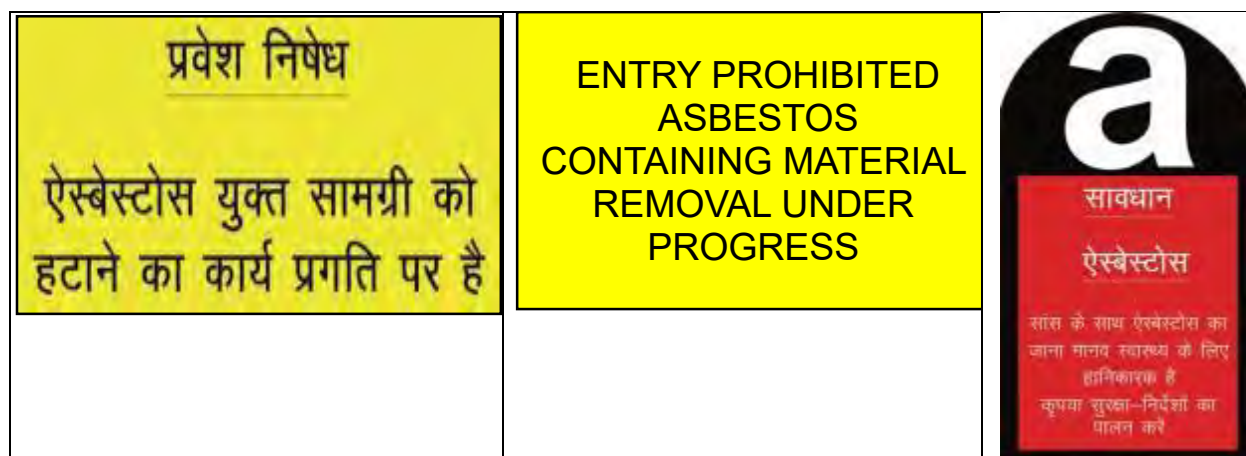


Figure 1: Asbestos warning signage during removal of ACM from site

G. Safe Practices in Handling ACM

14. Proper handling and PPE:

- Cover up and wear PPE (Personal Protection Equipment) including respirator or dust mask.
- Make sure the mask has two straps to hold it firmly in place. Don't use masks that only have one.
- Also wear a Hard hat, gloves, disposable coveralls with a hood, and safety glasses or goggles to protect eyes
- Do not eat, drink or smoke in the work area as you may inhale or eat dust. Wash your hands and face with soap and water before meal breaks and when finished work for the day.
- Do not use power tools Asbestos fibers can be released if power tools are used for anything other than the removal of screws.
- Do not water blast or scrub with a stiff broom or brush. It is illegal to water blast asbestos cement sheets. If the material has been accidentally water blasted or has suddenly deteriorated in some way, you should call a licensed asbestos removal DBO Operator
- Wet gently with water when removing asbestos cement pipes, use a pump spray to lightly dampen the pipes and keep the dust down. Remember: Not to waterblast asbestos cement materials.
- Avoid drilling and cutting into asbestos products.
- Do not drill holes through and never cut Instead remove the entire product and replace it with a non-asbestos product.
- Don't drop fiber pipes remove them carefully, Lower them to the ground, don't drop them, to minimize breakage.
- Lay plastic sheeting under the work area to prevent any dust contaminating the ground. Use 200 micron thick plastic sheeting or bags or as permissible these must not be made from recycled materials or re-used for any other purpose.

- The work area has to be barricaded and there should be no un-authorized person allowed. Only Trained ACM expert should be allowed to handle the ACM along with EHS Expert.
- Close windows and doors and seal vents to stop dust getting into the house; ask neighbors' to do the same.
- Seal off other places where dust can get in.
- Remove soft furnishings like rugs, clothes, jute bags from the work area, and seal anything with plastics if it cannot be moved.
- All the AC broken pipes have to be collected and stacked properly with 200 micron plastic wrapping with warning signage.
- Do not leave plastic sheet lying about where they may be further broken or crushed by people or traffic.
- Remove all ACM by the trained handler.
- Since we are amidst of dry climatic conditions due care must be taken to see that no waste broken pipes or fittings are left loose and outside the confined area and may be dampened as required.
- Mark and add signage.
- Due care has to be taken to collect the dampened waste in a permissible standard bags with proper warning signage's.

H. Storage of ACM Pipes

15. The removed undamaged ACM pipes have to be stacked properly as shown below to avoid any rolling of the pipes and eventual damage. The existing ACM Pipe stacking has to be re-handled to stack the ACM pipes properly. If the removed ACM Pipes is less than the full length of the ACM pipes, then separate stack of the same should be done with proper pre-caution and safety measures and gears (refer **Figure 2**).

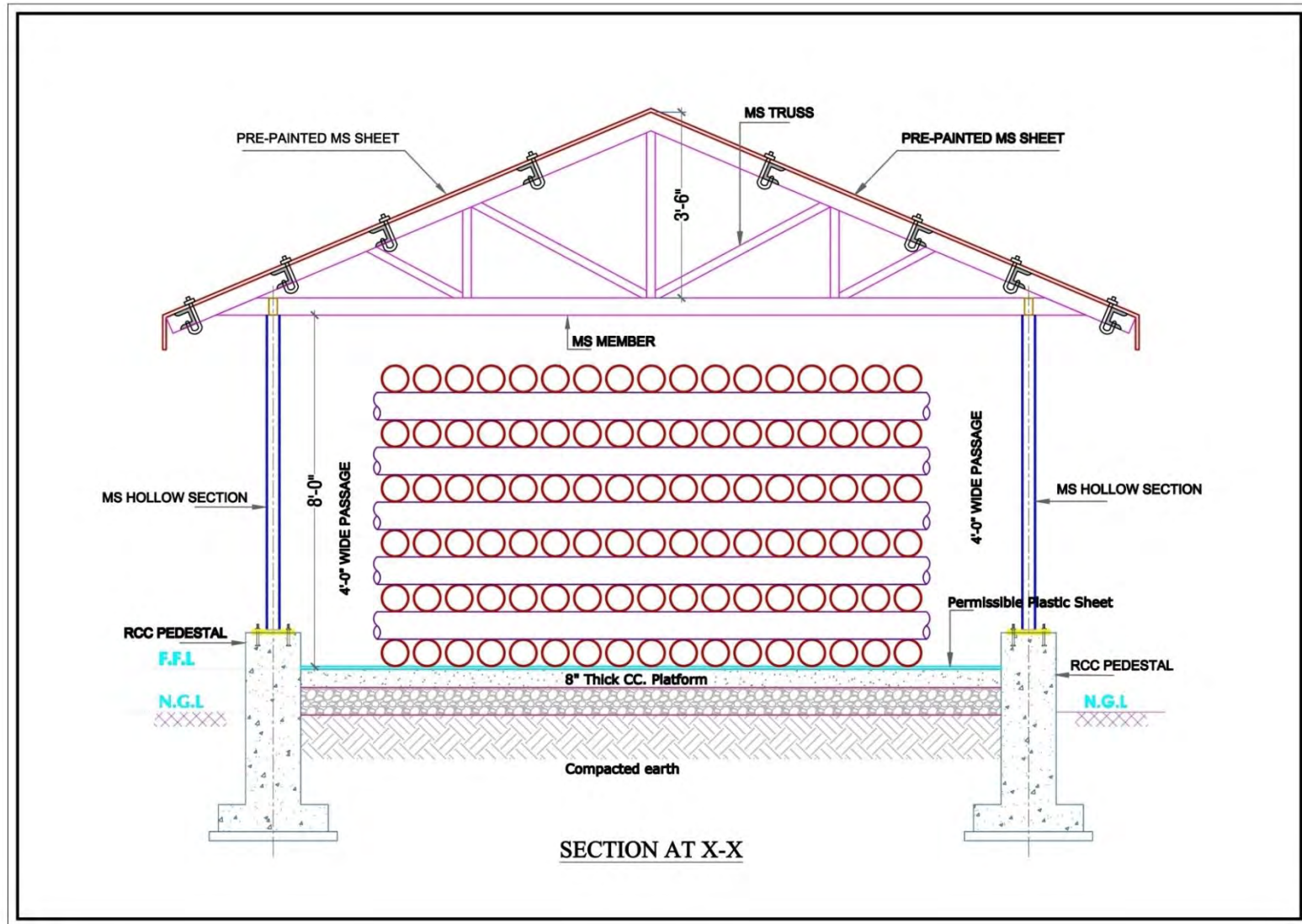


Figure 2: Schematic diagram showing ACM Pipes stacking

16. The ACM stack has to be enveloped with proper fencing showing internal movement of person with 4.0 ft corridor all around the stack. The storage area will have display of all requisite warning and access control of the authorized person's entry and exit (refer **Figures 3 & 4**).

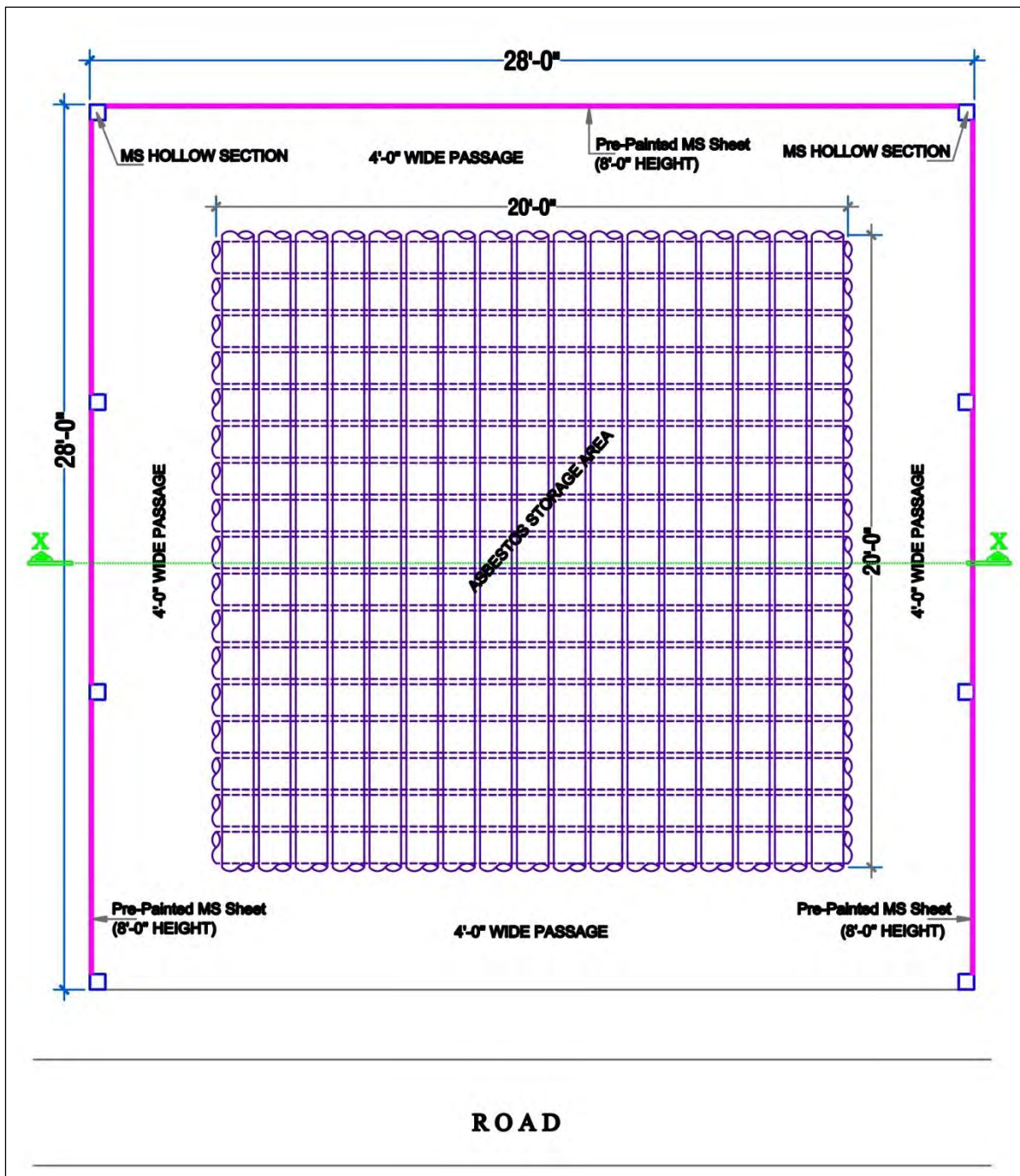


Figure 3: Schematic diagram showing ACM Pipes storage area

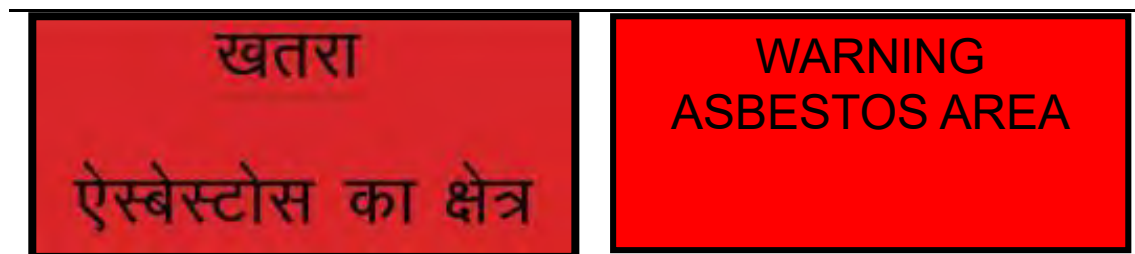


Figure 4: ACM: In-situ storage warning

I. Disposal of ACMs

17. The wastages packed have to be disposed off to Treatment, Storage or Disposal Facility (TSDF). Label/ display for TSDF disposal bags has to have clear display of the content in both English and local language as displayed under:

- B. Waste Type:
- C. Date of packing:
- D. Qty/ Numbers:
- E. Packed by:
- F. Warning Signage:
- G. Disposal

18. It will be responsibility of DBO contractor and PIU to send the ACMs to authorized agency for final disposal of ACMs. List of approved Treatment, Storage and Disposal Facilities (TSDF), who deal with ACMs in Rajasthan is given below-

Table 2: LIST OF APPROVED TSDF OPERATORS IN RAJASTHAN

S.No	Operator	Address	Remark
1.	Rajasthan Waste Management Project (M/s. Ramky Enviro Engineers Ltd)	Survey 1018/13, Vill- Gudli, Tehsil-Mavli, Zinc Choraha to Debari Railway Station Road, Dist, Udaipur (Rajasthan).	This TSDF is for all kind of hazardous waste as listed in the hazardous waste (Management & Handling) Rules.
2.	Ramky Enviro Engineers Ltd, Balotra	Ramky BWMP Rd, Rajasthan 344032.	This TSDF is for all kind of hazardous waste as listed in the hazardous waste (Management & Handling) Rules
3.	Continental Petroleum Ltd	Behror, Distt- Alwar	Only for Incineration

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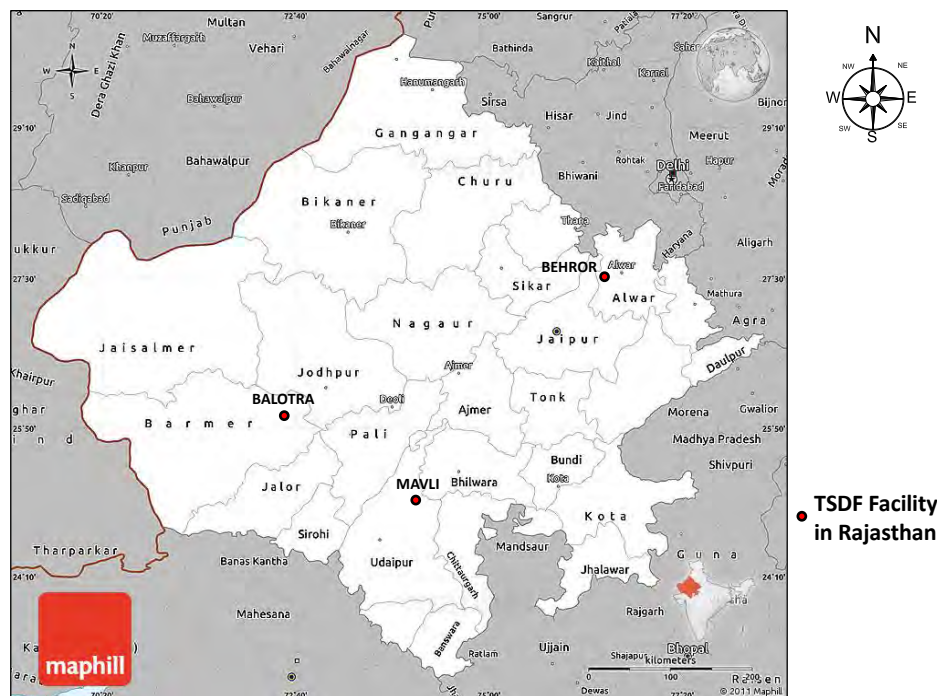


Figure 5: Map of the locations of approved TSDF in Rajasthan.

19. All the records in the pre-determined format are to be maintained and the disposal as stated in the applicable National legislation is to be followed. Any innovative use of the discarded ACM with the permissible law frame must be approved by respective Regulators prior to practice.

J. Standard Operating Procedures (SOPs) for Handling, Transportation and Disposal of ACMs

20. Two Standard Operating Procedures (SOPs) are prepared for safe handling, transportation and disposal of ACMs. These OCPs are to be followed by DBO contractor if ACMs is encountered at any site.

21. **Standard Operating Procedure-01-** are as follows-

- a. Objectives – to keep the work zone safe and secured.
- b. Requirements–identify all the requirements needed for handling AC in the specific site and project
- c. Conduct and ensure awareness and vocational training to ACM handlers
- d. Conduct a comprehensive identification and risk assessment of ACMs
- e. Apply restriction/ re-handling of ACM on ground-use of PPE. Ensure that workers handling ACM have the right PPEs as follows:
 - Hard helmet
 - Overall suit
 - Gloves
 - Mask to be strapped tight
 - Safety goggles
 - Safety shoes
 - Ear plugs
- f. Avoid underground encountering of ACM

- Ensure that an authorized person (HSE) is supervising the work
 - Barricade the area with signage
 - Damp ACM
 - Use safety gears
 - Dismantle ACM to be labeled, kept on plastic grounding and packed in permissible bags
 - Label the bags properly
 - Ensure shipping to proper disposal sites
- g. Site selection – the disposal site should be ready to handle ACM and protect the nearby people as well. The site selection criteria are as follows:
- Away from habitation
 - Avoid low lying areas
 - Away from water storage
 - To be enveloped with minimum of 8-feet height enclosure
 - Avoid high vertical stacks
 - Access controlled
 - Proper signage enclosure
- h. Proper re-handling of ACM, labeling and packing
- i. Control access and ensure proper monitoring of records, specifically:
- i. Environment
 - ii. Health
 - iii. Reporting to regulators
- j. Dispose the ACM through qualified DBO Operators up to the Total Sanitary Disposal Facility (TSDF)

22. Outline of SOP-1 is given in below Figure-

Standard Operating Procedure for removal of ACM

Asbestos Expert/HSE to provide permission and instruction for safe working of ACM Removal

The area should be free from all non-concerned employees and personals.

It is desired to provide removal of ACM by:

- Removal/Encapsulation method
- Location of required signage
- Independent Air Monitoring
- Disposal Methodology
- All safety gears and permissible plastic bags and sheet as appropriate

It is be ensured that:

- The removal procedure of ACM is followed
- Detailed planning of location and storage
- All safety norms to be defined and declared
- All requisite warning signage to be displayed

- The Air monitoring has to be conducted during the operation
- All the operation to be executed with trained staff under supervision of trained HSE
- The ACM should be wet prior to operation and during the operation.
- NO POWERED TOOL TO BE USED
- Only manual operation to be undertaken
- All operation to be reported in format
- HSE to ensure all the safe and good practices are followed.

Area to be decontaminated and Work to be resumed after the area or work zone is declare safe with air monitoring again.

Figure 6 -Standard Operating Procedure Flow Sheet

23. **Standard Operating Procedure-02-** SOP-2 is formulated for Asbestos Fiber Monitoring, Analysis and Identification. SOP-2 is described as follows -

24. **Principle-** The collection of environmental samples including air must follow an appropriate sampling procedure. A review of method for sampling of asbestos fibers has been published (IPCS, 1986). The most commonly used analytical method involves phase contrast optical microscopy (PCOM) in the work place and transmission electron microscopy (TEM) in the general environment. The phase contrast optical microscopy (POCM) is universally recommended for asbestos analysis (Eache and Groff, 1997; Dion and Perrault, 1994) including Bureau of Indian Standard. POCM coupled with polarized light is largely used for asbestos analysis in solid samples (USEPA, 1993). The fiber monitoring has to be done by any NABL/MOEF&CC accredited laboratory either in-house or by third party.

25. **Monitoring of Asbestos Fiber in Air-** A general survey of inside and outside the storage sites of the work zone has to be conducted to choose the sampling sites. Sampling is to be carried out at visually selected locations appeared more prone to emission or possibility of release of asbestos fiber. The sample collected by drawing a measured quantity of air through cellulose ester a membrane filter by a battery operated sampling pump that was fully charged to operate continuously over the chosen sampling time. The exposed filters will then be placed into plastic petri dishes and transferred carefully to the laboratory.

The predominant average hourly wind direction in Laxmangarh varies throughout the year. The wind is most often from the south west. Predominant wind blows from south west to north east direction.

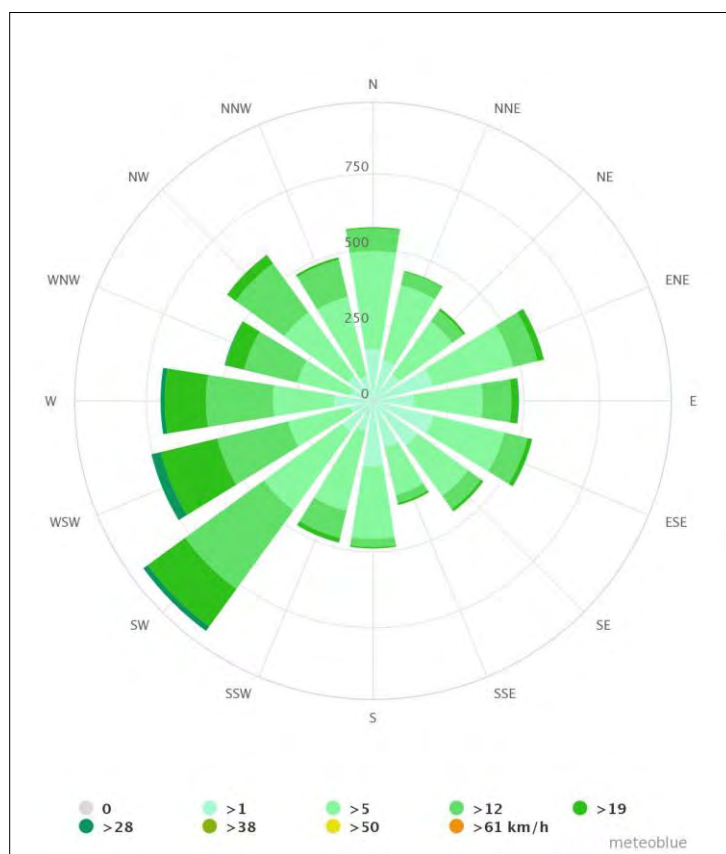


Figure 7: Predominant Wind Direction in Laxmangarh, District-Sikar, Rajasthan

26. Two types of samples are to be taken, one within the workers breathing zone that is 300mm radius extending in front of the face, and measured from the midpoint of a line bisecting the ears called personal samples. The samples taken at a fixed location mostly near to the source point called area or static samples. Personal sampler model "XX 5700000" and low volume vacuum/pressure pump model "XX5622050" attached with monitor or cowl model "MAWP025AC" of Millipore Corporation, USA are to be used for the collection of personal and area samples, respectively. The flow rate of pump is to be adjusted to 1litre per minute. The flow rate checked before and after in each monitoring, those samples showing the difference by >10 percent from the initial flow rate are to be rejected. In both the samples filter holder (Cowl) always pointed downward position to avoid the deposition of heavy particles. An ester cellulose membrane filters "AAWP02500" having 0.8 µm-1.2 µm pore size diameter are to be used throughout the sampling for asbestos counts at work environment.

27. **Mounting Procedure**-Complete filter is to be placed on clean microscopic slide, dust side up at room temperature. Electrostatic force keeps the filter usually on the slide. Filters are to be exposed to acetone fumes and triacetin (Glycerol triacetate, Sigma). In this procedure a small quantity of acetone in round bottom flask (500-1000ml) heated at the boiling point underwater bath, the vapors condensed in a simple condensing column. When the sufficient fumes of acetone become ready then pass it throughout on the filter for 3-5 seconds at a distance of 15-25mm. put the 1-3 drops of Glycerol Triacetate (Triacetin) on the acetone-cleared filter. Place a cover slip on cleared filter by avoiding the air bubbles. Heat the cleared filter at 50°C for 15 minutes and leave it at room temperature for 24 hours under the action of triacetin to clear entire filter. Alternatively, membrane filter can also be made transparent with immersion oil (Leica Microsystems Wetzlar GmbH, Wetzlar). Using a phase contrast microscope with polarized light, Laborlux S (of M/s Leica, Germany) and then counting has to be done at magnification 400X-500x.

$$C = A/a \times N/n \times 1/r \times 1/t$$

Where:

C= concentration in fibers per cubic centimeter rounded to first place of decimal,

N = total no. of fiber counted,

n = number of graticule areas observed,

A= effective filter area in mm²

a= graticule counting area in mm²,

r= flow rate of air through filter in cm³/min., and

t= single sample duration in minutes

28. To rule out the probability of the air borne asbestos in the existing scenario at the said site as well as other similar sites at the different work zones, it is necessary to have the asbestos fiber monitoring and sampling counts to be recorded at regular intervals. The environmental air sampling stations will have to be minimum three at 120 degree angle, within 1000-500m from the ACM. The sampling frequency has to be in all three stages-Pre-Construction, Construction and Post Construction, while the personal sampling has to be done as stated above.

29. Bureau of Indian Standards (BIS) Guidelines for Safe Use of Products containing Asbestos states that "Asbestos cement products (such as AC pipes) generally contain about 10-15% asbestos fibers in a cement matrix that comprises the rest of the materials and are termed as locked in asbestos products as these products have the asbestos fibers bound in cement. The possibilities of air borne asbestos fiber will be in case of mishandling of encountered pipes with unsafe practice. During storing and installation; recommended work practices shall be followed to

avoid harmful exposure". According to Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016, any waste with asbestos concentration limit of 10,000 mg/kg (i.e. 1%), however this will apply only if the asbestos containing substances are in a friable, powdered or finely divided state. Under the Basel Convention⁴⁷, asbestos or asbestos waste in the form of dust and fibers is classified as hazardous waste.

K. Roles and Responsibilities with Estimated Cost for ACM Management

30. This contract under RSTDSP is Design, Build and Operate (DBO); therefore primary responsibility of ACM management is of DBO contractor. RUDSICO-EAP (formerly known as RUIDP); being principal employer has to ensure that ACM Management Plan is being implemented as per applicable rules and regulations. Roles and responsibilities of different entities and estimated cost of implementation of ACM Management Plan is given in below table-

Table 3: Roles and Responsibilities and Cost Estimates

PRE-CONSTRUCTION				
Activities	Responsibilities	Associated Documents	Estimated Cost	Remark
Design to encounter minimal ACM, and then Identification & Inventorization ACM - AC pipes & fittings	RUDSICO-EAP & DBO CONTRACTOR	Form-I (refer Annexure-1)	Rs.100/km	The onus of the minimal encounter of ACM is vested upon the RUDSICO-EAP and inventory will be with the DBO Operator and has to be annually verified by RUDSICO-EAP.
Define & confine ACM storage area-in-situ			Rs.65/Sq.m	The storage area made available will be confined and fenced.
Warning signage near the ACM work site, storage and on AC pipes in local language**			Rs.500/label	The signage labels can be printed, sticker pamphlets or painted.
Training of personals handling the AC pipes and fittings	DBO CONTRACTOR	Form-II (refer Annexure-1)	Rs.1000/Person	All requisite safety gears should be made available at all sites.
Use of safety Gears			Rs.6000/Person	All the safety gears should be silicon based and suitable for Asbestos protection.
Briefing of Emergency Response Plan			Rs.500/Person	All the risk zones with respect to white card has to be briefed.
Confined storage with access control plan			Rs.5000/site	Inward and outward movement of authorized person must be allowed and has to be guarded or should be under key control.

⁴⁷ Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal, adopted in 1989

Pre-history medical records of the ACM handling team			Rs.3000/Person	All requisite medical test, Respiratory test, lungs /Chest X-ray/CT Scan, Blood Test, Lower Abdomen examination etc.
CONSTRUCTION PHASE				
Monthly Inspection & Annual Environmental Monitoring.	DBO CONTRACTOR	Form-III (refer Annexure-1)	Rs.40,000/sample	The sampling zone should be 500m from the storage site and personal sampling has to be as per SOP-2.
Reporting in SEMR	RUDSICO-EAP/ DBO CONTRACTOR	None	Nil	As per ADB Format
Collection of Health records in compliance to the local laws	DBO CONTRACTOR/ RUDSICO-EAP/ PHED/ LSG	Form-IV (refer Annexure-1)	Nil	For regular evaluation & identification of any abnormality.
Ensure adoption of all standard operating procedure		SOP-1 & 2	Nil	As revision desired on basis of Site specific information may be upgraded in the SOP 1 & 2 if required
Collection, Segregation, Reception and Disposal as per National norms of ACM		Form-V (refer Annexure-1)	Nil	Standard Regulatory format has to be filled and disposed off within 90 days.
Use of safety gears prior to handling of ACM based on White Card.		White Card- Page-11	Nil	Periodic training can be site specific
Disposal of ACM to the indentified TSDF Facility to be done as per procedure within or prior to 90 days		SOP-2	1500/ton of waste plus freight as per actual.	Within 90 days from the generation of waste, in case of existing waste it has to be disposed off within 90 days from the Project Start.
To inform and fill the returns in the prescribed manifest as per HWMR.		Form-V (Form-10 of the Rule HWMR- refer Annexure-1)	Nil	90 days from the start of work
To facilitated a restricted confined storage space with access control with proper inventorization.		Form-II (refer Annexure-1)	Nil	Site Specific
In-situ storage of ACM.	DBO CONTRACTOR	Form-VI (refer Annexure-1)		The storage of existing and encountered ACM pipes (more than 4.0ft) will be stacked end to end at 90 deg. With vertical stacks, 8 inches above

				the ground, covered with permissible plastic sheet. The campus custodian – viz. PHED etc. should also be informed about the In-situ storage of ACM and its impact.
ACM removal	DBO CONTRACTOR	--	--	Follow ACM Removal
Record maintenance of ACM in-situ and disposed off to TSDF	DBO CONTRACTOR	Form-I & Form-IV (refer Annexure-1)	Nil	The copies of inventory generated and collected will have to be shared with Land Custodian (LC), RUDSICO-EAP and DBO Operator. To distinguish the forms they can be numbered. FORM-I (LC), Form-IV (LC)
Transits ACM storage of waste to be disposed off to TSDF	DBO Contractor	Form-IV (refer Annexure-1)	50,000/room	An isolated storage room should be constructed with 10x10 with height of 3.5 ft roofed properly for transit disposal of ACM to TSDF. DISPOSABLE ASBESTOS WASTE STORAGE ROOM HAZARDOUS WASTE CATEGORY-15.2 (As per Hazardous waste management & Handling Rules 2015).
POST CONSTRUCTION PHASE				
Compliance of AAQM, Asbestos Fiber monitoring and Soil Quality monitoring and Periodic Work zone monitoring (Asbestos fiber count) records to be maintained	DBO Contractor	SOP-2	Rs.40,000/ sample	The Asbestos Fiber count monitoring has to be conducted prior to ACM handling operation and after ACM Handling operation by an Accredited Laboratory. List of accredited laboratory will be available at Rajasthan State Pollution Control Board website- rspcb.nic.in
Health records & Periodic Medical Checkup of the personals handling ACM to be maintained.	PHED/ LSG/ DBO CONTRACTOR	Form-II (refer Annexure-1)	Rs.3000/ Person	All the concerned employees deputed to handle or deal with ACM has to have Pre medical history and periodic medical examination done

L. Emergency Response Plan (ERP) & Chance Find Protocol

31. The emergency procedures should include managing an uncontrolled release of asbestos materials into the workplace. The onus of the same shall be ensured with immediate action of the field staff-DBO Operator/ HSE Staff. Steps should be taken to:

- Warn anybody who may be affected.
- Exclude from the area anyone not needed to deal with the release.
- Identify the cause of the uncontrolled release.
- Regain adequate control as soon as possible.
- Make sure anyone in the work area affected, who is not wearing personal protective equipments (PPEs), including respiratory protective equipment (RPE), leaves the affected area immediately.
- Minimize the spread of asbestos by ensuring they are suitably decontaminated.
- Clean up dust and debris.
- Decontaminate anyone who is contaminated with dust and debris.
- Ensure rags, clothing or PPE is decontaminated or disposed of as contaminated waste.
- Consider alone and/or remote workers to ensure they can alert someone if necessary.

Check what you're working on before you start:

- Avoid using a sweeping brush as this can spread asbestos.
- Make sure no unauthorised personnel enter the area.
- The clean-up of any accidental release of higher risk materials, *e.g.* asbestos cuttings, powered asbestos that may release the asbestos fibers, to be done by authorized person

32. Flow chart of ERP is shown in below Figure 8 -

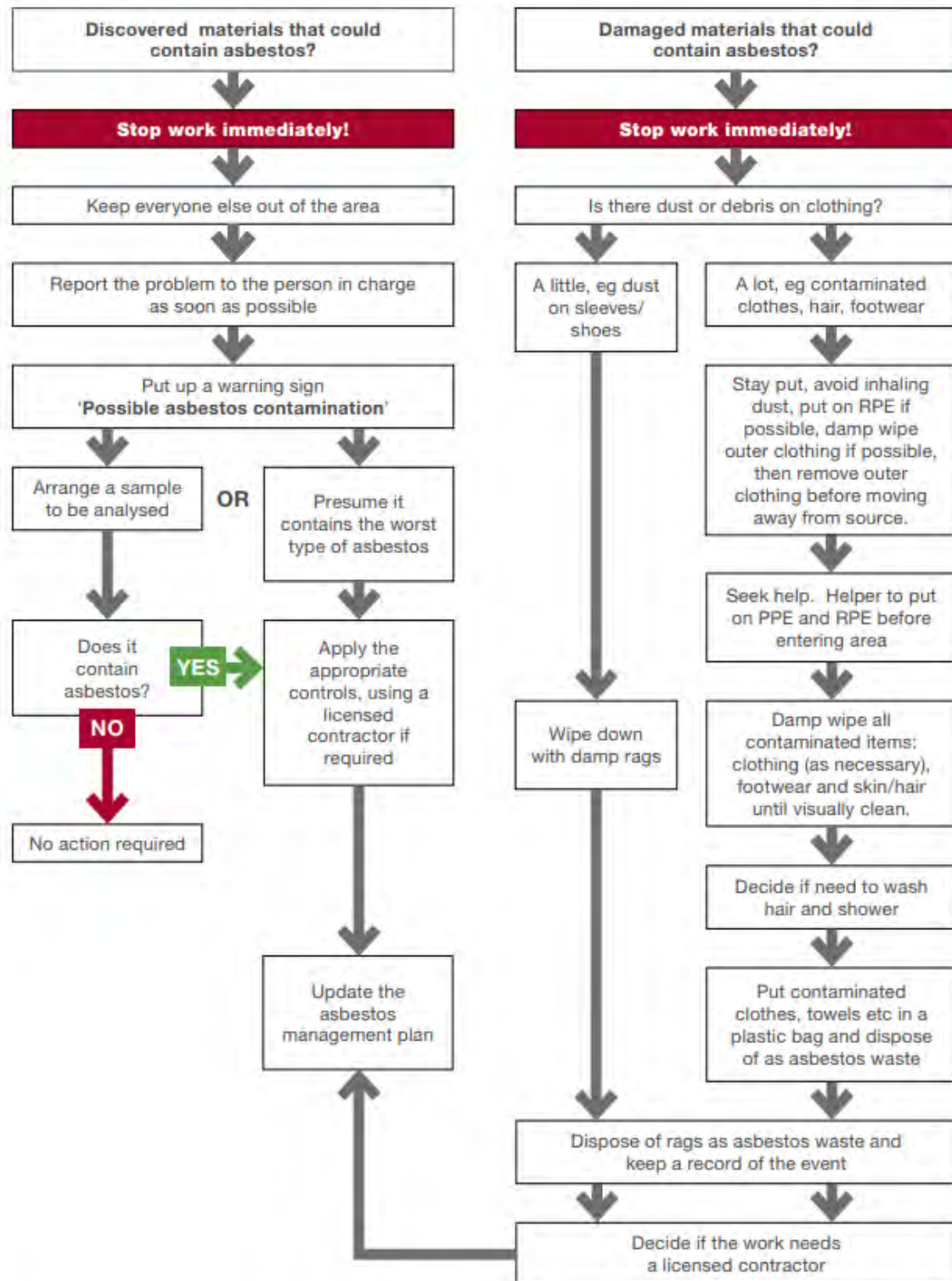


Figure 8: Flow chart of ERP

33. The format of Inventorization & records at all locations must be maintained irrespective of generation of ACM waste. The format of documentation must be uniform in order to track and trace the details as desired.

Summary of Asbestos Management Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation/ Monitoring	Remark
Clearing, transfer and disposal of ACM pipes	Possibilities of air borne asbestos if handled unsafely, cut, drilled or broken into pieces that may cause: ☐ Inflammation of the lungs ☐ Mesothelioma ☐ Peritoneal mesothelioma ☐ Pleural plaques ☐ Asbestosis ☐ Bronchogenic Carcinoma ☐ Second hand-exposure	Implement the AMP strictly that includes identification of hazards, the use of proper safety gear and disposal methods.	DBO Contractor /RUDSICO-EAP	There has to be a suitable call to be taken for in-situ disposal if the removed ACM pipes are not damaged, full length or 4.0ft length not damaged.
Work in narrow streets	Possibilities of air borne asbestos if handled unsafely cut, drilled or broken into pieces that may cause: ☐ Inflammation of the lungs ☐ Mesothelioma ☐ Peritoneal mesothelioma ☐ Pleural plaques ☐ Asbestosis ☐ Bronchogenic Carcinoma ☐ Second hand-exposure	Conduct awareness program on safety during the construction work. Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day. 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. Identify risk of intervention with existing AC pipes. If there is significant risk, implement the AMP strictly that includes identification of hazards, the use of proper safety gear and disposal methods.	DBO Contractor/ RUDSICO-EAP	All provision of safe working with proper signage has to be undertaken prior to work initiation, during the work and after the work.

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation/ Monitoring	Remark
Interventions in existing AC pipelines	Possibilities of air borne asbestos if handled unsafely cut, drilled or broken into pieces that may cause: ☐ Inflammation of the lungs ☐ Mesothelioma ☐ Peritoneal mesothelioma ☐ Pleural plaques ☐ Asbestosis ☐ Bronchogenic Carcinoma Second hand-exposure	Appropriate actions as defined in the Asbestos Management Plan will have to be adhered to	DBO Contractor/ RUDSICO-EAP	Measure to avoid the encounter & removal has to be prioritized and if the same is not avoided then the measures stated have to be strictly followed.
Documentation /record	Unmonitored ACM might be handled incorrectly and can cause release of airborne asbestos	To be formatted and kept as mentioned in the Asbestos Management Plan	DBO Contractor/ RUDSICO-EAP	To be kept intact for easy tracking and reference in legible format. The same can be kept in soft format as well.

Annexure 1: Formats of ACM Management

FORM I – ASBESTOS INVENTORY, INSPECTION AND ACTION FORM

Format: RUDSICO-EAP/ IIA/ LOCATION/ NAME OF DBO CONTRACTOR/ HSE 002/ YEAR		
Location:		
Site co-ordinates:		
Elevation:	Team:	
Date of visit	Sign:	
Present Status		Indicate if installed, operational, in storage, etc.
Original age		Months or years since installation
Diameter		mm or inches
Length		meters
Volume		
Total packet		
Packing date		
Disposal date		
Existing Site (Photo or illustrations):		
Illustration/ Design of Activities On-site with respect to existing asbestos (include details such as size of new pipes, distance from existing AC pipes, other notable observations)		
DBO Contractor Handling Asbestos:		
Number of persons handling waste		
Medical Records		
Safety Gears		
Vocational Training Last Conducted:		
Number of attendees:		
Conducted by Schedule:		
Required Actions:		
Remarks		
Conclusion/ Remark		
HSE Signatory		

FORM-II – MATRIX FOR TRAINING & RECORDS

Format: RUDSICO-EAP/ INSP. MATRIX/ LOCATION/ NAME OF DBO CONTRACTOR/ HSE 001/ YEAR			
S. No.	Aspects of ACM	Check points	Remarks
Training Schedule:			
Trainer Details:			
Date/Location of Training:			
Number of attendees:			
Training Schedule, Training Materials & Attendance Sheet, Feedback of Trainees.			
Understanding of:			
A. DOCUMENTS AND RECORDS			
1.	Site Inventory		
2.	List of ACM storage and installation points		
3.	Structure of ACM management committee		
B. INVENTORY			
1.	Inventorization of ACM		
	Number of ACM/ pipes		
	Dimensions of ACM/ pipes		
	Total volume of ACM/ pipes		
2.	Storage facility/ installation location:		
A.	In-use	Location	
		Condition	Intact/ damaged
		Purpose	
		Accessibility by the workers	
		Evidence of physical damage and approximate size (length, width, volume) without coming into contact with The damaged ACM	
		Impacts on the environment (Based on Asbestos fiber Monitoring)	
3.	LABELING AND SIGNAGE		
	Notification to workplace safety and health		
	Working instruction		
	The risks associated with exposure to asbestos fibers		
	Cautionary statement to not disturb materials containing asbestos		
4.	PERSONAL PROTECTIVE EQUIPMENT (PEP)		
	Record of pep		
	Mask		
	Eye glasses		
	Gloves		
	Ear muffs		
	Others		
	Training		
	On occupational risks of asbestos to the workers	Date: Time: In-house/ external: Faculty: No of workers attended:	
	Training for maintenance, repair and renovation	Date: Time: In-house/ external: Faculty: No of workers attended:	

	Training for workers working with asbestos	Date: Time: In-house/ external: Faculty: No of workers attended:
	Periodic air quality monitoring records	• Within the permissible limits • Not within the permissible limits (specify the reason)
	Workers medical check-up records	Date: In-house/ external: Performed by: Remarks: No of workers attended:
Conclusion/ Remark HSE Signatory		

The all the data required in Form-II will be filled by the DBO Operator (HSE-Officer), the records of this document has to be maintained for a pre-decided life. Details of training imparted have to be file with appropriate evidence like photographs, feedback form, videos etc. There has to be a proper documentation of the records kept with highest level of transparency to retrieve, trace and track the records as necessary. The records maintained by the DBO Operator, has to be audited regularly by the ACM-Expert.

Form-I has to be accompanied with Form-II. Defined period of Air Quality monitoring and health will have to be minimum twice a year. Where ever the fiber counts are found/ recorded beyond the permissible norms, corrective action, like:

- ☐ Cordon off the area of ACM
- ☐ HSE team with trained experts to be deputed for the task
- ☐ Moisten the ACM prior to handling
- ☐ Storage area of the ACM stacks to be covered
- ☐ The damaged/deteriorated ACM to be re-handled in presence of Asbestos Expert/ HSE (Trained) with all defined norms and safety gears.
- ☐ Disposal of damaged/deteriorated ACM to be done as per the Norms.
- ☐ Records of disposal to be maintained.
- ☐ Keep all requisite evidence in form of documentation, geo-tagged photographs etc.
- ☐ Frequency of health monitoring at such locations to be increased.

Form-III- AIR QUALITY MONITORING AND RESULTS

Format: RUDSICO-EAP/AQMR/ LOCATION/NAME OF DBO CONTRACTOR/HSE 003/YEAR			
Vendor details			
Approvals			
S.No.	Location	Agency	Results & Permissible Norms
Conclusion/ Remark HSE Signatory			

FORM-IV-MEDICAL HISTORY

Format: RUDSICO-EAP/MH/ LOCATION/NAME OF DBO CONTRACTOR/HSE 004/YEAR																				
Employee code:																				
Employer Details:																				
PPE Used:																				
Insurance/ESI																				
S.No	Name	Age/ DBO	Sex/	Address/ Contact details:	Period of Employment/ Job Title	Pre-History	Doctor's comments	HSE Remarks												
						<table border="1"> <tr><td>Height</td><td></td></tr> <tr><td>Weight/ BMI</td><td></td></tr> <tr><td>Blood group</td><td></td></tr> <tr><td>X-Ray</td><td></td></tr> <tr><td>CT Scan</td><td></td></tr> <tr><td>others</td><td></td></tr> </table> Smoker: Tobacco: Alcohol Consumption: Family History: Medication if any: Eye sight: Hearing: Others:	Height		Weight/ BMI		Blood group		X-Ray		CT Scan		others			
Height																				
Weight/ BMI																				
Blood group																				
X-Ray																				
CT Scan																				
others																				

FORM -V**[FORM-10- as per rule 19 (1) of Hazardous waste Handling & Management Rules-2016]****MANIFEST FOR HAZARDOUS AND OTHER WASTE**

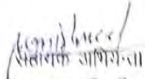
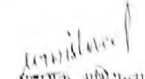
1.	Sender's name and mailing address (including Phone No. and e-mail)			
2.	Sender's authorization No.		•	
3.	Manifest Document No.		•	
4.	Transporter's name and address: (including Phone No. and e-mail)			
5.	Type of vehicle		•	(Truck/ Tanker/ Special Vehicle)
6.	Transporter's registration No.		•	
7.	Vehicle registration No.		•	
8.	Receiver's name and mailing address (including Phone No. and :		(e-mail)	
9.	Receiver's	Authorization	No.	
10.	Waste description		•	
11.	Total quantity No. of Containers		•	m ³ or MTNos.

12.	Physical form	(Solid/ Semi-Solid/ Sludge/ Oily/ Tarry/ Slurry/ Liquid)											
13.	Special handling instructions and additional information												
14.	Sender's Certificate	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked, and labeled, and are in all respects in proper conditions for transport by road according to applicable National Government regulations.											
	Name and stamp:	Signature:	Month		Day				Year				
15.	Transporter acknowledgement of receipt of Wastes												
	Name and stamp:	Signature:	Month		Day				Year				
16.	Receiver's certification for receipt of hazardous and other waste												
	Name and stamp:	Signature:	Month		Day				Year				

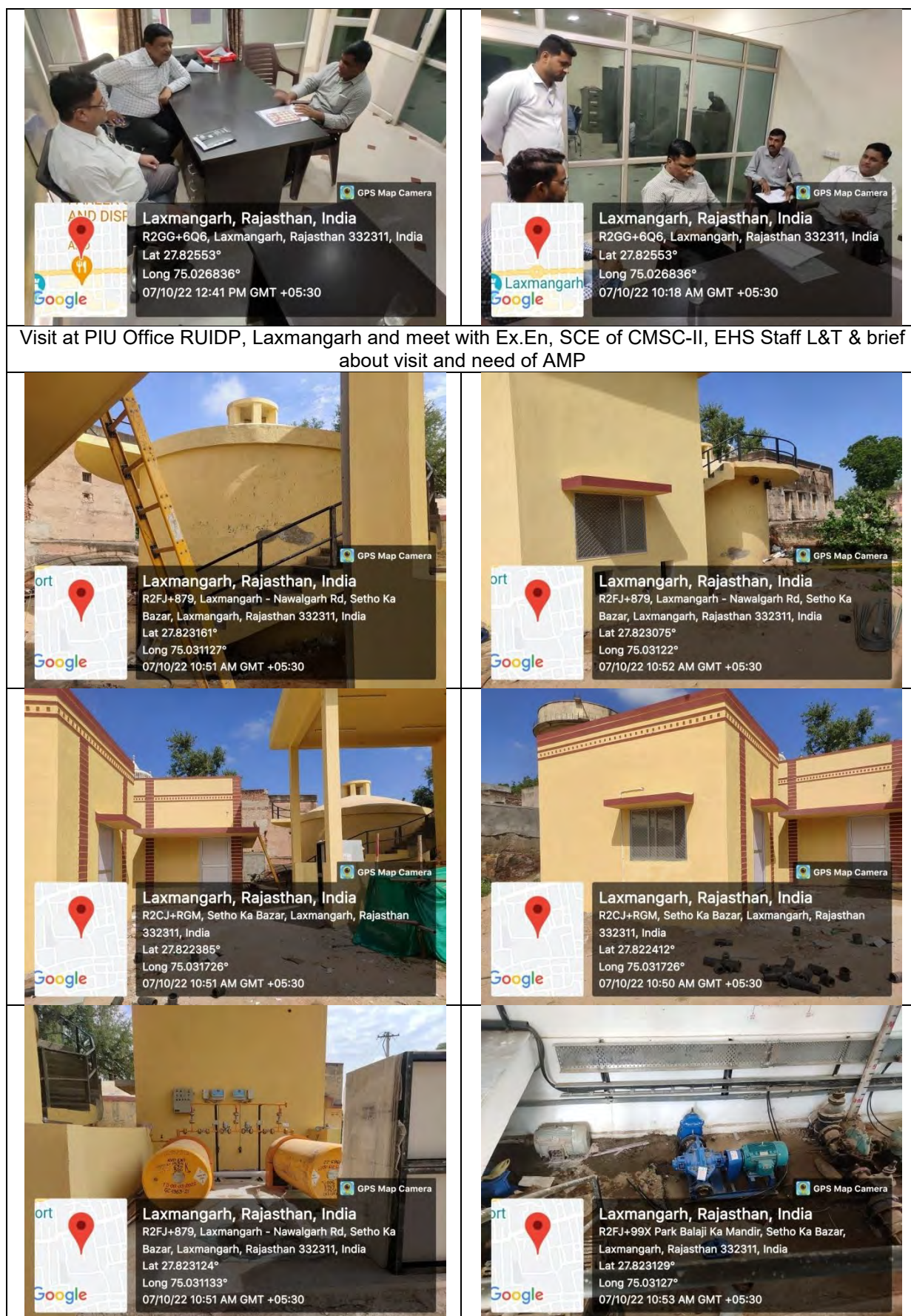
FORM –VI: IN-SITU STORAGE OF ACM

S.No	Activity	Number of Stacks	Area occupied	Details of ACM Pipes	Day/ month/ year of storage
Site History					
For existing Stacks, details of re-handling of pipes in number or volume to be mentioned under supervision of Authorized Experts.					
Details of Location of re-handled ACM storage, new area should be					
• Minimum 10-15 ft away from campus habitation. • 250m away from the water sources. • 500-800m away from Children play area. • The area should be isolated and covered from all the sides with restricted Access for Authorized Experts Only. • Register to be maintained for Entry & Exit of personals. • Register to be maintained for Entry & Exit of ACM • Labels to be displayed in legible format • Specific training of ACM to be inducted in the ACM storage area for residing population in the campus.					
Details of transit storage of ACM to be maintained as per norms in an isolated storage room full covered					

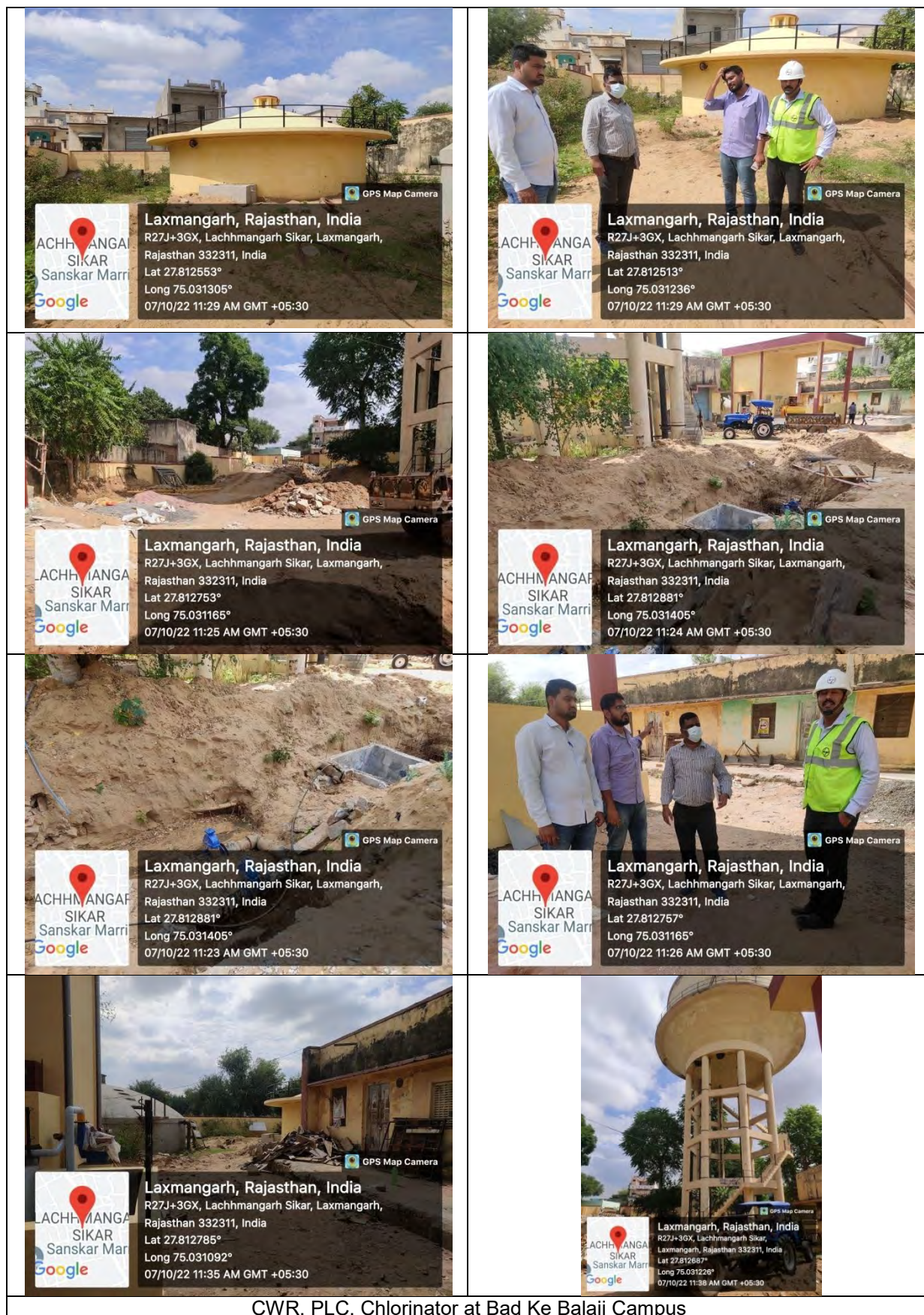
Annexure 2: Details of AC pipes in Existing Water Supply Network in Laxmangarh

कार्यालय सहायक अभियन्ता		
जन स्वास्थ्य अभियान्त्रिकी विभाग लक्ष्मणगढ़ (सीकर)		
क्रमांक -	दिनांक -	
अतिशायी अभियन्ता आरयूआईडीपी पीआईयू फतेहपुर।		
विषय	लक्ष्मणगढ़ शहर में आपके विभाग द्वारा संचालित पेयजल परिगोजना में उपयोग किये जा रहे एसी प्रेशर पाईप लाईन का विवरण मिलाने संबंधित।	
प्रसंग	प्राप्त पत्रांक: 1178 दिनांक: 09.01.2023	
उपरोक्त विषयान्तर्गत प्राप्त प्रारंभिक चयन के संदर्भ में विवेचन है कि लक्ष्मणगढ़ शहर में जन.स्वा. अभि. विभाग द्वारा संचालित पेयजल परिगोजना में उपयोग किये जा रहे A.C. पाईप लाईनों की उपलब्ध रिकॉर्ड अनुसार सूचना निम्नानुसार है।		
S. no.	Dia of A.C. Pipe	Length of A.C. Pipe
01	80 MM	25332 Mtr
02	100 MM	6487 Mtr
03	125 MM	1352 Mtr
04	150 MM	4091 Mtr
05	200 MM	2732 Mtr
06	250 MM	4384 Mtr
07	Total	44378 Mtr
 सहायक अभियन्ता जन.स्वा. अभि. विभाग लक्ष्मणगढ़ (सीकर)		
क्रमांक - 757.56	दिनांक -	
प्रतिलिपि 1 1/1-23		
1. श्रीमान् अधीक्षण अभियन्ता, जन.स्वा. अभि. विभाग, सीकर। 2. श्रीमान् अतिशायी अभियन्ता, जन.स्वा. अभि. विभाग, लक्ष्मणगढ़ (सीकर)।		
 सहायक अभियन्ता जन.स्वा. अभि. विभाग लक्ष्मणगढ़ (सीकर)		

Annexure 3: Site Visit Photographs of Laxmangarh Town Subproject Components

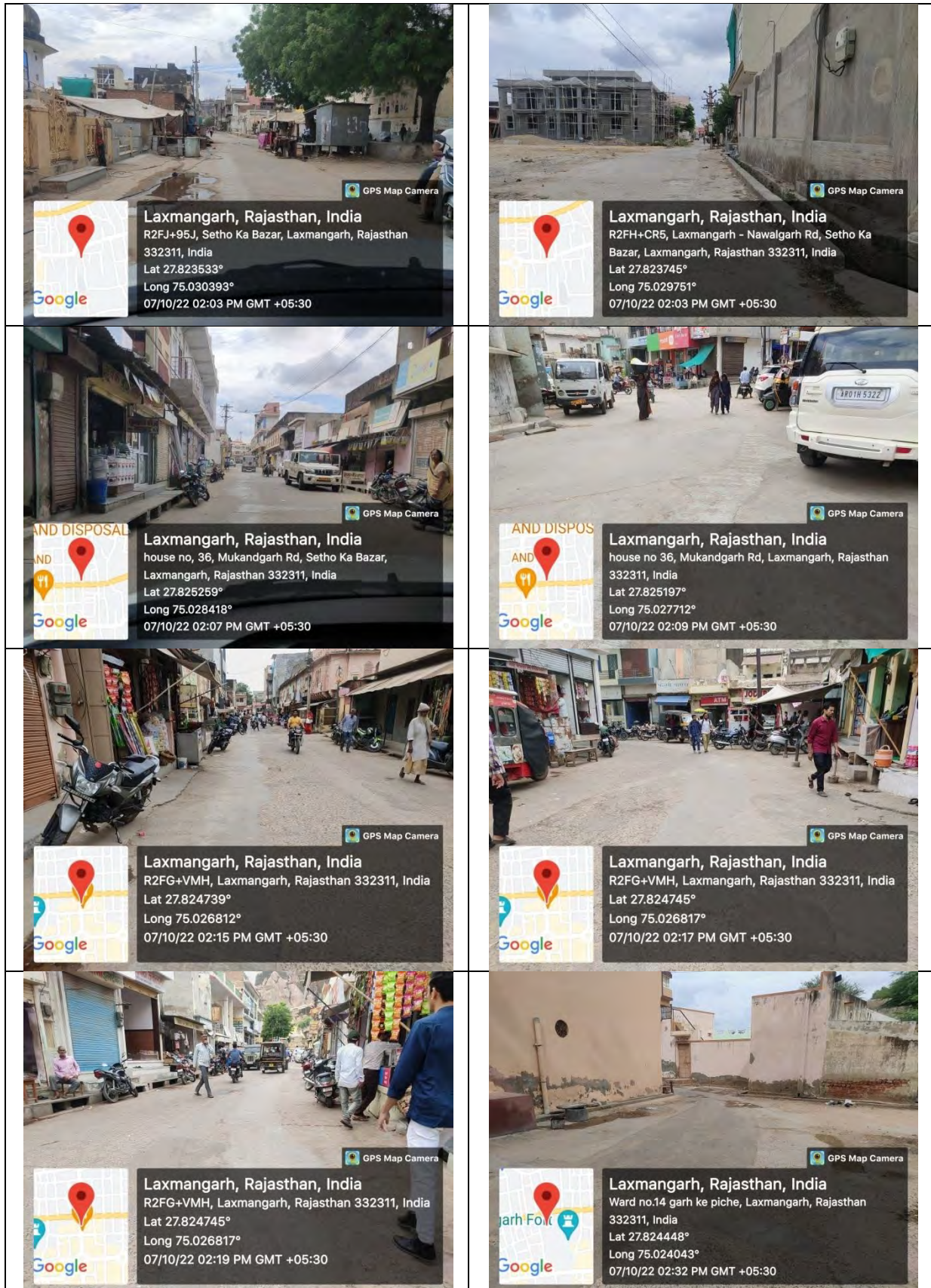


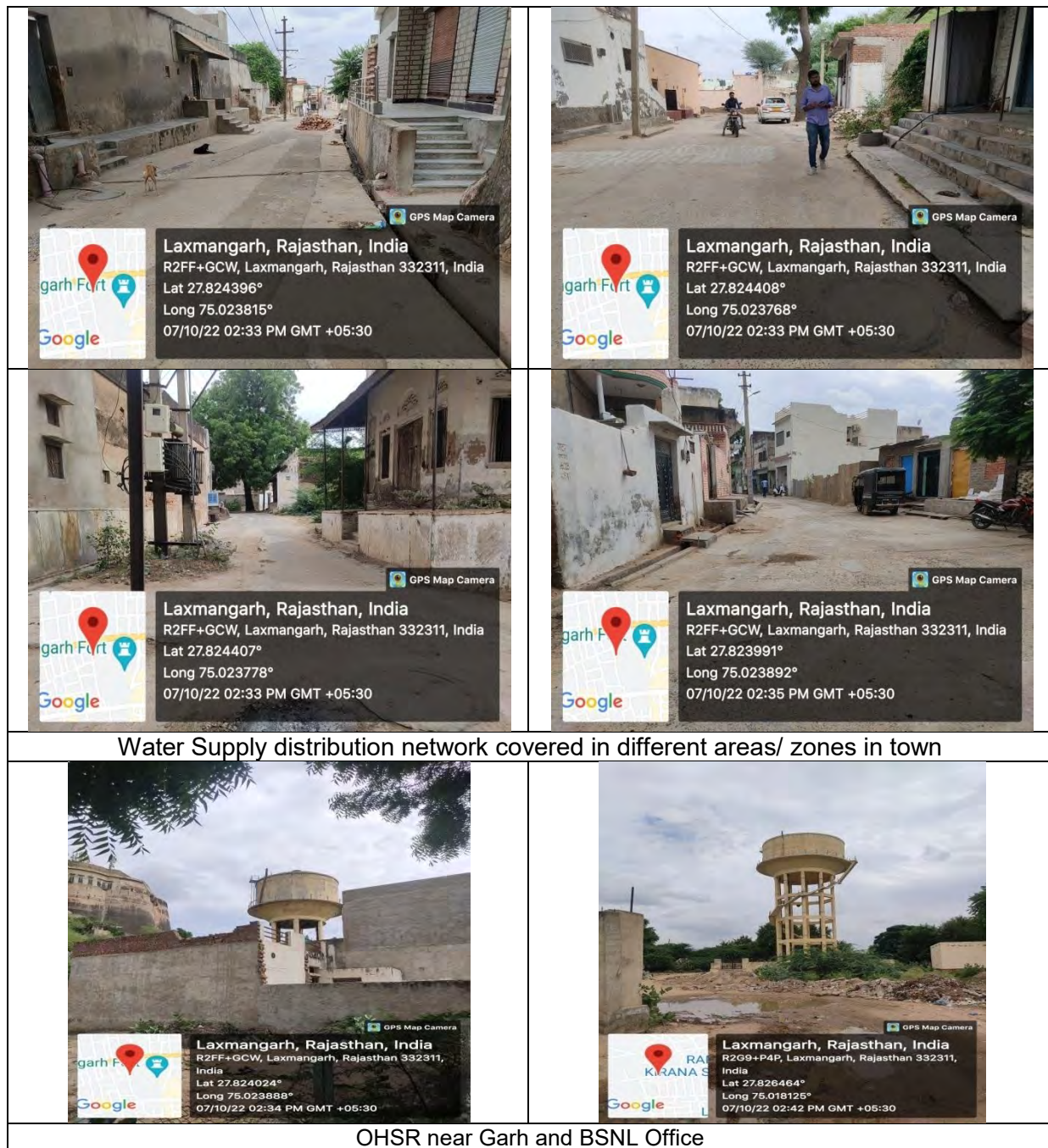




CWR, PLC, Chlorinator at Bad Ke Balaji Campus







Conclusion:

Visited the Laxmangarh town dated on 07/10/2022 and meet with the Official of PIU, Executive Engineer Mr. Manoj Mittal, along with SCE CMSC-II Mr. Anupam Malviya. Detail discussion with executive engineer and SCE of CMSC-II regarding Asbestos Management Plan and purpose of visit. During discussion detail deliberation such as issues of Asbestos pipes occurring during excavation of WS in Laxmangarh Town. During construction/ excavation activities, pipes need to be properly removed and disposed as per approved Asbestos Management Plan if occurred.

As per discussion with SCE and CMSC-II, existing WS line laid at the depth of 2.0m at many places. New line of WS is being laid at the depth of approx. 1.0m to 1.25m. New line is being laid in opposite direction of existing line. It may vary place to place, location of pipeline in reference to sides of road. Moreover sometimes in narrow street new line is being laid in opposite direction of existing WS line. So there is lesser chance to encountered AC pipes

during excavation. However cannot deny the possibility to encounter AC pipes in broken stage sometimes during crossing the line but there will be low risk. In case of occur; all the procedure will be follows as per approved AMP. All existing line of water supply will not be disturbed and will left in the ground in their original condition.

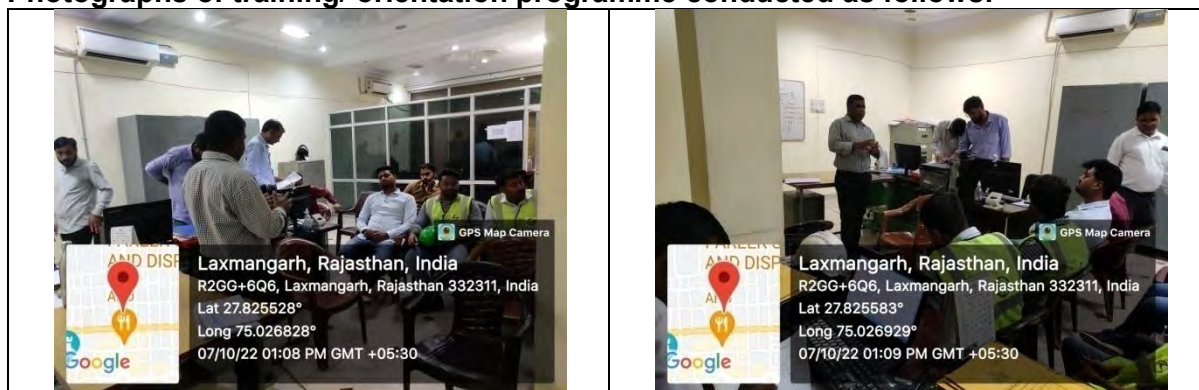
During discussion with Ex.En. and SCE of CMSC-II, detail deliberation such as issues of Asbestos pipes if occur during excavation of WS works in Laxmangarh Town. During construction/ excavation activities, pipes needs to be properly remove and disposed as per approved Asbestos Management Plan if occurred. Pre-dominant wind direction needs to be considered in planning of storage of ACM at designated place. No habitation should be located in downwind direction of ACM storage near or its immediate vicinity.

During discussion with SCE-CMSC-II, works of laying of WS distribution network (approx.100%) have laid in different wards/zones in Laxmangarh Town till date. During visit found that 1 nos of CWR 100 KL capacity constructed at A.En. campus and another CWR of 250 KL constructed at Bad Ke Balaji campus. One CRMC constructed near the CWR at A.En campus, and one CRMC and MCC constructed infront of Ex. En. Office, Manasi.

During site visit no asbestos containing materials (ACMs) were present/ occurred during excavation at different sites in Laxmangarh Town. In case of any occurrence of ACM's during excavation near future, different sites such as CRMC/MCC, CWR, WS distribution network areas have visited but adequate space is available in near CWR site at A.En. PHED Campus & Bad Ke Balaji campus. However in view of space there is no issue to temporary stack of ACM's if occurred in near future in A.En. PHED campus & Bad Ke Balaji campus, as no habitation/schools/ temple is exist near/in vicinity the site except few old staff quarters. CWR site at A.En Campus & Bad Ke Balaji campus have sufficient space to temporary store the ACM if occurred in near future and quite remote from habitation, any water body or sensitive receptors.

In line of better management of ACM's if occurred during works, a training cum orientation programme was also conducted dated on 07th October 2022 in due consent with Executive Engineer of PIU along with CMSC-II Staff and Contractor (L&T) safety personnel etc. During training, welcomed all the concerned person and brief about the Asbestos Management Plan and their needs while executing the works. From PMCBC, Asbestos Expert brief about the need and management of ACM's during works also discuss the ACMs removal, handling and temporary stacking and disposal procedure. During removal all the rules and regulation will need to be strictly adhered as per Asbestos Management Plan (AMP).

Photographs of training/ orientation programme conducted as follows:





Photographs during Training/ Orientation on Asbestos Management at PIU Office, Laxmangarh

Attendance Sheet

TRAINING ON ASBESTOS MANAGEMENT

Project Town: Laxmangarh, District - Sikar, Rajasthan
 Venue: PIU office Laxmangarh
 Date: 07/10/2022

S.No.	Name of Person	Gender	Designation	Contact No.	Signature
1	M. PRABU SELVAN	M	Sr. CONSTR. MAN	9945476519	<i>[Signature]</i>
2	Nadim chopdar	M	CMSC Support engineer	9024513936	<i>[Signature]</i>
3	Subankans Paul	M	Electrical Engg. (Design)	8274806946	<i>[Signature]</i>
4	Karthikeya Singh	M	Site Engineer	9695169333	<i>[Signature]</i>
5	DEVESH ATREYA	M	CMSC Supp Engg	9636131211	<i>[Signature]</i>
6	Haviter Ali paware	m	CMSC 2 Support engineer	7614289028	<i>[Signature]</i>
7	Anupam Malaviya	M.	SCE	9828960252	<i>[Signature]</i>
8	mahendra singh Rathore	m	ASDCOMDSCAPP	9166746898	<i>[Signature]</i>
9	Vijaykumar	M	EHS- Engineer	9412313638	<i>[Signature]</i>
10	Sauad Khan	M	Safety standard	7732824184	<i>[Signature]</i>
11	Rajeev Rajput	M	Quality Control	8103868700	<i>[Signature]</i>
12	Kamlesh Shrivastava	M	ASD-CAPP	9571387733	<i>[Signature]</i>
13	Nitin Kumar	m	Support Engg	9602966555	<i>[Signature]</i>

[Signature]
 07.10.2022
 Signature of Asbestos Expert

C.S.
 07.10.22
 EXECUTIVE ENGINEER
 RUDIPATPUR
 Sign of PIU

Appendix 16: 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.

I. 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.

II. 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

III. Documentation

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

Appendix 17: 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.

6. 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.

7. 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.

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

9. 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

10. 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:

- Signs
- Pavement Markings
- Channelizing Devices
- Arrow Panels
- Warning Lights

11. 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").

12. **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:

- Work on shoulder or parking lane
- Shoulder or parking lane closed on divided road
- Work in Travel lane
- Lane closure on road with low volume
- 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)
- Lane closure on a two lane road (two flagger operation)
- Lane closure on a four lane undivided Road
- Lane closure on divided roadway
- Half road closure on multi-lane roadway
- Street closure with detour

13. 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.

14. 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. Flaggers/ 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

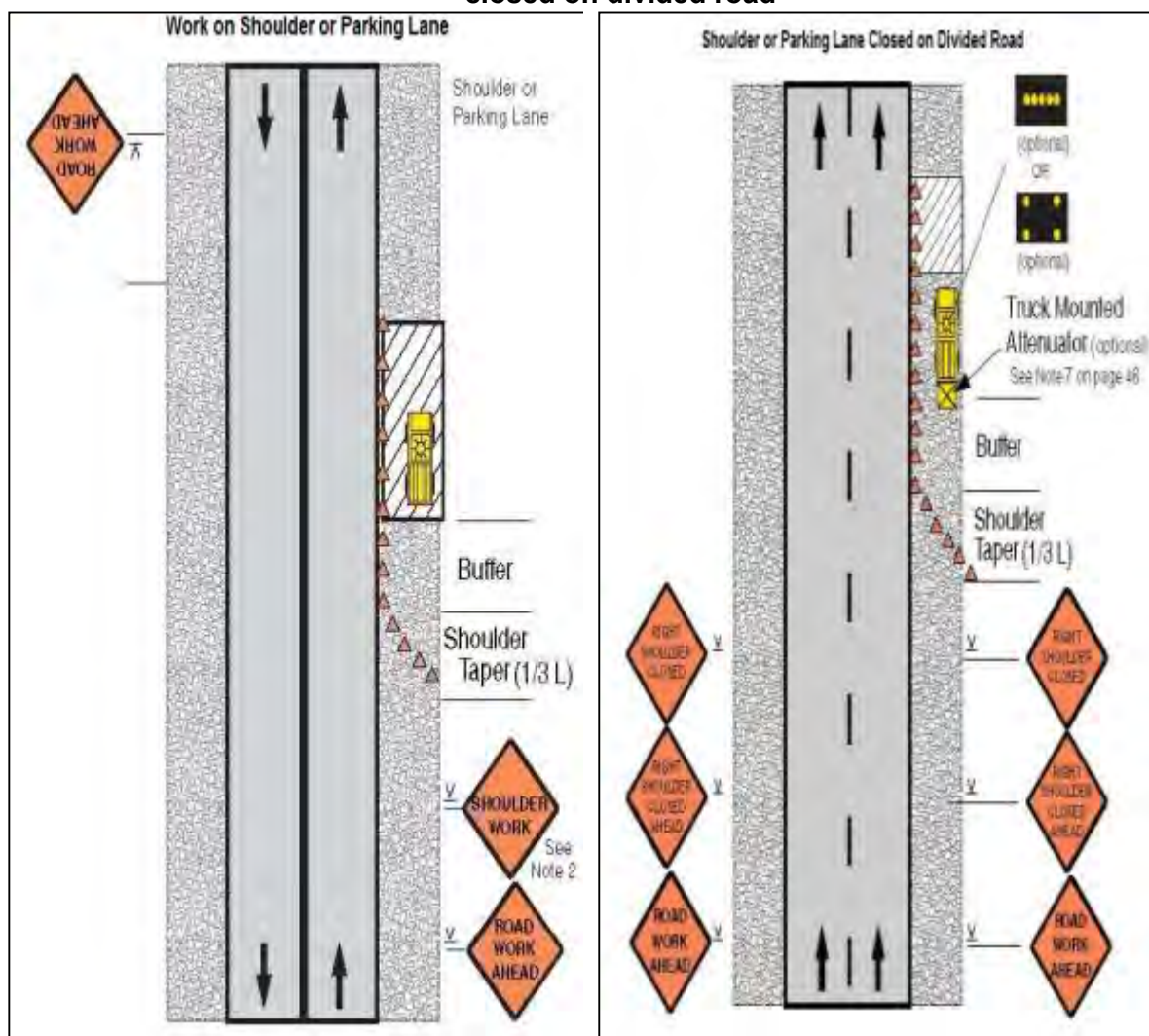


Figure A4&A5: Work in Travel lane & Lane closure on road with low volume

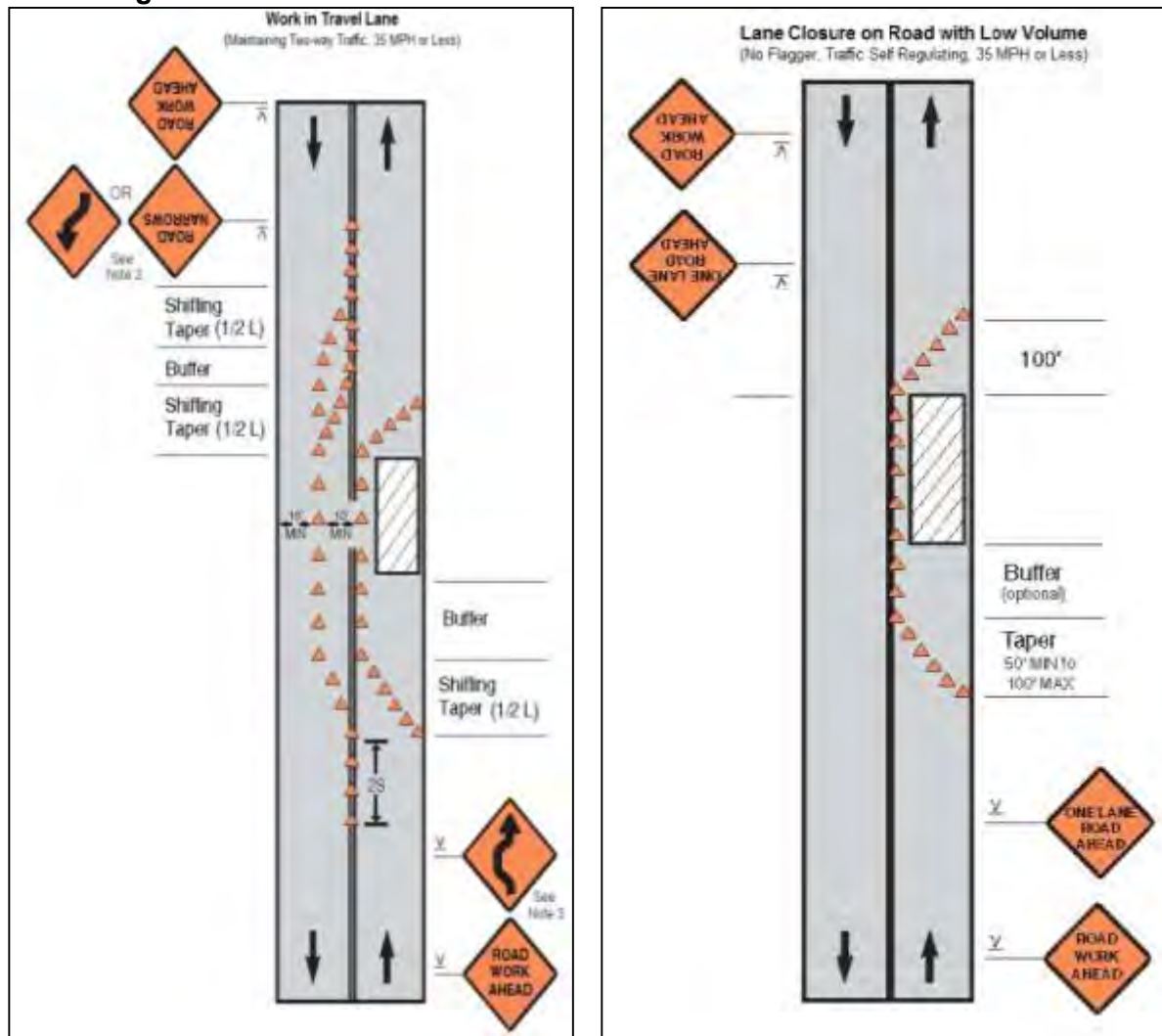


Figure A6&A7: Lane closure on a two-line road with low volume (with yield sign) & Lane closure on a two-line road with low volume (one flagger operation)

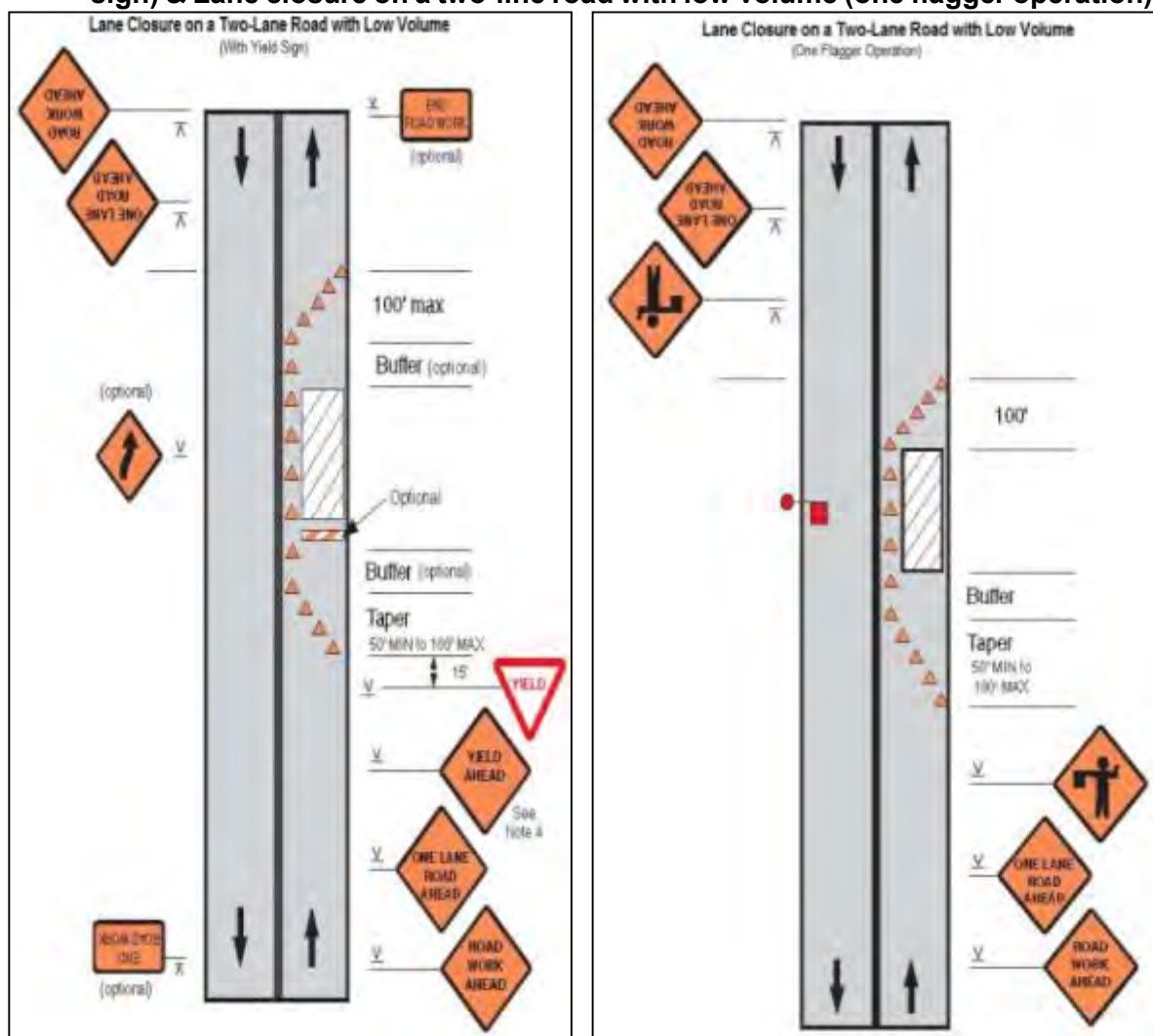


Figure A8&A9: Lane Closure on a Two-Lane Road (Two Flagger Operation) & Lane Closure on a Four-Lane Undivided Road

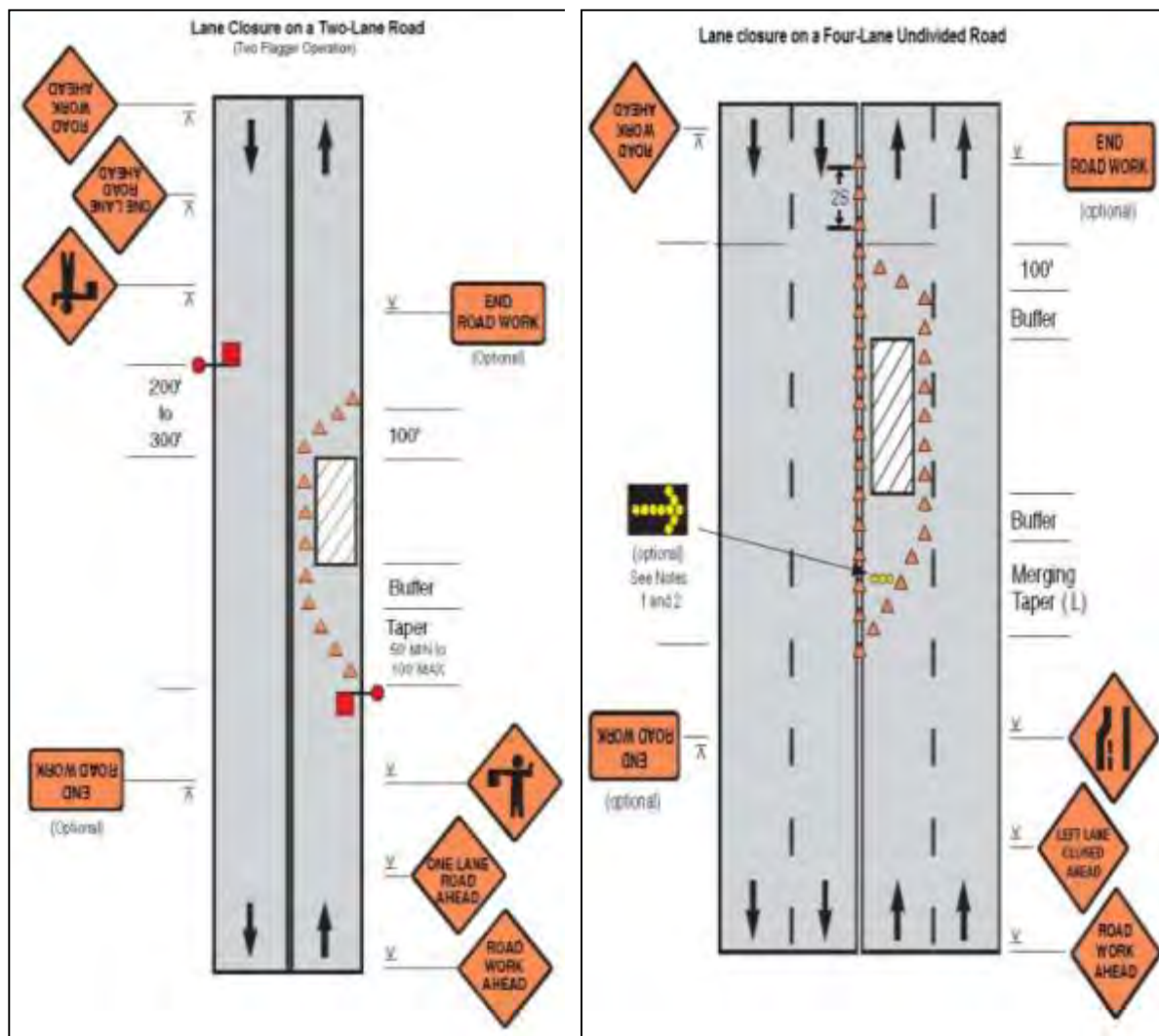


Figure A10&A11: Lane Closure On Divided Roadway & Half Road Closure On Multi-Lane Roadway

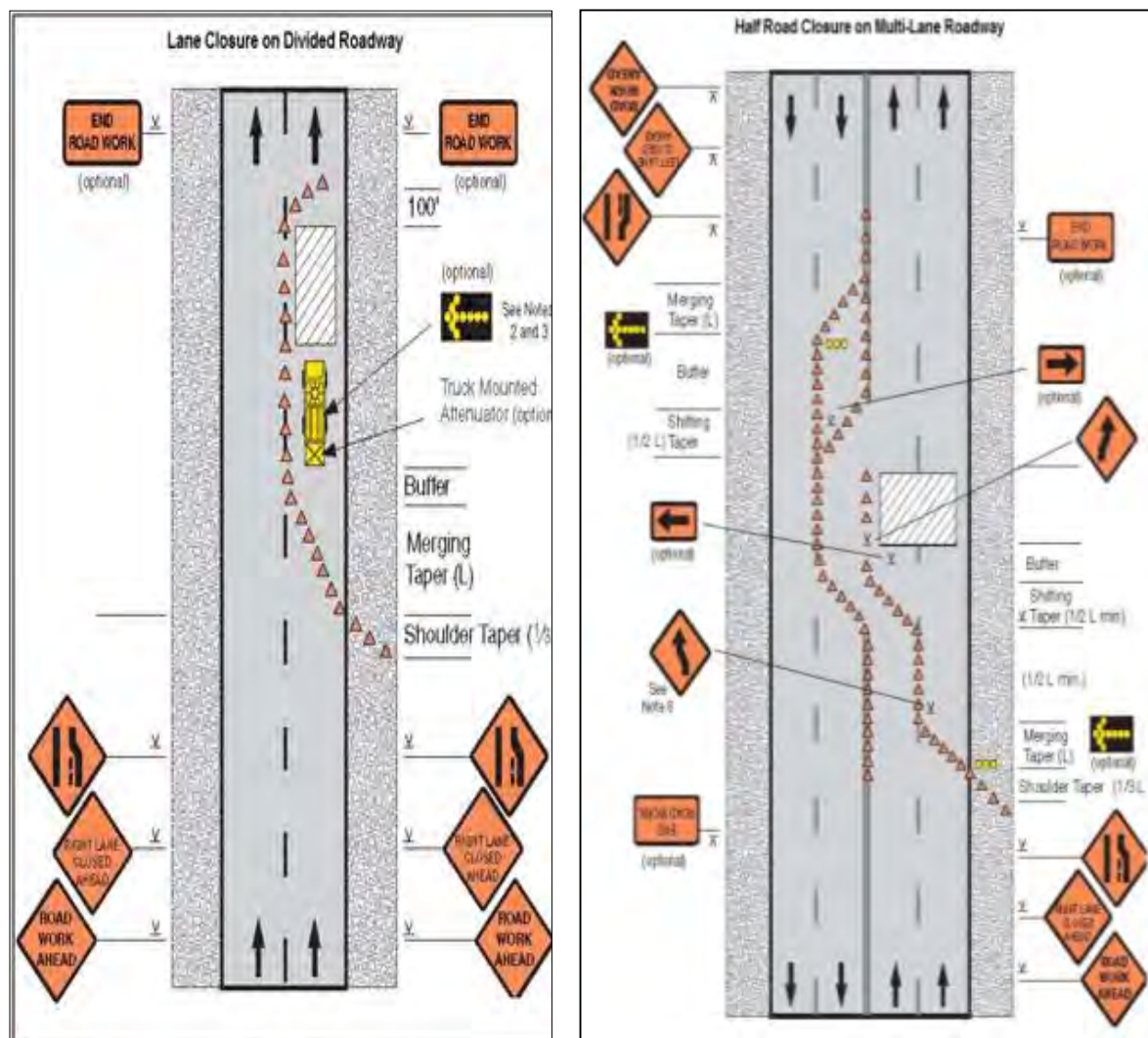
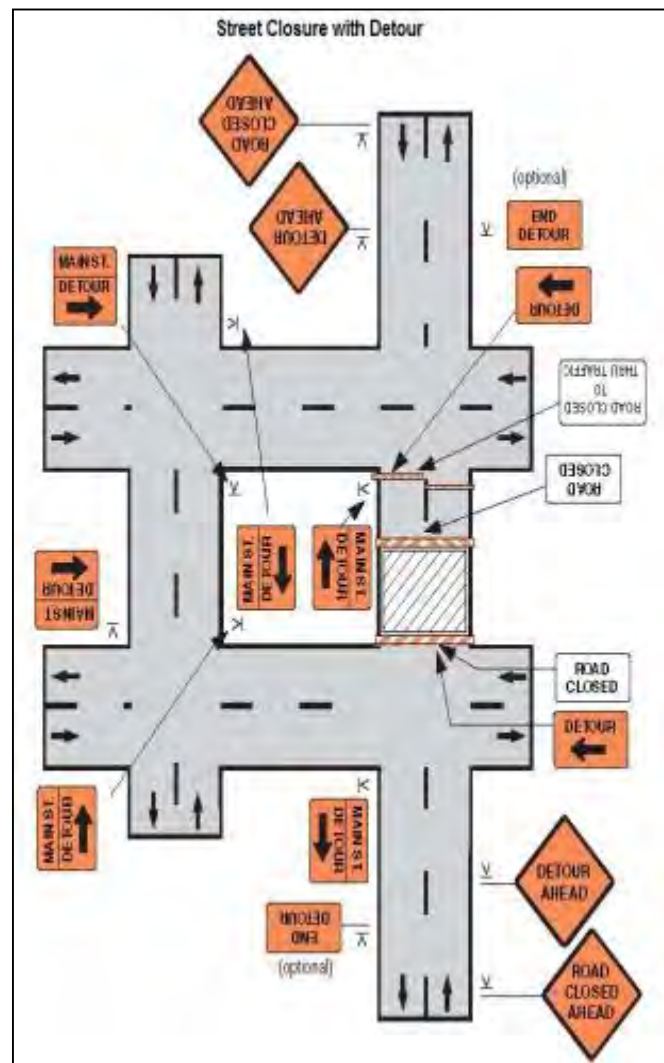


Figure A12: Street closure with detour



Appendix 18: Environmental Monitoring Plan - Ambient Air, Noise, Water and Soil

1. Under RUIDP works Environmental Monitoring will done for ambient air, noise, surface water, ground water and soils with following parameters-
 - A. **Ambient Air Quality-** Particulate Matters PM₁₀, Particulate Matter PM_{2.5}, SO_x, NO_x, Carbon Monoxide (CO) as per methods and norms approved by CPCB
 - B. **Ambient Noise Quality-** L_{day} and L_{night} (in LeqdB(A) 24 hrs basis as per methods and norms approved by CPCB
 - C. **Ground Water Quality-** pH, TDS, Total Hardness, Zn, Chloride, Iron, Copper, DO, Manganese, Sulphate, Nitrate, Fluoride, Hg, Cadmium, Cr⁺⁶, Arsenic, Lead, Total Alkalinity, Phosphate, Phenolic compound
 - D. **Soil quality-** pH, Elect. Conductivity (at 25°C), Moisture (at 105°C), Texture (silt, clay, sand), Calcium (as CaO), Magnesium (as Mg), Permeability, Nitrogen (as N), Sodium (as Na), Phosphate (as PO₄), Potassium (as K), Organic Matter, oil and grease
2. During pre-construction stage monitoring is required to establish baseline at following sites-

Environmental Monitoring in Pre-Construction Period

S.N .	Type of monitoring	Location of monitoring and no. of samples	Total No. of samples
1	Ambient Air Monitoring	CWR sites -2 Pipe Laying site-1	3
2.	Ambient Noise monitoring	CWR sites -2 Pipe Laying site-1	3
3	Ground Water quality	CWR sites -2	2
4	Soil Quality	CWR sites -2	2

3. During construction stage below monitoring should be done on minimum quarterly basis at the following sites-

Environmental Monitoring in Construction Period

Proposed sites	Ambient Air quality	Ambient Noise quality	Ground Water Quality	Soil Quality
Pipe laying site within the town preferably near sensitive receptor*	1	1	Nil	Nil
CWR site	2	2	2	2
Total number of samples in each quarter (A)	3	3	2	2
Total number of samples in construction period (B)	24	24	16	16

Calculation of total Number of samples-

Project duration= 3 years=12 quarters

Pre-construction phase= 3 months=1quarter

Monsoon period in each year=3 months=1 quarter (July-Sept)

Monsoon period in project duration=3 quarter

Effective period of environmental monitoring (C) = 12-1-3=8 quarters

Total number of samples in construction period (B)=AxC

Note -

- i. All the tests should be done by labs approved by CPCB and/or RPCB and should be accredited by NABL
- ii. All the tests should be done as per the norms and methods approved by CPCB/RPCB
- iii. All the meteorological data like weather, wind, location, nearby features etc. should be recorded during sampling and indicated in the report for ambient air quality
- iv. If surface water is not available within 500 meters of the site, ground water quality monitoring should be done from the vicinity within 500 meters and if both surface and ground water is available at any site both should be taken
- v. For air quality monitoring, if any two sites are within the distance of 2 kms from each other, only one sampling can be done at any site

* Sensitive receptors are hospitals, schools, any major religious place etc

Appendix 19: IFC benchmark standards for workers accommodation

August 2009

11

PART II: STANDARDS FOR AND MANAGEMENT OF WORKERS' ACCOMMODATION

I. Standards for workers' accommodation

This section looks at the principles and standards applicable to the location and construction of workers' accommodation, including the transport systems provided, the general living facilities, rooms/dormitories facilities, sanitary facilities, canteen and cooking facilities, food safety, medical facilities and leisure/social facilities.

A. National/local standards

The key standards that need to be taken into consideration, as a baseline, are those contained in national/local regulations. Although it is quite unusual to find regulations specifically covering workers' accommodation, there may well be general construction standards which will be relevant. These may include the following standards:

- **Building construction:** for example, quality of material, construction methods, resistance to earthquakes.
- **Housing and public housing:** in some countries regulations for housing and public housing contain requirements on issues such as the basic amenities, and standards of repair.
- **General health, safety and security:** requirements on health and safety are often an important part of building standards and might include provisions on occupation density, minimal air volumes, ventilation, the quality of the flooring (slip-resistant) or security against intrusion.
- **Fire safety:** requirements on fire safety are common and are likely to apply to housing facilities of any type. This can include provision on fire extinguishers, fire alarms, number and size of staircases and emergency exits, restrictions on the use of certain building materials.
- **Electricity, plumbing, water and sanitation:** national design and construction standards often include very detailed provisions on electricity or plumbing fixtures/fittings, water and sanitation connection/equipment.

Benchmark

1. The relevant national and local regulations have been identified and implemented.

B. General living facilities

Ensuring good standards in living facilities is important in order to avoid safety hazards and to protect workers from diseases and/or illness resulting from humidity, bad/stagnant water (or lack of water), cold, spread of fungus, proliferation of insects or rodents, as well as to maintain a good level of morale. The location of the facilities is important to prevent exposure to wind, fire, flood and other natural hazards. It is also important that workers' accommodation is unaffected by the environmental or operational impacts of the worksite (for example noise, emissions or dust) but is sufficiently close that workers do not have to spend undue amounts of time travelling from their accommodation to the worksite. Living facilities should be built using adequate materials and should always be kept in good repair, clean and free from rubbish and other refuse.

Benchmarks

1. Living facilities are located to avoid flooding and other natural hazards.
2. Where possible, living facilities are located within a reasonable distance from the worksite.
3. Transport from the living facilities to worksite is safe and free.
4. The living facilities are built with adequate materials, kept in good repair and kept clean and free from rubbish and other refuse.

Drainage

The presence of stagnant water is a factor of proliferation of potential disease vectors such as mosquitoes, flies and others, and must be avoided.

Benchmarks

1. The building site is adequately drained to avoid the accumulation of stagnant water.

Heating, air conditioning, ventilation and light
Heating, air-conditioning and ventilation should be appropriate for the climatic conditions and provide workers with a comfortable and healthy environment to rest and spend their spare time.

Benchmarks

1. For facilities located in cold weather zones, the temperature is kept at a level of around 20 degrees Celsius notwithstanding the need for adequate ventilation.
2. For facilities located in hot weather zones, adequate ventilation and/or air conditioning systems are provided.
3. Both natural and artificial lighting are provided and maintained in living facilities. It is best practice that the window area represents not less than 5% to 10% of the floor area. Emergency lighting is provided.

Water

Special attention to water quality and quantity is absolutely essential. To prevent dehydration, water poisoning and diseases resulting from lack of hygiene, workers should always have easy access to a source of clean water. An adequate supply of potable water must be available in the same buildings where bedrooms or dormitories are provided. Drinking water must meet local or WHO drinking water standards⁷ and water quality must be monitored regularly. Depending on the local context, it could either be produced by dedicated catchment and treatment facilities or tapped from existing municipal facilities if their capacity and quality are adequate.

Benchmarks

1. Access to an adequate and convenient supply of free potable water is always available to workers. Depending on climate, weather conditions and accommodation standards, 80 to 180 litres per person per day are available.
2. Drinking water meets national/local or WHO drinking water standards.⁸
3. All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from becoming polluted or contaminated.

4. Drinking water quality is regularly monitored.

Wastewater and solid waste

Wastewater treatment and effluent discharge as well as solid waste treatment and disposal must comply with local or World Bank effluent discharge standards⁹ and be adequately designed to prevent contamination of any water body, to ensure hygiene and to avoid the spread of infections and diseases, the proliferation of mosquitoes, flies, rodents, and other pest vectors. Depending on the local context, treatment and disposal services can be either provided by dedicated or existing municipal facilities.

Benchmarks

1. Wastewater, sewage, food and any other waste materials are adequately discharged, in compliance with local or World Bank standards – whichever is more stringent – and without causing any significant impacts on camp residents, the biophysical environment or surrounding communities.
2. Specific containers for rubbish collection are provided and emptied on a regular basis. Standards range from providing an adequate number of rubbish containers to providing leak proof, non-absorbent, rust and corrosion-resistant containers protected from insects and rodents. In addition it is best practice to locate rubbish containers 30 metres from each shelter on a wooden, metal, or concrete stand. Such containers must be emptied at regular intervals (to be determined based on temperatures and volumes generated) to avoid unpleasant odours associated with decaying organic materials.
3. Pest extermination, vector control and disinfection are carried out throughout the living facilities in compliance with local requirements and/or good practice. Where warranted, pest and vector monitoring should be performed on a regular basis.

7. www.who.int/water_sanitation_health/dwaq/en/
8. *Ibid*

9. As per the "Pollution Prevention and Abatement Handbook", World Bank Group, July 1998, available from www.worldbank.org

C. Room/dormitory facilities

The standards of the rooms or dormitory facilities are important to allow workers to rest properly and to maintain good standards of hygiene. Overcrowding should be avoided particularly. This also has an impact on workers' productivity and reduces work-related accidents. It is generally acknowledged that rooms/dormitories should be kept clean and in a good condition. Exposure to noise and odour should be minimised. In addition, room/dormitory design and equipment should strive to offer workers a maximum of privacy. Resorting to dormitories should be minimised and single or double rooms are preferred. Dormitories and rooms must be single-sex.

Benchmarks

1. Rooms/dormitories are kept in good condition.
2. Rooms/dormitories are aired and cleaned at regular intervals.
3. Rooms/dormitories are built with easily cleanable flooring material.
4. Sanitary facilities are located within the same buildings and provided separately for men and women.
5. Density standards are expressed either in terms of minimal volume per resident or of minimal floor space. Usual standards range from 10 to 12.5 cubic metres (volume) or 4 to 5.5 square metres (surface).
6. A minimum ceiling height of 2.10 metres is provided.
7. In collective rooms, which are minimised, in order to provide workers with some privacy, only a reasonable number of workers are allowed to share the same room. Standards range from 2 to 8 workers.
8. All doors and windows should be lockable, and provided with mosquito screens where conditions warrant.
9. There should be mobile partitions or curtains to ensure privacy.
10. Every resident is provided with adequate furniture such as a table, a chair, a mirror and a bedside light.
11. Separate sleeping areas are provided for men and women, except in family accommodation.

Additional issue

Irrespective of whether workers are supposed to keep their facilities clean, it is the responsibility of the accommodation manager to ensure that rooms/dormitories and sanitary facilities are in good condition.

Bed arrangements and storage facilities

The provision of an adequate numbers of beds of an appropriate size is essential to provide workers with decent, safe and hygienic conditions to rest and sleep. Here again, particular attention should be paid to privacy. Consideration should be given to local customs so beds could be replaced by hammocks or sleeping mats for instance.

Benchmarks

1. A separate bed for each worker is provided. The practice of "hot-bedding" should be avoided.
2. There is a minimum space between beds of 1 metre.
3. Double deck bunks are not advisable for fire safety and hygiene reasons, and their use is minimised. Where they are used, there must be enough clear space between the lower and upper bunk of the bed. Standards range from 0.7 to 1.10 metres.
4. Triple deck bunks are prohibited.
5. Each worker is provided with a comfortable mattress, pillow, cover and clean bedding.
6. Bed linen is washed frequently and applied with repellents and disinfectants where conditions warrant (malaria).
7. Facilities for the storage of personal belongings for workers are provided. Standards vary from providing an individual cupboard for each worker to providing 475-litre big lockers and 1 metre of shelf unit.
8. Separate storage for work boots and other personal protection equipment, as well as drying/airing areas may need to be provided depending on conditions.

D. Sanitary and toilet facilities

It is essential to allow workers to maintain a good standard of personal hygiene but also to prevent contamination and the spread of diseases which result from inadequate sanitary facilities. Sanitary and toilet facilities will always include all of the following: toilets, urinals, washbasins and showers. Sanitary and toilet facilities should be kept in a clean and fully working condition. Facilities should also be constructed of materials that are easily cleanable and ensure privacy. Sanitary and toilet facilities are never shared between male and female residents, except in family accommodation. Where necessary, specific additional sanitary facilities are provided for women.

Benchmarks

1. Sanitary and toilet facilities are constructed of materials that are easily cleanable.
2. Sanitary and toilet facilities are cleaned frequently and kept in working condition.
3. Sanitary and toilet facilities are designed to provide workers with adequate privacy, including ceiling to floor partitions and lockable doors.
4. Sanitary and toilet facilities are not shared between men and women, except in family accommodation.

Toilet facilities

Toilet arrangements are essential to avoid any contamination and prevent the spread of infectious disease.

Benchmarks

1. An adequate number of toilets is provided to workers. Standards range from 1 unit to 15 persons to 1 unit per 6 persons. For urinals, usual standards are 1 unit to 15 persons.
2. Toilet facilities are conveniently located and easily accessible. Standards range from 30 to 60 metres from rooms/dormitories. Toilet rooms shall be located so as to be accessible without any individual passing through any sleeping room. In addition, all toilet rooms should be well-lit, have good ventilation or external windows, have sufficient hand wash basins and be conveniently located. Toilets and other sanitary facilities should be ("must be" in cold climates) in the same building as rooms and dormitories.

Showers/bathrooms and other sanitary facilities

Hand wash basins and showers should be provided in conjunction with rooms/dormitories. These facilities must be kept in good working condition and cleaned frequently. The flooring for shower facilities should be of hard washable materials, damp-proof and properly drained. Adequate space must be provided for hanging, drying and airing clothes. Suitable light, ventilation and soap should be provided. Lastly, hand washing, shower and other sanitary facilities should be located within a reasonable distance from other facilities and from sleeping facilities in particular.

Benchmarks

1. Shower/bathroom flooring is made of anti-slip hard washable materials.
2. An adequate number of handwash facilities is provided to workers. Standards range from 1 unit to each 15 persons to 1 unit per 6 workers. Handwash facilities should consist of a tap and a basin, soap and hygienic means of drying hands.
3. An adequate number of shower/bathroom facilities is provided to workers. Standards range from 1 unit to 15 persons to 1 unit per 6 persons.
4. Showers/bathrooms are conveniently located.
5. Shower/bathroom facilities are provided with an adequate supply of cold and hot running water.

E. Canteen, cooking and laundry facilities

Good standards of hygiene in canteen/dining halls and cooking facilities are crucial. Adequate canteen, cooking and laundry facilities and equipments should also be provided. When caterers are contracted to manage kitchens and canteens, special attention should be paid to ensure that contractors take into account and implement the benchmarks below, and that adequate reporting and monitoring mechanisms are in place. When workers can individually cook their meals, they should be provided with a space separate from the sleeping areas. Facilities must be kept in a clean and sanitary condition. In addition, canteen, kitchen, cooking and laundry floors, ceilings and walls should be made of easily cleanable materials.

Benchmarks

1. Canteen, cooking and laundry facilities are built in adequate and easy to clean materials.
2. Canteen, cooking and laundry facilities are kept in a clean and sanitary condition.
3. If workers can cook their own meals, kitchen space is provided separate from sleeping areas.

Laundry facilities

Providing facilities for workers to wash both work and non-work related clothes is essential for personal hygiene. The alternative is for the employer to provide a free laundry service.

Benchmarks

1. Adequate facilities for washing and drying clothes are provided. Standards range from providing sinks or tubs with hot and cold water, cleaning soap and drying lines to providing washing machines and dryers.
2. When work clothes are used in contact with dangerous substance (for example, application of pesticide), special laundry facilities (washing machines) should be provided.

Additional issue

When workers are provided with facilities allowing them to individually do their laundry or cooking, it should be the responsibility of each worker to keep the facilities in a clean and sanitary condition. Nonetheless, it is the responsibility of the accommodation manager to make sure the standards are respected and to provide an adequate cleaning, disinfection and pest/vector control service when necessary.

Additional issue

When the employer provides family accommodation, it is best practice to provide each family with a private kitchen or the necessary cooking equipment to allow the family to cook on their own.

Canteen and cooking facilities

Canteen and cooking facilities should provide sufficient space for preparing food and eating, as well as conform to hygiene and safety requirements.

Benchmarks

1. Canteens have a reasonable amount of space per worker. Standards range from 1 square metre to 1.5 square metres.
2. Canteens are adequately furnished. Standards range from providing tables, benches, individual drinking cups and plates to providing special drinking fountains.
3. Places for food preparation are designed to permit good food hygiene practices, including protection against contamination between and during food preparation.
4. Kitchens are provided with facilities to maintain adequate personal hygiene including a sufficient number of washbasins designated for cleaning hands with clean, running water and materials for hygienic drying.
5. Wall surfaces adjacent to cooking areas are made of fire-resistant materials. Food preparation tables are also equipped with a smooth durable washable surface. Lastly, in order to enable easy cleaning, it is good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures and all walls and ceilings have a smooth durable washable surface.
6. All kitchen floors, ceiling and wall surfaces adjacent to or above food preparation and cooking areas are built using durable, non-absorbent, easily cleanable, non-toxic materials.
7. Wall surfaces adjacent to cooking areas are made of fire-resistant materials. Food preparation tables are equipped with a smooth, durable, easily cleanable, non-corrosive surface made of non-toxic materials. Lastly, in order to enable easy cleaning, it is good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures have a smooth, durable and washable surface.
8. Adequate facilities for cleaning, disinfecting and storage of cooking utensils and equipment are provided.
9. Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently to avoid accumulation.

F. Standards for nutrition and food safety

When cooking for a number of workers, hygiene and food safety are absolutely critical. In addition to providing safe food, providing nutritious food is important as it has a very direct impact on workers' productivity and well-being. An ILO study demonstrates that good nutrition at work leads to gains in productivity and worker morale, prevention of accidents and premature deaths and reductions in health care costs.¹⁰

Benchmarks

1. The WHO 5 keys to safer food or an equivalent process is implemented (see Box 6 below).
2. Food provided to workers contains an appropriate level of nutritional value and takes into account religious/cultural backgrounds; different choices of food are served if workers have different cultural/religious backgrounds.
3. Food is prepared by cooks. It is also best practice that meals are planned by a trained nutritionist.

Box 6 - Five keys to safer food

Keep clean

Wash your hands before handling food and often during food preparation.
Wash your hands after going to the toilet.
Wash and sanitise all surfaces and equipment used for food preparation.
Protect kitchen areas and food from insects, pests and other animals.

While most micro organisms do not cause disease, dangerous micro organisms are widely found in soil, water, animals and people. These micro organisms are carried on hands, wiping cloths and utensils, especially cutting boards and the slightest contact can transfer them to food and cause food borne diseases.

Separate raw and cooked

Separate raw meat, poultry and seafood from other foods.
Use separate equipment and utensils such as knives and cutting boards for handling raw foods.
Store food in containers to avoid contact between raw and prepared foods.

Raw food, especially meat, poultry and seafood, and their juices, can contain dangerous micro organisms which may be transferred onto other foods during food preparation and storage.

Cook thoroughly

Cook food thoroughly, especially meat, poultry, eggs and seafood.
Bring foods like soups and stews to boiling to make sure that they have reached 70°C. For meat and poultry, make sure that juices are clear, not pink. Ideally, use a thermometer.
Reheat cooked food thoroughly.

Proper cooking kills almost all dangerous micro organisms. Studies have shown that cooking food to a temperature of 70°C can help ensure it is safe for consumption. Foods that require special attention include minced meats, rolled roasts, large joints of meat and whole poultry.

Keep food at safe temperatures

Do not leave cooked food at room temperature for more than 2 hours.
Refrigerate promptly all cooked and perishable food (preferably below 5°C).
Keep cooked food piping hot (more than 60°C) prior to serving.
Do not store food too long even in the refrigerator.
Do not thaw frozen food at room temperature.

Micro organisms can multiply very quickly if food is stored at room temperature. By holding at temperatures below 5°C or above 60°C, the growth of micro organisms is slowed down or stopped. Some dangerous micro organisms still grow below 5°C.

Use safe water and raw materials

Use safe water or treat it to make it safe.
Select fresh and wholesome foods.
Choose foods processed for safety, such as pasteurised milk.
Wash fruits and vegetables, especially if eaten raw.
Do not use food beyond its expiry date.

Raw materials, including water and ice, may be contaminated with dangerous micro organisms and chemicals. Toxic chemicals may be formed in damaged and mouldy foods. Take care in selection of raw materials and implement simple measures such as washing.

Source: World Health Organization, Food Safety
www.who.int/foodsafety/publications/consumer/en/5keys_en.pdf

10. C. Wanjek (2005). "Food at Work - Workplace solutions for malnutrition, obesity and chronic disease". International Labour Organization, Geneva.

G. Medical facilities

Access to adequate medical facilities is important to maintain workers' health and to provide adequate responses in case of health emergency situations. The availability or level of medical facilities provided in workers' accommodation is likely to depend on the number of workers living on site, the medical facilities already existing in the neighbouring communities and the availability of transport. However, first aid must always be available on site.

First aid facilities

Providing adequate first aid training and facilities can save lives and prevent minor injuries becoming major ones.

Other medical facilities

Depending on the number of workers living on site and the medical services offered in the surrounding communities, it is important to provide workers with additional medical facilities. Special facilities for sick workers and medical services such as dental care, surgery, a dedicated emergency room can, for instance, be provided.

Benchmarks

1. A number of first aid kits adequate to the number of residents are available.
2. First aid kits are adequately stocked. Where possible a 24/7 first aid service/facility is available.
3. An adequate number of staff/workers is trained to provide first aid.
4. Where possible and depending on the medical infrastructures existing in the community, other medical facilities are provided (nurse rooms, dental care, minor surgery).

Box 7 - UK/HSE First Aid facilities

What should be in a first aid kit?

There is no standard list and it very much depends on the assessment of the needs in a particular workplace:

- a leaflet giving general guidance on first aid, for example HSE leaflet *Basic advice on first aid at work*
- individually wrapped sterile adhesive dressings (assorted sizes)
- two sterile eye pads
- four individually wrapped triangular bandages (preferably sterile)
- six safety pins
- six medium-sized (approximately 12 cm x 12 cm) individually wrapped sterile unmedicated wound dressings
- two large (approximately 18 cm x 18 cm) sterile individually wrapped unmedicated wound dressings
- one pair of disposable gloves.

What should be kept in the first aid room?

The room should contain essential first aid facilities and equipment. Typical examples of these are:

- a sink with hot and cold running water
- drinking water and disposable cups
- soap and paper towels
- a store for first aid materials
- foot-operated refuse containers, lined with disposable yellow clinical waste bags or a container for the safe disposal of clinical waste
- a couch with waterproof protection, clean pillows and blankets
- a chair
- a telephone or other communication equipment
- a record book for recording incidents where first aid has been given.

Source: UK Health and Safety Executive



Initial Environmental Examination

July 2023

India: Rajasthan Secondary Towns Development Sector Project

Subproject : Water Supply Project in Laxmangarh City, District - Sikar, Rajasthan
Part 3 of 3 : Appendix 19 (continued) and Appendices 20 - 32

Prepared by Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited, Government of Rajasthan for the Asian Development Bank. This is an updated version of the initial environmental examination report originally posted in November 2021 available on (<https://www.adb.org/projects/documents/ind-42267-031-iee-29>).

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Asian Development Bank

H. Leisure, social and telecommunication facilities

Basic leisure and social facilities are important for workers to rest and also to socialise during their free time. This is particularly true where workers' accommodation is located in remote areas far from any communities. Where workers' accommodation is located in the vicinity of a village or a town, existing leisure or social facilities can be used so long as this does not cause disruption to the access and enjoyment of local community members. But in any case, social spaces should also be provided on site. Exercise and recreational facilities will increase workers' welfare and reduce the impact of the presence of workers in the surrounding communities. In addition it is also important to provide workers with adequate means to communicate with the outside world, especially when workers' accommodation is located in a remote location or where workers live on site without their family or are migrants. Consideration of cultural attitudes is important. Provision of space for religious observance needs to be considered, taking account of the local context and potential conflicts in certain situations.

Benchmarks

1. Basic collective social/rest spaces are provided to workers. Standards range from providing workers multi-purpose halls to providing designated areas for radio, TV, cinema.
2. Recreational facilities are provided. Standards range from providing exercise equipment to providing a library, swimming pool, tennis courts, table tennis, educational facilities.
3. Workers are provided with dedicated places for religious observance if the context warrants.
4. Workers have access to public phones at affordable/public prices (that is, not inflated).
5. Internet facilities can also be provided, particularly where large numbers of expatriates/Third Country Nationals (TCNs) are accommodated.

Box 8 - Examples of social/leisure facilities

In Qatar there is a newly built 170-hectare complex which accommodates contractors and more than 35,000 workers for a project run by a major oil company. At the heart of this complex, the recreation area includes extensive sport facilities, a safety-training centre, an outdoor cinema and a park. The purpose of those facilities goes beyond providing adequate accommodation to the large numbers of contractors and workers on this project but is designed to provide the same level of services as a small town. The accommodation complex has a mayor, as well as a dedicated welfare team which is responsible for the workers' welfare, cultural festivals and also acts as the community's advocates.

II. Managing workers' accommodation

Once the living facilities have been constructed and are operational, effective ongoing management of living facilities is essential. This encompasses issues such as the physical maintenance of buildings, security and consultation with residents and neighbouring communities in order to ensure the implementation of the housing standards in the long term.

A. Management and staff

Worker camps and housing facilities should have a written management plan, including management policies or plans on health and safety, security, living conditions, workers' rights and representation, relationships with the communities and grievance processes. Part of those policies and plans can take the form of codes of conduct. The quality of the staff managing and maintaining the accommodation facilities will have a decisive impact on the level of standards which are implemented and the well-being of workers (for instance on the food safety or overall hygiene standards). It is therefore important to ensure that managers are competent and other workers are adequately skilled. The manager will be responsible for overseeing staff, for ensuring the implementation of the accommodation standards and for the implementation of the management plans. It is important the accommodation manager has the corresponding authority to do so.

If the facility is being managed by a contractor, as is often the case, the expected housing and management standards should be specified in the relevant contract, and mechanisms to ensure that those standards are implemented should be set up. As part of this process, the accommodation manager (or contractor) should have a duty to monitor the application of the accommodation standards and to report frequently on their implementation to the client.

Benchmarks

1. There are management plans and policies especially in the field of health and safety (with emergency responses), security, workers' rights, relationships with the communities.
2. An appointed person with the adequate background and experience is in charge of managing the workers' accommodation.
3. If contractors are being used, there are clear contractual management responsibilities and monitoring and reporting requirements.
4. Depending on the size of the accommodation, there is a sufficient number of staff in charge of cleaning, cooking and of general maintenance.
5. Such staff are recruited from the local communities.
6. Staff have received basic health and safety training.
7. Persons in charge of the kitchen are trained in nutrition and food-handling and adequately supervised.

B. Charging fees for accommodation and services

Charging fees for the accommodation or the services provided to workers such as food or transport should be avoided where workers do not have the choice to live or eat anywhere else, or if deemed unavoidable, should take into account the specific nature of workers' accommodation. Any charges should be transparent, discussed during recruitment and specified in workers' contracts. Any such charges should still leave workers with sufficient income and should never lead to a worker becoming indebted to an employer.

Benchmarks

1. When fees are charged, workers are provided with clear information and a detailed description of all payments made such as rent, deposit and other fees.
2. When company housing is considered to be part of workers' wages, it is best practice that workers are provided with an employment contract clearly specifying housing arrangements and regulations, in particular rules concerning payments and fees, facilities and services offered and rules of notice.
3. When fees are charged, the renting arrangements are fair and do not cost the worker more than a small proportion of income and never include a speculative profit.
4. Food and other services are free or are reasonably priced, never above the local market price.
5. The provision of accommodation or other services by employers as a payment for work is prohibited.

Additional issue

To avoid that fair renting arrangements turn into unfair ones, any deposit of advance should be set at a reasonable level and it is best practice that renting prices include a fixed fee covering the water needed and the use of the energy required to the functioning of the heating/cooling/ventilation/cooking systems. However, in such cases it might be necessary to raise workers' awareness to ensure that workers will use the facilities responsibly, particularly in areas where water is scarce.

C. Health and safety on site

The company or body in charge of managing the workers' accommodation should have the prime responsibility for ensuring workers' physical well-being and integrity. This involves making sure that the facilities are kept in good condition (ensuring that sanitary standards or fire regulations are respected for instance) and that adequate health and safety plans and standards are designed and implemented.

Benchmarks

1. Health and safety management plans including electrical, mechanical, structural and food safety have been carefully designed and are implemented.
2. The person in charge of managing the accommodation has a specific duty to report to the health authorities the outbreak of any contagious diseases, food poisoning and other important casualties.
3. An adequate number of staff/workers is trained to provide first aid.
4. A specific fire safety plan is prepared, including training of fire wardens, periodic testing and monitoring of fire safety equipment and periodic drills.
5. Guidance on the detrimental effects of the abuse of alcohol and drugs and other potentially harmful substances and the risk and concerns relating to HIV/AIDS and of other health risk-related activities is provided to workers. It is best practice to develop a clear policy on this issue.
6. Workers have access to adequate preventive measures such as contraception (condoms in particular) and mosquito nets.
7. Workers have easy access to medical facilities and medical staff. Where possible, female doctors/nurses should be available for female workers.
8. Emergency plans on health and fire safety are prepared. Depending on the local context, additional emergency plans are prepared as needed to handle specific occurrences (earthquakes, floods, tornadoes).

D. Security of workers' accommodation

Ensuring the security of workers and their property on the accommodation site is of key importance. To this end, a security plan must be carefully designed including appropriate measures to protect workers against theft and attacks. Policies regarding the use of force (force can only be used for preventive and defensive purposes in proportion to the nature and the extent of the threat) should also be

carefully designed. To implement those plans, it may be necessary to contract security services or to recruit one or several staff whose main responsibility is to provide security to safeguard workers and property. Before making any security arrangements, it is necessary to assess the risks of such arrangements to those within and outside the workers' accommodation and to respect best international practices, including IFC PS4 and EBRD PR4 and applicable law.¹¹ Particular attention should be paid to the safety and security of women workers.

Benchmarks

1. A security plan including clear measures to protect workers against theft and attack is implemented.
2. A security plan including clear policies on the use of force has been carefully designed and is implemented.
3. Security staff have been checked to ensure that they have not been implicated in any previous crimes or abuses. Where appropriate, security staff from both genders are recruited.
4. Security staff have a clear mandate and have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline or discriminate against workers.
5. Security staff have received adequate training in dealing with domestic violence and the use of force.
6. Security staff have a good understanding about the importance of respecting workers' rights and the rights of the communities.
7. Body searches are only allowed in specific circumstances and are performed by specially trained security staff using the least-intrusive means possible. Pat down searches on female workers can only be performed by female security staff.
8. Security staff adopt an appropriate conduct towards workers and communities.
9. Workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff.

11. See for instance the Voluntary Principles on Security and Human Rights, www.voluntaryprinciples.org/principles

E. Workers' rights, rules and regulations on workers' accommodation

Freedoms and human rights of workers should be recognised and respected within their living quarters just as within the working environment. House rules and regulations should be reasonable and non discriminatory. It is best practice that workers' representatives are consulted about those rules. House rules and regulations should not prevent workers from exercising their basic rights. In particular, workers' freedom of movement needs to be preserved if they are not to become effectively "trapped". To this end it is good practice to provide workers with 24/7 access to the accommodation and free transport services to and from the surrounding communities. Any restriction to this freedom of movement should be limited and duly justified. Penalties for breaking the rules should be proportional and implemented through a proper procedure allowing workers to defend themselves and to challenge the decision taken. The relationship between continuing employment and compliance with the rules of the workers' accommodation should be clear and particular attention should be paid to ensure that housing rules do not create indirect limitation of the right to freedom of association. Best practice might include a code of conduct relating to the accommodation to be signed together with the contract of employment.

Box 9 - Dole housing plantation regulation in Costa Rica

In every plantation there is an internal accommodation regulation that every worker is required to sign together with his/her employment contract. That document describes the behaviour which is expected from workers at all times and basic rules such as the prohibition of alcohol and the interdiction to make noise after a certain time at night. In case there is any problem concerning the application of those internal rules, a set of disciplinary procedures which have been designed with the workers' representatives can be enforced. Workers are absolutely free to enter or leave the site and do not have any restrictions in relation to accessing their living quarters. Families are not allowed in the living quarters unless they have been registered for a visit.

Benchmarks

1. Restriction of workers' freedom of movement to and from the site is limited and duly justified. It is good practice to provide workers 24/7 access to the accommodation site. Any restrictions based on security reasons should be balanced by the necessity to respect workers' freedom of movement.
2. Where possible, an adequate transport system to surrounding communities is provided. It is good practice to provide workers with free transportation to and from local communities.
3. Withholding workers' ID papers is prohibited.
4. Freedom of association is expressly respected. Provisions restricting workers' rights on site should take into account the direct and indirect effect on workers' freedom of association. It is best practice to provide trade union representatives access to workers in the accommodation site.
5. Workers' gender and religious, cultural and social backgrounds are respected. In particular, workers should be provided with the possibility of celebrating religious holidays and observances.
6. Workers are made aware of their rights and obligations and are provided with a copy of the internal workers' accommodation rules, procedures and sanction mechanisms in a language or through a media which they understand.
7. Housing regulations, including those relating to allocation of housing, should be non-discriminatory. Any justifiable discriminatory rules – for example all-male dormitories – should be strictly limited to the rules which are necessary to ensure the smooth running of the worker camp and to maintain a good relationship with the surrounding communities.
8. Where possible, visitor access should be allowed.
9. Decisions should be made on whether to prohibit alcohol, tobacco and third party access or not from the camp and the relevant rules should be clearly communicated to all residents and workers.
10. A fair and non-discriminatory procedure exists to implement disciplinary procedures including the right of workers to defend themselves (see also next section).

F. Consultation and grievance mechanisms

All residents should be made aware of any rules governing the accommodation and the consequences of breaking such rules. Processes that allow for consultation between site management and the resident workers will assist in the smooth running of an accommodation site. These may include a dormitory or camp committee as well as formal processes that allow workers to lodge any grievances about their accommodation.

Benchmarks

1. Mechanisms for workers' consultation have been designed and implemented. It is best practice to set up a review committee which includes representatives elected by workers.
2. Processes and mechanisms for workers to articulate their grievances are provided to workers. Such mechanisms are in accordance with PS2/PR2.
3. Workers subjected to disciplinary proceedings arising from behaviour in the accommodation should have access to a fair and transparent hearing with the possibility to contest decisions and refer the dispute to independent arbitration or relevant public authorities.
4. In case conflicts between workers themselves or between workers and staff break out, workers have the possibility of easily accessing a fair conflict resolution mechanism.
5. In cases where more serious offences occur, including serious physical or mental abuse, there are mechanisms to ensure full cooperation with the police authority (where adequate).

Additional issue

Alcohol is a complex issue and requires a very clear policy from the workers' accommodation management. If a non-alcohol policy is taken, special attention should be paid to clearly communicate the interdiction, how it applies and the consequences for breaching this rule. Special attention should also be paid to enforce it adequately.

G. Management of community relations

Workers' living facilities have various ongoing impacts on adjacent communities. In order to manage these, it is good practice to design a thorough community relations management plan. This plan will contain the processes to implement the findings of the preliminary community impact assessment and to identify, manage, mitigate or enhance ongoing impacts of the workers' accommodation on the surrounding communities. Issues to be taken into consideration include:

- community development – impact of workers' camp on local employment, possibility of enhancing local employment and income generation through local sourcing of goods and services
- community needs – ways to identify and address community needs related to the arrival of specific infrastructures such as telecommunications, water sanitation, roads, health care, education, housing
- community health and safety – addressing and reducing the risk in the increase in communicable diseases, corruption, trade in illegal substances such as drugs, alcohol (in the Muslim context), petty crimes and other sorts of violence, road accidents
- community social and cultural cohesion – ways to mitigate the impact of the presence of large numbers of foreign workers, often males, with different cultural and religious background, ways to mitigate the possible shift in social, economic and political structures due to changes in access to income generation opportunities.

Benchmarks

1. Community relations plans addressing issues around community development, community needs, community health and safety and community social and cultural cohesion have been designed and implemented.
2. Community relations plans include the setting up of a liaison mechanism allowing a constant exchange of information and consultation with the local communities in order to identify and respond quickly to any problems and maintain good working relationships.
3. A senior manager is in charge of implementing the community relations management plan and liaising with the community.

Appendix 20: Guidelines and Emergency plan for handling and storing chlorine

Instructions for Storage and Handling of Chlorine Cylinders (Based on the 'Manual on Operation and Maintenance of Water Supply Systems' published by the Central Public Health and Environmental Engineering Organization (CPHEEO) in 2005)

1.1 Storage Area

- a) Obtain storage license from controller of explosives under Gas Cylinder Rules 2004 if the quantity of Cl₂ containers to be stored is more than 5 Nos.
- b) Storage area should be cool, dry, well ventilated, and clean of trash and protected from external heat sources. Please refer to Manual on "Water Supply and Treatment", (1999 Edition), for further details.
- c) Ventilation must be sufficient to prevent accumulation of vapour pockets. The exhaust should be located either near the floor or duct be provided extending to the floor. All fan switches should be outside the storage area.
- d) Do not store container directly under the sun.
 - e) Weather cock should be installed near the storage to determine wind direction.
- f) The storage building should be of non-combustible construction with at least two exits opening outside.
- g) Neutralization system should be provided.
- h) Continuous monitoring of chlorine leak detection equipment with alarm should be installed in the storage area.
- i) The area should be free and remote from elevators, gangways or ventilating system to avoid dangerous concentration of Chlorine during leak.
- j) Two portable foam type fire extinguishers should be provided in the premises.
- k) Corrosive substances shall not be stored nearby which react violently with each other.
- l) Unauthorized person should not be allowed to enter into the storage area.
- m) The floor level of storage shed should be preferably 30 cms (at least one foot) higher from the ground level to avoid water logging.
- n) Ensure that all containers are properly fitted with safety caps or hooks.

1.2. Cylinder & Drum Containers

- a. Store chlorine cylinders upright and secure them so that they do not fall.
- b. Drum containers should be stored on their sides on rails, a few inches above the floor. They should not be stacked one upon the other. They should be stored such that the valves are in vertical plane.
- c. Keep enough space between containers so as to have accessibility in case of emergency.
- d. Store the containers in a covered shed only. Keep them away from any source of heat as excessive heat may increase the pressure in container which will result into burst.
- e. Do not store explosives, acids, turpentine, ether, anhydrous ammonia, finely divided metals or other flammable material in the vicinity of Chlorine.
- f. Do not store containers in wet and muddy areas.
- g. Store filled and empty containers separately.
- h. Protective covers for valves are secured even when the containers are empty, except during use in the system.
- i. Never use containers as a roller to move other equipment.
- j. Never tamper with fusible plugs of tonners.
- k. Check leakages every day by means of ammonia torch. However, it should not be touched to brass components like valves of container for safety.
- l. Never carry out any welding work on the chlorine system as combustion of steel takes place at 2510C in presence of chlorine.
- m. The boxes containing emergency kit, safety applications and self contained breathing apparatus should be kept in working order in an easily approachable area.

1.3. Use of Cylinders & Drum Containers in Process System

- a. Use containers in the order of their receipt, as valve packing can get hardened during prolonged storage and cause gas leaks.
- b. Do not use oil or lubricant on any valve of the containers.
- c. Badly fitting connections should not be forced and correct tool should always be used for opening and closing valves. They should never be hammered.
- d. The area should be well ventilated with frequent air changes.
- e. Transport the cylinders to the process area by using crane, hoist or railings etc.
- f. The drum containers should be kept in a horizontal position in such a way that the valves are in a vertical plane. The upper valve gives out gas and the lower one gives out liquid chlorine.
- g. The cylinder should be kept in upright position in order to release gas from the valve. For liquid chlorine withdrawal, it should be inverted with the help of an inverted rack.
- h. Connect the containers to the system by using approved accessories.
- i. Use copper flexible tube, with lead washer containing 2 to 4% antimony or bonded asbestos or teflon washer. Use yoke clamp for connecting chlorine container.
- j. Never use rubber tubes, PVC tubes etc. for making connections.
- k. Use the right spanner for operating the valve. Always keep the spanner on the valve spindle. Never use ill fitting spanner.
- l. After making the flexible connection, check for the leakage by means of ammonia torch but it should not come in contact with a valve.
- m. Keep minimum distance between the container valve and header valve so that during change-over of the container, minimum amount of gas leaks.
- n. The material of construction of the adapter should be same as that of valve outlet threads.
- o. The valve should not be used as a regulator for controlling the chlorine. During regulation due to high velocity of Chlorine, the valve gets damaged which in turn can cause difficulty in closing.
- p. The tools and other equipment used for operating the container should be clean and free of grease, dust or grit.
- q. Wear breathing apparatus while making the change-over of the container from the process header.
- r. Do not heat the container to withdraw more gas at faster rate.
- s. Use pressure gauge and flow measuring device to control the flow and to know the quantity of gas left in the container.
- t. Use an inverted U type barometric leg or vacuum breaking arrangement for connecting the container to the process piping.
- u. Withdrawal of the gas should be stopped when the gas pressure inside the container is between 0.1 to 0.5 kg/cm² approximately.
- v. If withdrawal of the gas from the container connected to the process system has to be suspended for long intervals, it should be disconnected from the system, and the valve cap and hood replaced.
- w. Gas containers should be handled by trained persons only.

1.4. Disconnecting Containers from Process System

- a. Use breathing apparatus before disconnecting the container.
- b. First close the container valve fully. After removal of chlorine the process valve should be closed.
- c. Remove the flexible connection, plug the flexible connection in order to avoid entry of humid air. Replace the valve cap or hood on the container.
- d. Put the tag on the empty container & bring it to storage area marked for empties.
- e. Check for the leakage.

1.5. Loading and Unloading of Containers

- a. The handling of containers should be done under the supervision of trained and competent person.

- b. It should be done carefully with a crane, hoist or slanted ramp. Do not use magnet or sharp object for lifting the containers.
- c. Small cylinders should not be lifted by means of valve caps as these are not designed to carry the weight.
- d. The containers should not be allowed to strike against each other or against any hard object.
- e. Vehicles should be braked and isolated against any movement.
- f. After loading, the containers should be secured properly with the help of wooden wedges, rope or sling wire so that they do not roll away.
- g. The containers should never be dropped directly to the ground or on the tyre from the vehicle.
- h. There should be no sharp projection in the vehicle.
- i. Containers must have valve caps and plugs fitted properly.
- j. Check containers for leakage before loading/unloading.

1.6. Transportation of Container

- a. The name of the chemical along with diamond pictorial sign denoting the dangerous goods should be marked on the vehicle.
- b. The name of the transporter, his address and telephone number should be clearly written on the vehicle.
- c. The vehicle should not be used to transport any material other than what is written on it.
- d. Only trained drivers and cleaners should transport hazardous chemical
- e. The driver should not transport any leaking cylinder.
- f. The cylinder should not project outside the vehicle.
- g. The transporter must ensure that every vehicle driver must carry "Trem Card" (Transport Emergency Card) and 'Instructions in writing booklet' and follow them.
- h. Every driver must carry safety appliances with him, viz; Emergency kit, breathing apparatus etc.
- i. The vehicles must be driven carefully, specially in crowded localities and on bumpy roads. Do not apply sudden brakes.
- j. Check for the leakage from time to time.
- k. In the case of uncontrollable leakage the vehicle should be taken to an open area where there is less population.

1.7. Emergency Kit It consists of various tools and appliances like gaskets, yokes, studs, tie rods hoods, clamps, spanners, mild steel channels, screws, pins, wooden pegs etc. of standard sizes. Separate kits are used for cylinders and tonners. All the gadgets are designed for using in controlling or stopping the leakages from valves, fusible plug and side walls of cylinders and containers used for handling chlorine.

- a. Leakage may occur through the valve. There are basically four types of valve leaks.
 - I. Valve packing
 - II. Valve seat
 - III. Defective inlet thread
 - IV. Broken valve thread
- b. Leakage may occur through container wall. For controlling such leakages, clamps are used for cylinders and chain and yoke arrangement is used for tonner. Sometimes wooden peg is used by driving into the leaking hole as a temporary arrangement.
- c. Leakage may occur through fusible plug.
 - i. If the leakage is through the threads of fusible plug, yoke, hood and cap nut arrangement is used to control the leak.
 - ii. If fusible metal itself in the plug is leaking, yoke and stud arrangement is used to control the leak.

1. First Aid to be Provided for a Person Affected by Chlorine

a. General Remove the affected person immediately to an uncontaminated area. Remove contaminated clothing and wash contaminated parts of the body with soap and plenty of water. Lay down the affected person in cardiac position and keep him warm. Call a physician for medical assistance at the earliest. Caution: Never attempt to neutralize chlorine with other chemicals.

b. Skin Contact Remove the contaminated clothes, wash the affected skin with large quantity of water. Caution: No ointment should be applied unless prescribed by the physician.

c. Eye Contact If eyes get affected with liquid chlorine or high concentration of chlorine gas, they must be flushed immediately with running water for atleast 15 minutes keeping the eyelids open by hand. Caution: No ointment should be used unless prescribed by an eye specialist.

d. Inhalation If the victim is conscious, take him to a quiet place and lay him down on his back, with head and back elevated (cardiac position). Loosen his clothes and keep him warm using blankets. Give him tea, coffee, milk, peppermint etc. for making good effect on breathing system. If the victim is unconscious, but breathing, lay him down in the position mentioned above and give oxygen at low pressure until the arrival of doctor. If breathing has stopped, quickly stretch him out on the ground or a blanket if available, loosen his collar and belt and start artificial respiration without delay. Neilson arm lift back pressure method is useful. Automatic artificial respiration is preferable if available. Continue the respiration until the arrival of the doctor. Amboo bag can also be used for this purpose.

3. On-Site Emergency Plan to Cover the Leakage of Chlorine

3.1. Introduction As chlorine is a hazardous chemical, handling and storage of it demand adequate precautions to avoid possible hazards. Leakage of chlorine may develop into a major emergency. Therefore the emergency procedure to cover this eventuality is essential. It is drawn in the form of on-site emergency plan. The elements of onsite emergency plan are as follows:

3.2. Identification of Hazard Chart

In this case the site risk is evaluated by the expert and the extent of the probable damage is calculated on the basis of stored chlorine quantity, nearby population, wind direction, type of equipment failure etc. For this purpose hazard analysis is conducted in which case all the hazardous properties of chlorine are considered. If evacuation is required, the range of it is calculated.

3.3. Appointing Key Persons In order to control the incident like chlorine leakage, it is essential to appoint various persons with their well-defined responsibilities. Taking into account the various activities likely to be involved, the following key persons are appointed (i) Site Controller, (ii) Incident controller, (iii) Shift Executive In charge, (iv) Communication Officer, (v) Safety Officer, (vi) Fire and Security Officer, (vii) Utilities and Services In charge, (viii) Traffic Controller, (ix) First Aider

3.4. Assembly Points These points are set up where persons from the plant would assemble in case of chlorine leakage. At these points the in-charge for counting the heads will be available.

3.5. Emergency Control Center

The control centre is the focal point in case of an emergency from where the operations to handle the emergency from are directed and coordinated. It contains site plan, telephone lines, public address system, safety equipment, first aid boxes, loud speaker, torches, list of essential telephone numbers, viz. fire brigade, police, hospital, civil defence, collector, factory inspector, organizational authorities, chlorine suppliers, mutual aid group, social workers, list of key persons and their addresses, copy of chemical fact sheet, location plan of fire hydrant, details of dispersion model of chlorine gas, population distribution pattern, location of alarm system.

3.6. Procedure to Meet Emergency

The actions to be taken by the staff and authority are given below; Emergency Alarm: An audible emergency alarm system is installed throughout the plant. On hearing the alarm the incident controller will activate the public address system to communicate with the staff about the emergency and give specific instructions for evacuations etc. anyone can report the

occurrence of chlorine leakage to section in-charge or incident controller through telephone or intercom or in person.

3.7. Communication

Communication officer shall establish the communication suitable to that incident.

3.8. Services

For quickness and efficient operation of emergency plan the plant is divided into convenient number of zones and clearly marked on the plan. These are emergency services viz. fire fighting, first aid, rescue, alternative source of power supply, communication with local bodies etc. The incident controller will hand over the charge to the site controller of all these coordinating activities, when the site controller appears on the site. The site controller will coordinate all the activities of the key persons. On hearing the emergency alarm system all the key persons will take their charge. In case of their absence other alternatives are nominated. The person nominated for personnel and administration purposes will be responsible for informing all statutory authorities, keeping account of all persons in the plant including contract labour, casual workers and visitors. He will be responsible for giving information to press or any outside agencies. He is also responsible for organizing canteen facilities and keeping informed the families of affected persons. The person nominated as security officer should guide police, fire fighting and control the vehicle entries. The site controller or any other nominated person will announce resumption of normalcy after everything is brought under control. The onsite emergency plan needs to be evaluated by mock drill. Any weaknesses noticed during such drills should be noted and the plan is modified to eliminate the weaknesses.

3.9. Emergency

Measures In case of leakage or spillage of Chlorine, the following emergency measures should be taken:

- a) Take a shallow breath and keep eyes opened to a minimum.
- b) Evacuate the area.
- c) Investigate the leak with proper gas mask and other appropriate Personal protection.
- d) The investigator must be watched by a rescuer to rescue him in emergency.
- e) If liquid leak occurs, turn the containers so as to leak only gas.
- f) In case of major leakage, all persons including neighbours should be warned.
- g) As the escaping gas is carried in the direction of the wind all persons should be moved in a direction opposite to that of the wind. Nose should be covered with wet handkerchief.
- h) Under no circumstances should water or other liquid be directed towards leaking containers, because water makes the leak worse due to corrosive effect.
- i) The spillage should be controlled for evaporation by spraying chilled water having temperature below 9.4°C. With this water crystalline hydrates are formed which will temporarily avoid evaporation. Then try to neutralize the spillage by caustic soda or soda ash or hydrated lime solution carefully. If fluorofoam is available, use for preventing the evaporation of liquid chlorine.
- j) Use emergency kit for controlling the leak.
- k) On controlling the leakage, use the container in the system or neutralize the contents in alkali solution such as caustic soda, soda ash or hydrated lime. Caution: Keep the supply of caustic soda or soda ash or hydrated lime available. Do not push the leaking container in the alkali tank. Connect the container to the tank by barometric leg.
- l) If container commences leak during transport, it should be carried on to its destination or manufacturer or to remote place where it will be less harmful. Keeping the vehicle moving will prevent accumulation of high concentrations.
- m) Only specially trained and equipped workers should deal with emergency arising due to major leakage.
- n) If major leak takes place, alert the public nearby by sounding the siren.
- o) Any minor leakage must be attended immediately or it will become worse.
- p) If the leakage is in the process system, stop the valve on the container at once.

3.10. Safety Systems Required at Chlorination Plant

The following safety systems should be kept ready at the chlorination plant:

- a. Breathing apparatus.
- b. Emergency kit.
- c. Leak detectors.
- d. Neutralisation tank.
- e. Siren system.
- f. Display of boards in local language for public cautioning, first aid and list of different authorities with phone numbers.
- g. Communication system.
- h. Tagging system for equipments.
- i. First aid including tablets and cough mixtures.
- j. Exhaust fans.
- k. Testing of pressure vessels, chlorine lines etc. every year as per factory act.
- l. Training & mock drill.
- m. Safety showers.
- n. Eye fountain.
- o. Personal protective equipment.
- p. Protecting hoods for ton-containers.
- q. Fire extinguishers.
- r. Wind cock.

Appendix 21: Details of Public Consultations

Consultations during Preparation of IEE

Various consultations were done during preparation of IEE with residents of the town at various locations to understand their level of satisfaction about the present water supply and sewerage conditions in town and also to understand their awareness about the proposed works and their willingness/acceptance of the proposed works under RUSTDIP. Details of these consultations are given below-

S.No	Number of Person consulted	Male	Female	Issues Discussed	Outcome
1	89	35	54	Present water supply system, Proposed work of water supply and its advantage, Present solid waste collection and disposal problem, Safety of residents during construction phase and applying of vehicle for construction activities, proposed water supply works, Presence of any forest, wildlife or any sensitive/unique environmental components nearby the project, Environment & public health and availability of land, Quality of present Water Supply. Willingness to project work, temporary inconveniences during pipe laying works, contractor's cooperation, willingness to pay for improved services in the town	People are agree with the proposed water supply works and understand that proposed works will improve health and environmental conditions of town and chances of water borne diseases will be mitigated at some extent. Peoples have given their assurance to provide full support to the department and contractor when the new project will be commence. People are willing to pay for improved services.

Table 1: Public Consultation dated 15TH August 2018

S.No	Name of Persons	Location	Topic Discussed	Outcome
	15.08.2018			
1	Mamta Sharma, Kanchan Sen, Sunita Sen, Sharda Sharma, Bhanwari Devi, Pinki Devi, Ginni Devi, Dhanni Devi, Heera Devi, Laxmi Devi, Suman Devi, Sangeeta Sharma, Sharda	Near Old Post office, Laxmanarh	• Present water supply system, • Awareness of the project—including Project Coverage area, • Presence of any forest, wild life or any sensitive/unique environmental	• People are concerned about the poor water quality issue. Some People are aware of the proposed project of water supply. • There are no any forest, wildlife or any sensitive /unique environmental, component nearby the project. Solid waste collection

	Devi, Tara Devi, Sharda & Maya		components nearby the project, • Present solid waste collection and disposal problem, • Dust and noise pollution and disturbances during construction work, • Safety of residents during construction phase and applying of vehicle for construction activities, proposed water supply works, • Environment & public health and availability of land, • R & R issues; if any etc.	facility is poor in this area. Town has lack of solid waste collection and their proper disposal facilities. • People demanded for the measures of dust suppression such as water sprinkler to control dust and noise during construction phase. • Proper care of the safety arrangement during construction phase and should provide traffic diversion routes to avoid the vehicle congestion by the contractor. • Water supply is intermittent and there are a lot of losses due to profuse leaking of old pipes. By the proposed project of water supply environment & public health will be improved and chance of water borne diseases will be mitigated in the area/town. They want to supply the water on 24x7. They have given their concurrence about the proposed works.
2	Mohd. Rafiq, Nadim ji Bari, Roshan Khan, Mohd. Bilal	Old Bus Stand Laxmangarh	• Present Status of Water Supply in the town • Work Proposed by RUIDP • Environment & Health impacts of proposed projects • Quality of present Water Supply. • Willingness to pay for improved services	• People are concerned about the poor supply (intermittent supply on alternate days) and quality of water. No sewerage in the town • People are supportive of the project. • By the proposed projects of water supply, chance of water borne disease will be mitigated as proper disinfection will be ensure before supply the water and there relevant health implication will be mitigated due to mitigated in the area/town. • People are willing to pay for improved services. • People are agree with the proposed water supply works and understand that proposed works will improve health and environmental conditions of town and chances of water borne diseases will be mitigated at some extent.

3	Darshan, Javid, Raju, Shravan, Abbas, Mohd. Salim & Mohd. Ramzan,	Nyama Bazaar, laxmangarh	• Present Status of Water Supply in the town • Work Proposed by RUIDP • Quality of present Water Supply. • Willingness to pay for improved services	• People are concerned about the poor supply (intermittent supply on alternate days) and quality of water. Water supply is erratic and quality is poor. • People demand 24x7 supply connections to be provided to their area under the proposed project. • People are willing to pay for the improved quality of water. • Proposed water supply will improve health conditions and living standards of people due to supply of good quality water round the clock
4	Geeta, Shanti Devi, Chandrawati, Saraswati, Bidami, Manbhari, Nathi Devi, Chhoti Devi, Santosh Devi, Geeta Devi, Anandi, Manju Devi, Savitri Devi & Sharda	Khinchi Chowk, Laxmangarh	• Present Status of Water Supply in the town • Awareness of the project-including Project Coverage area, • Work Proposed by RUIDP • Present drinking water problem-quantity and quality, • Impact of Public Health by proposed water supply subproject • Presence of any forest, wild life or any sensitive/ unique environmental components nearby the project • Safety of residents during construction phase and applying of vehicle for construction activities. • Willingness to pay for improved services	• People are supportive of the project and indicated their willingness to participate in the project to make it successful.(especially women) • People are aware of the proposed Project. • People understand direct benefits along with latent benefits of the project • Quality of preset water supply is not good and sufficient water is not supplied, proposed water supply works will provide good and sufficient quantity of water, which will save time and energy of people present spent to collect water from existing supply. • People are concerned about the poor supply (intermittent supply on alternate days) and quality of water. Water supply is erratic and quality is poor. People demand 24x7 supply connections to be provided to their area under the proposed. They are willing to pay for getting regular potable water. By the proposed project, people get better quality of water will improve the public health. • There are not any forest, wildlife or any sensitive/ unique environmental, component nearby the project site. • The contractor should take care of the safety arrangement during

				construction phase and should provide traffic diversion routes to avoid the vehicle congestion. • People are interested to pay for improved services in the town.
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Photographs of Public Consultations



Consultation with Helper, PHED



Consultation with local public



Consultation with Vendors near Mandi



Consultation with local public



Consultation with Female at Maliyon Ki Gali



Consultation with Female near Old Post Office



Consultation with Locals near Hospital

Consultation with Locals near old bus stand

Consultation sheet

Place पुष्पलोक रंग भवन के पास, लक्ष्मीनगर Date 15-08-18

Topic Discussed परिपोषण की जानकारी दी गई व एक वर्तमान
नामिका के बारे में चर्चा कर एक निष्कर्ष
में आकाश हुआ

S.No.	Name	Designation/Mobile No.	Signature
1	ममता शर्मा		ममता शर्मा
2	सुनीता शर्मा		सुनीता
3	सुनीता शर्मा		सुनीता
4	सुनीता शर्मा		सुनीता
5	सुनीता शर्मा		सुनीता
6	सुनीता शर्मा		सुनीता
7	सुनीता शर्मा		सुनीता
8	सुनीता शर्मा		सुनीता
9	सुनीता शर्मा		सुनीता
10	सुनीता शर्मा		सुनीता
11	सुनीता शर्मा		सुनीता
12	सुनीता शर्मा		सुनीता
13	सुनीता शर्मा		सुनीता
14	सुनीता शर्मा		सुनीता
15	सुनीता शर्मा		सुनीता
16	सुनीता शर्मा		सुनीता

Consultation sheet

Place पुष्पलोक रंग भवन के पास, लक्ष्मीनगर Date 15-08-18

Topic Discussed परिपोषण की जानकारी दी गई एवं शहर
की वृक्षारोपण पर चर्चा कर एक निष्कर्ष
में आकाश हुआ

No.	Name	Designation/Mobile No.	Signature
1	श्री. व. शर्मा	982907915	श्री. व. शर्मा
2	श्री. व. शर्मा	9413817446	श्री. व. शर्मा
3	श्री. व. शर्मा	9828501512	श्री. व. शर्मा
4	श्री. व. शर्मा	9299858087	श्री. व. शर्मा

PLACE न्यामाजगर, लक्ष्मणगढ़ DATE 15-08-18

S. No.	Name	Father name	Age	Cat	Type of Structure	Type of Occupation /Business	Daily Income	Family Member
1.	श्री देवी	श्री देशराज	45	OBC	हेला	चाट	300	5
2.	" जाविद	" हासमउली	35	OBC	हेला	सलगी बिरेला	300	3
3.	" गजु	" हरीलाल	36	OBC	हेला	रहोमरा	300	10
4.	" शिवरा	" कामधुदयाल	35	OBC	हेला	चाट	350	5
5.	" आबबास	" बशीर	30	OBC	हेला	सलगी बिरेला	400	6
6.	मौ० सलीम	" अब्दुल सत्तार	56	OBC	हेला	सलगी बिरेला	300	8
7.	मौ० रमजान	" मौ० हुसैन	45	OBC	हेला	Ice Cream	300	5

M.

Consultation sheet

Place रवीची चौक, लक्ष्मणगढ़ Date 15-08-18

Topic Discussed परिचालन कार्य की जानकारी दी गई एवं वित्तगत बचतका एवं स्थिति से अवगत हुआ

S.No.	Name	Designation/Mobile No.	Signature
1	श्रीमती गीता		
2	" सार्वती देवी		
3	" पद्मावती		
4	" सरस्वती		
5	" विद्या देवी		
6	" मनमोदी		
7	" गायत्री देवी		
8	" पूजा देवी	आशा देवी	
9	" हरी देवी	हरी देवी	
10	संगीत देवी		
11	गीता देवी		
12	आनंद देवी		
13	मंजू देवी		
14	" सार्वती देवी	संजय	
15	" सारदा		

Table 2: Public Consultations at Laxmangarh Dated 17.09.2019

S.No.	Date and place of consultation	Works being executed at/near site	Persons consulted	Topics discussed during consultation	Outcome of consultation
1.	17.09.2019 Ward No. 30	Water pipe laying network	Mr. Nathmal (Cloth merchant), Mr. Bhanwar (Labour), Mr. Radhayshyam (Labour), Mr. Pradeep(Plumber), Mr. Ratan Lal(Labour), Mr. Dhramendr(Ward Member), Mr. Sultan (Old age), Mr. Sohan Ji, Mr. Bhanwar (Labour)	Discussed about present water supply system and its quality & proposed works and its advantages, their willingness to project work, temporary inconveniences during pipe laying works, contractor's cooperation, willingness to pay for sustainability of the project	Present water supply conditions is very poor and water quality is also not good. allergic problem facing by public , public are taking water from tube wells,for this waiting for a long time. They have given their assurance to provide full support to the deprt and contractor when the new project will be commence.
2	17.09. 2019 Ward No. 13	Water pipe laying network	Smt. Dhannu, Smt. Maya, Smt. Santosh, Smt. Sunita Smt. Suman , Smt. Laxmi Smt. Babita, Smt. Asha, Smt. Sunita Devi, Smt. Jamni Devi, Smt. Shanti (Housewife), Smt. Krishan Devi(Aganwadi worker), Mr. Vinod (Contractor), Mr. Chander prakesh (Rajasthan Patrika)	Discussed about present water supply system and its quality & proposed works and its advantages, their willingness to project work, temporary inconveniences during pipe laying works, contractor's cooperation, willingness to pay for sustainability of the project	Present water supply conditions is very poor and water quality is also not good. allergic problem facing by public , public are taking water from tube wells,for this waiting for a long time. They have given their assurance to provide full support to the deprt and contractor when the new project will be commence.
3	17.09. 2019 Ward No. 12	Water pipe laying network	Mr. Surendra (Labour), Mr. Sharukh(Vegetable), Smt. Nazma Bano (shop), Mr. Saleem (Flour meal), Smt. Zemela(Labour), Smt. Sapna Devi Smt. Rasida Bano , Smt. Seema Bano , Smt. Rukhshar Bano , Smt. Rubina , Smt. Sabina (Housewife), Mohammed Liyakat(Labour), Mohammed Tagala, Mohammed Saleem, Mohammed Tofik (Furniture Shop)	Discussed about present water supply system and its quality & proposed works and its advantages, their willingness to project work, temporary inconveniences during pipe laying works, contractor's cooperation, willingness to pay for sustainability of the project	Present water supply conditions is very poor and water quality is also not good. allergic problem facing by public , public are taking water from tube wells,for this waiting for a long time. They have given their assurance to provide full support to the deprt and contractor when the new project will be commence.

S.No.	Date and place of consultation	Works being executed at/near site	Persons consulted	Topics discussed during consultation	Outcome of consultation
4	17.09. 2019 Ward No. 11	Water pipe laying network	Mr. Chand Mohammed(Worker), Mr. Makan (Old age), Mr. Shaïd (Shop), Smt. Sabira (Housewife), Mr. Asif, Mr. Latif, Mr. Samim (Labour), Smt. Shakeera(Housewife), Mr. Ajam, Smt. Aziz Bano(Labour), Smt. Meherun(Peon), Smt. Samim(Labour)	Discussed about present water supply system and its quality & proposed works and its advantages, their willingness to project work, temporary inconveniences during pipe laying works, contractor's cooperation, willingness to pay for sustainability of the project	Present water supply conditions is very poor and water quality is also not good. allergic problem facing by public , public are taking water from tube wells,for this waiting for a long time. They have given their assurance to provide full support to the dept and contractor when the new project will be commence.

Photographs & Attendance sheet of consultations



Consultations at Ward No. 11 dtd.17.09.2019



Consultations at Ward No. 30
dtd. 17.09. 2019



Consultations at Ward No. 13
dtd. 17.09. 2019



Consultations at Ward No. 12
dtd. 17.09. 2019



Consultations at Ward No. 13
dtd. 17.09. 2019



Consultations at Ward No. 12
dtd. 17.09. 2019



Consultations at Ward No. 12
dtd. 17.09. 2019



Consultations at Ward No. 12
dtd. 17.09. 2019



Consultations at Ward No. 12
dtd. 17.09. 2019



Consultations at Ward No. 12
dtd. 17.09. 2019



Consultations at Laxmangarh Road dtd.
17.09. 2019



Consultations at Laxmangarh Road dtd.
17.09. 2019

S. No	Location	Last Name	Name	M/F	Occupation	Signature
1	Ward No. 12	Mr.	Dhanu	F	Housewife	87408
2	near Gogamoo	Mr.	Suman	F	"	87408
3		Mr.	Balita	F	"	अधीन
4		Mr.	Asha	F	"	अधीन
5		Mr.	Mukund	M	Rest and day	87408
6		Mr.	Shanti	F	Housewife	अधीन
7		Mr.	Jamuna	F	"	अधीन
8		Mr.	Shanti	F	"	अधीन
9		Mr.	Prishad	F	Agarwadi worker	अधीन 87408

S. No	Location	Name	M/F	Occupation	Signature
1	Laxmangarh	Mr. Mathmal	M	Clothes work	अधीन 966 33 1131
2	Ward No (30)	Mr. Ramesh Lal	M	Labour	अधीन 995 1701
3	30	Mr. Ramesh Chandra	M	"	अधीन
4	"	Mr. Pandey	M	Water pipe fitting	अधीन 978 14 986
5	"	Mr. Ramesh Lal	M	Labour	अधीन 979 9 772
6	"	Mr. Dharmendra	M	Ward M.	अधीन 916 9 92835
7	"	Mr. Suman	M	Rest	अधीन
8	"	Mr. Sahaji	M	Labour	अधीन
9	"	Mr. Ramesh	M	"	अधीन 992 10 119

Luxmangathi					
S. No	Location	Name		Occupation	Signature
(1)	Ward No. 12 Edgha	Mr. Suresh	M	Labour	
(2)	Ward No. 12	Mr. Shasank Choudhary	M	Vegetable	21123-54 730034113
(3)	W. No. 12	Smt. Nagma Rana	F	Shop	
(4)	W. No. 12	Smt. Saleem	M	Flour meal	— सुकवम
(5)	W. No. 12	Smt. Zameela	F	Labour	
(6)	W. No. 12	Smt. Bano	F	Labour	बाबी
(7)	W. No. 12	Smt. Sita Devi	F	Housewife	
(8)	W. No. 12	Rasida	F	"	रसिदा बानो
(9)	W. No. 12	Seema	F	"	सीमा बानो

Luxmangathi					
S. No	Location	Name		Occupation	Signature
(10)	Ward No. 12	Rukshan Rana	F	"	— रुक्शन राना
(11)	Ward No. 12	Rubina	F	"	रुबिना
(12)	Ward No. 12	Sabina	F	"	सबिना
(13)	Ward No. 12	Mohammad Liaquat	M	Labour	— मोहम्मद लीक़ात
(14)	Ward No. 12	Sazida Rana	F	"	— साज़िदा राना
(15)	Ward No. 12	Mahmud Tagla	M	Shop	
(16)	Ward No. 12	Mohammad	M	"	मोहम्मद

Appendix 22: Minutes of City level Stakeholder Committee (CLC) Meeting

Minutes of CLC meeting with Outcomes

City level Stakeholder Committee (CLC) Meeting (dtd. 23.05.2018) - City stakeholder committee meeting was organized in Laxmangarh on dtd.23.05.2018 to discuss the matter of proposed works in Laxmangarh under the chairmanship of District Collector, Sikar in presence of consultants, RUIDP officials, PHED officials, Municipal officials and other invitee members. Proposed scope of works and technology was discussed in the meeting.

राजस्थान सरकार
कार्यालय अधीक्षण अभियन्ता आर.यू.आई.डी.पी. फेज III झुन्झुनू (राज.)
C/O श्री जगमल सिंह लाम्बा, वाई.नं. 10, लहसील के पास, झुन्झुनू (राज.)

मौटिंग कार्यवाही विवरण

श्रीमान जिला कलेक्टर, सीकर की अध्यक्षता में दिनांक 23.05.2018 को होटल रॉयल इन, सीकर के सभागार में पेयजल योजना शहर लखमणगढ़ एवं सीवरज योजना फतेहपुर के कार्यों की डीपीआर अनुमोदन हेतु सिटी लेवल कमेटी की मौटिंग आयोजित की गई जिसमें निम्नलिखित जनप्रतिनिधि-गण / अधिकारी गण उपस्थित हुए।

✓ श्री मोहिन सिंह ठोठारवा	विधायक, लखमणगढ़
✓ श्री नंदकिशोर महारिया	विधायक, फतेहपुर
✓ श्री नरेश कुमार ठकुराल	जिला कलेक्टर, सीकर
✓ श्रीमती ललिता मिश्रा	अध्यक्ष, नगरपालिका, फतेहपुर
✓ श्री अखिल कुमार जैन	मुख्य अभियन्ता, आर.यू.आई.डी.पी. जयपुर
✓ डॉ. डी.आर. जागिड़	अधीक्षण अभियन्ता, आर.यू.आई.डी.पी. (WWW) जयपुर
✓ श्री प्रवीण आंकोदिया	अधीक्षण अभियन्ता, आर.यू.आई.डी.पी. (WS) जयपुर
✓ श्री मोहनलाल मीना	अधीक्षण अभियन्ता, आर.यू.आई.डी.पी. झुन्झुनू
✓ श्री रमेश चन्द सैनी	अधिकांशी अभियन्ता, आर.यू.आई.डी.पी.झुन्झुनू
✓ श्री महसूदन	अधिकांशी अभियन्ता, सार्वजनिक निर्माण विभाग
✓ श्री नवनीत कुमार	आयुक्त, नगरपरिषद, सीकर
✓ श्री जितेन्द्र कुमार	सहायक अभियन्ता, पीएचडीसी शहर
✓ श्री ई.एस. सुनेर	डीपीओ, नगरपरिषद, सीकर
✓ श्री अखिल कुमार मील	एसडीओ, पीएसएनएल, सीकर
✓ श्री अशोक कुमार कडवांस	कनिष्ठ अभियन्ता, आर.यू.आई.डी.पी.झुन्झुनू
✓ सुश्री लता चौधरी	कनिष्ठ अभियन्ता, पीएचडीसी, सीकर
✓ श्री रवि शुक्ल	पीएमडीएससी, जयपुर

श्रीमान अध्यक्ष महोदय की अनुमति से श्री प्रवीण आंकोदिया, अधीक्षण अभियन्ता आर.यू.आई.डी.पी. जयपुर ने पेयजल योजना लखमणगढ़ राशि रु. 56.97 करोड़ एवं सीवरज योजना फतेहपुर राशि रु. 174.62 करोड़ की डीपीआर में प्रस्तावित कार्यों/घटकों की विस्तृत रूप में जानकारी दी, जिन पर चर्चा उपरान्त सर्वसहमति से अनुमोदन किया गया।

उपस्थित माननीय विधायक गणों ने निम्नलिखित अतिरिक्त सुझाव भी दिए-

1. डीपीआर में ड्रेनेज कार्यों का भी समावेश किया जाना चाहिए।
2. कार्य करते समय नगरपरिषद/नगरपालिका का अभियन्ता भी साथ रहे ताकि सड़क, ड्रेनेज एवं मैनहॉल आदि का टॉप कार्य करते समय नगरपालिका/नगरपरिषद को भी जानकारी मिल सके।
3. डीपीआर में सड़क के समस्त कार्य एक ही बार में पूरे किया जावें ताकि सड़क तथा सड़क का लेवल में सुधार रहे।
4. * श्रीमान जिला कलेक्टर ने निर्देश दिया कि लखमणगढ़ की डीपीआर में सड़क रिपेयर हेतु प्रस्तावित 28 करोड़ रुपये को आवश्यकतानुसार न्यूनतम राशि रखते हुए लगभग 15.20 करोड़ रुपये बचाकर, ड्रेनेज कार्य का समावेश प्रस्तावित है। अंत में आर.यू.आई.डी.पी. के प्रतिनिधि ने सभी का धन्यवाद ज्ञापित किया। मौटिंग सौहार्द पूर्ण वातावरण में सम्पन्न हुई।

मौटिंग कार्यवाही विवरण श्रीमान जिला कलेक्टर सीकर से अनुमोदित है।

(प्र.एल.मीना)
अधीक्षण अभियन्ता, आर.यू.आई.डी.पी. (फेज III)
पी.आई.यू. झुन्झुनू
दिनांक 31/05/2018

कमर्क 328-343

1. माननीय संसद महोदय, संसदीय क्षेत्र सीकर
2. माननीय विधायक महोदय, विधानसभा क्षेत्र फतेहपुर/लखमणगढ़
3. जिला सचिव, श्रीमान परिवोजना निदेशक आर.यू.आई.डी.पी. जयपुर।
4. श्रीमान प्रजित्त अधीक्षक सीकर।
5. आयुक्त, नगर परिषद, सीकर
6. सहायक, नगरपालिका, फतेहपुर/एस.एस.डी.पी. सीकर
7. अधिकांशी अधिकारी, नगरपालिका, फतेहपुर/एस.एस.डी.पी. सीकर
8. अधीक्षण अभियन्ता जन स्वातंत्र्य विभाग, सीकर (दूर/प्रोजेक्ट)
9. अधीक्षण अभियन्ता, सार्वजनिक निर्माण विभाग, सीकर,
10. नगर नियोजक, सीकर
11. स्थानीय मंत्र सरकार की संस्थान प्रतिनिधि/सीपीओ.....

(प्र.एल.मीना)
अधीक्षण अभियन्ता, आर.यू.आई.डी.पी. (फेज III)
पी.आई.यू. झुन्झुनू

Transcript and Summary in English Details of Minutes of Meeting

Under the chairmanship of District Collector, Sikar, CityLevel Committee meeting was held on dated 23.05.2018 for approval of Detailed project report of proposed Water Supply works of Laxmanagarh city and Sewerage work in Fatehpur.

By the permission of Chairman, Shri Praveen Ankodia, SE, RUIDP, Jaipur informed that the tentative cost of subproject components/works for Laxmangarh City Water Supply Works is proposed Rs.56.97crore & sewerage work for Fatehpur an amount of Rs.174.62 crore taken under the DPR and briefed about the proposed components taken under the DPR. It was deliberated that drainage will also incorporated in the DPR and coordination between contractor, Implementation unit and nagar palika will be required during execution. For maintaining the level of road, all the works will be started simultaneously.

Details of minutes of meeting is approved by District Collector Sikar.

M.L.Meena
S.E., PIURUIDP,
Jhunjhunu



Attendance Sheet of CLC Meeting

RUIDP PHASE-4 CLC MEETING				
Town: Fatehpur & Laxmangarh			Date: 23-5-2018	
Dist: SIRAR				
S.No	NAME	DESIGNATION	Mob. No.	Signature
3	Narendra Thakral	Dist Collector		
4	Ujjwal Singh	MDA	9983332771	
5	Pratap Singh	C.M. Fatehpur		
6	A.K. Jais	CE RUIDP	940322483	
7	Isam Khan	CE RUIDP	982106272	
8	Narendra Singh	MDA	940322483	
9	Narendra Singh	MDA	940322483	
10	Mohu Lal Meena	CE RUIDP	940003500	
11	Praveen Kumar	CE RUIDP	940003500	
12	D.R. Jaisid	SE RUIDP	916222200	
13	Ramesh Chandra	FE RUIDP	940322483	
14	Jasdeep Dhillon	Consultant	940003500	
15	Ramendra Kumar	Consultant	940003500	
16	Narendra Kumar	CE RUIDP	940003500	
17	Jitendra Kumar	FE RUIDP	940003500	
18	A.S. Samant	CEO RUIDP	940003500	
19	Anil K. Meel	SDO RUIDP	940003500	
20	Ramendra Kumar	MDA	940003500	
21	Vijay Kumar	MDA	940003500	
22	Lata Choudhary	J.P. PHE	940003500	
23	Ravi Sharma	W.E. PHE	940003500	

RUIDP PHASE-4 CLC MEETING				
TOWN: LAXMANGARH, FATEHPUR (DIST: SIRAR)			DATE: 23/5/18	
S.NO.	NAME	DESIGNATION	MOB. NO.	SIGNATURE
	K.K. Sharma	CEM-CEC RUIDP	9314413811	
	Mohan Kumar	Consultant	9461223211	
	Anil Kumar	EO	9721811777	
	Vijay Kumar	FEU	9421811777	
	Shankar Kumar	FEU	9421811777	
	Tarun Kumar	Consultant	9821811777	
	S. V. Kumar	Consultant	9421811777	

Appendix 23: Sample Grievance Registration Form

The _____ Project welcomes complaints, suggestions, queries and comments regarding project implementation. Aggravated persons may provide grievance with their name and contact information to enable us to get in touch for clarification and feedback. In case, someone chooses not to include personal details and wants that the information provided to remain confidential, please indicate by writing/typing ***(CONFIDENTIAL)*** above Grievance Format. Thank you.

Date		Place of registration			
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 Official(s) reviewing grievance)	
Action Taken:	
Whether Action Taken Disclosed:	Yes No
Means of Disclosure:	

Appendix 24: Office order for establishing GRM

167

Government of Rajasthan
Office of Project Director
Rajasthan Urban Infrastructure Development Project
 AVS Building, Jawahar Circle, JLN Marg, Jaipur - 302017
 Tel No.: 0141-2721966, Fax No.: 0141-2721919, email : mail@ruidp.gov.in, web site : www.ruidp.gov.in
 F3(301)(50)RUIDP/PMU/PH-IV/WS/GENERAL/ 1283-84

Dated: 04.2018
04/05/18

Office - Order

Subject:- Grievance Redress Mechanism for Rajasthan Secondary Town Development Investment Program (RSTDIP) - RUIDP Phase IV

Reference:- Agreed Resettlement & Environmental framework -3183 IND (RUIDP Phase III) <https://www.sadb.org/projects/42267-020main/020maindocuments>

It is directed that Grievance Mechanism of RUIDP Phase III will be replicated in RUIDP Phase IV and accordingly, PIU will maintain/ ensure proper records of safeguard related Grievances received in their town. PIU will also ensure that the safeguard related Grievances received are resolved as per Grievance Redress Mechanism (GRM) prescribed in RFP which is summarized as under (for ready reference):-

Methodology of multi-tier GRM	Responsibility/Action to be taken	Time Frame	Record Keeping
1st level: Grievances that are immediate and urgent in the perception of the complainant, the contractor, and supervision personnel from PIU, will provide the most easily accessible or first level of contact for quick resolution of grievances.	SE/EE PIU will resolve issues in consultation with supervision personnel, Contractor.	PIU will resolve issues within 3 days of receipt of a complaint/ grievance.	The grievance register will be endorsed by all field agencies involved in implementation of EMP and RFP.
2nd level: All grievances that cannot be redressed within 3 days at field will be referred to PMU through PO Social/Environment by PIU.	Project Officers (Environment/Social) PMU in consultation with PMU, PIU and the Contractor will resolve the issues referred.	PMU will resolve issues within 7 days of receipt of a complaint/ grievance.	PIU will keep records of the matter referred to PMU and will document the outcome of each grievance resolved in the Grievance Register.
3rd level: All the grievances that are not addressed by PMU within 7 days, will be brought to the notice of Grievance Redress Committee (GRC). The City Level Committee (CLC), which will be established in every project town will act as GRC.	SE/EE PIU will coordinate with PO Social/ Environment or other official of PMU and will prepare agenda for the GRC meeting accordingly and ensure keeping the same in GRC.	The GRC will resolve the grievance within 15 days of receiving the complaint.	PIU will be responsible to see through the process of redress of each grievance and document the outcomes.
4th level: 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).	SE/EE PIU will assist PMU officials to prepare agenda for the Empowered committee meeting.		SE/EE PIU will keep records of Empowered committee meeting and will ensure documentation of outcome.

Please note that 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 dependant on the negative outcome of the GRM.

PIUs will be responsible to ensure redressal of grievances as per GRM procedures summarized above and intimate to the complainant.

Contractor's will keep information board depicting Grievance registration numbers at each working site, Grievance registration form and will maintain Grievance Registers (refer annexure 1 & 2).

Addl. Project Director, RUIDP
 Dated: 04.2018
 04/05/18
 (G. S. Hada)
 15/18

F3(301)(50)RUIDP/PMU/PH-IV/WS/GENERAL/ 1283-84
 Copy to following for information and necessary action
 1) PA to PD /CE /FA/DyPD(A)/SE(WS)/SE(VW)/PO(Environment)/PO(Social)/, RUIDP, Jaipur
 2) All EE, PIU, Phase-IV for ensuring maintenance of the Grievance register and helpline and for resolving of Grievances

(K. M. Mandawaria)
 PO(Co-ord.&Social)

Project Management - Capacity Building Coordinating Office		Project ID: PMP (PMP-1)	
Received By: <u>21/12/2020</u>		Invoice No: <u>1000</u>	
TO: <u>...</u>	FROM: <u>...</u>	DATE: <u>...</u>	TIME: <u>...</u>
ATTN: <u>...</u>	BY: <u>...</u>	DATE: <u>...</u>	TIME: <u>...</u>
NO: <u>...</u>	BY: <u>...</u>	DATE: <u>...</u>	TIME: <u>...</u>
NO: <u>...</u>	BY: <u>...</u>	DATE: <u>...</u>	TIME: <u>...</u>
NO: <u>...</u>	BY: <u>...</u>	DATE: <u>...</u>	TIME: <u>...</u>

Methodology of multi-tier GRM	Responsibility/Action to be taken	Time Frame	Record Keeping
			RP.
2nd level: All grievances that cannot be redressed within 7 days at field/PIU level will be brought to the notice of Zonal PIU headed by Additional Chief Engineer (ACE).	The ACE at zonal PIU will resolve issues in consultation with SE/EE PIU, assistant safeguard officer (ASO), field level PIU, CMSC, and the contractor.	The ACE at zonal PIU will resolve the grievance within 7 days of receipt of complaint/grievance.	Environmental and Social Safeguards Personnel of CMSC will keep all the records referred to zonal PIU and after compilation, all the details will be submitted to PMU.
3rd level: All the grievances that are not addressed by Zonal PIU within 7 days of receipt will be brought to the notice of the PMU.	Project Officer (Social/Environment) at PMU will resolve the grievance with necessary coordination of Zonal PIU and CMSC and guidance/instruction of additional project director (APD-PMU).	PMU will resolve the grievance within 15 days of receipt of grievance.	Safeguard Support of PMCBC will keep all the records referred to PMU.
4th level: Grievances not redressed through this process within the project level within stipulated time period will be referred to the CLC/grievance redress committee (GRC).	Zonal PIU will inform the CLC regarding any grievances required to be resolved urgently.	The GRC will resolve the grievance within 15 days of receiving the complaint.	Environmental and Social Safeguards Personnel of CMSC will keep all the records.
Please note that 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.			

PIU Safeguard and Safety Officer (SSO) will monitor the entire process and all decisions taken by the PIU, zonal officers, PMU and GRC and will be communicated to the APs by Safeguard Support of CMSC.

It is also directed that names and contact number of the concerned Safeguard and Safety Officer (SSO) of PIU, contractors, safeguard support staff of CMSC will be posted at all construction sites at visible locations.

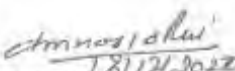
All PIUs will ensure timely issuance of order with a copy to Project Officer (Social & Environment), PMU. Further PIUs will be responsible to ensure redressal of grievances as per GRM procedures summarized above.


Laxmi Wast

Chief Engineer, RUIDP

No. F3 (301) (60)/RUIDP/PMU/PH-IV/ Social Safeguard/General Adm./2020-21/ Date: 18/12/2020
Copy to the following for information and necessary action please:- 18368-70

1. ACE-I & II Phase-IV, RUIDP zone Jaipur & Jodhpur
2. TL, PMCBC, Phase-IV, RUIDP
3. TL CMSC-01/02 Phase-IV, RUIDP zone Jaipur & Jodhpur


18/12/2020
(K. M. Mandawaria)
PO (Co-ord. & Social)

Appendix 25: Sample Environmental Site Inspection Checklist

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 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	
Monitoring Items	Compliance
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 26: Semi Annual Environmental Monitoring Report Format

I. INTRODUCTION

- Overall project description and objectives
- Environmental category as per ADB Safeguard Policy Statement, 2009
- Environmental category of each subproject as per national laws and regulations
- Project Safeguards Team

Name	Designation/Office	Email Address	Contact Number
1. PMU			
2. PIUs			
3. Consultants			

- Overall project and sub-project progress and status
- Description of subprojects (package-wise) and status of implementation (preliminary, detailed design, on-going construction, completed, and/or O&M stage)

Package Number	Components/ List of Works	Status of Implementation (Preliminary Design/Detailed Design/On-going Construction/Completed/O&M) ^a	Contract Status (specify if under bidding or contract awarded)	On-going Construction	
				%Physical Progress	Expected Completion Date

^a If on-going construction, include %physical progress and expected date of completion.

**COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY
ENVIRONMENTAL REQUIREMENTS^a**

Package No.	Subproject Name	Statutory Environmental Requirements ^b	Status of Compliance ^c	Validity if obtained	Action Required	Specific Conditions that will require environmental monitoring as per Environment Clearance, Consent/Permit to Establish ^d

^a All statutory clearance/s, no-objection certificates, permit/s, etc. should be obtained prior to award of contract/s. Attach as appendix all clearance obtained during the reporting period. If already reported, specify in the "remarks" column.

^b Specify (environmental clearance? Permit/consent to establish? Forest clearance? Etc.)

^c Specify if obtained, submitted and awaiting approval, application not yet submitted.

^d Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.

III. COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

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

**IV. COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT PLAN
(REFER TO EMP TABLES IN APPROVED IEE/S)**

- Confirm if IEE/s require contractors to submit site-specific EMP/construction EMPs. If not, describe the methodology of monitoring each package under implementation.

Package-wise Implementation Status

Package Number	Components	Design Status (Preliminary Design Stage/Detailed Design Completed)	Final IEE based on Detailed Design				Site-specific EMP (or Construction EMP) approved by Project Director? (Yes/No)	Remarks
			Not yet due (detailed design not yet completed)	Submitted to ADB (Provide Date of Submission)	Disclosed on project website (Provide Link)	Final IEE provided to Contractor/s (Yes/No)		

- Identify the role/s of Safeguards Team including schedule of on-site verification of reports submitted by consultants and contractors.
- For each package, provide name/s and contact details of contractor/s' nodal person/s for environmental safeguards.
- Include as appendix all supporting documents including **signed** monthly environmental site inspection reports prepared by consultants and/or contractors.
- With reference to approved EMP/site-specific EMP/construction EMP, complete the table below
 - Provide the monitoring results as per the parameters outlined in the approved EMP (or site-specific EMP/construction EMP when applicable).
 - In addition to the table on EMP implementation, the main text of the report should discuss in details the following items:
 - (i) **Grievance Redress Mechanism.** Provide information on establishment of grievance redress mechanism and capacity of grievance redress committee to address project-related issues/complaints. Include as appendix Notification of the GRM (town-wise if applicable).
 - (ii) **Complaints Received during the Reporting Period.** Provide information on number, nature, and resolution of complaints received during reporting period. Attach records as per GRM in the approved IEE. Identify safeguards team member/s involved in the GRM process. Attach minutes of meetings (ensure English translation is provided).
- Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
- Identify muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads.
- Identify type of erosion and sediment control measures installed on site/s, condition of erosion and sediment control measures including if these were intact following heavy rain;
- Identify designated areas for concrete works, chemical storage, construction materials, and refueling. Attach photographs of each area.
- Confirm spill kits on site and site procedure for handling emergencies.
- Identify any chemical stored on site and provide information on storage condition. Attach photograph.
- Describe management of stockpiles (construction materials, excavated soils, spoils, etc.). Provide photographs.
- Describe management of solid and liquid wastes on-site (quantity generated, transport, storage and disposal). Provide photographs.
- Provide information on barricades, signages, and on-site boards. Provide photographs.
- Provide information on
- Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary of Environmental Monitoring Activities (for the Reporting Period)^a

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						

^a Attach Laboratory Results and Sampling Map/Locations

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

V. APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

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

VI. MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS (ambient air, water quality and noise levels)

- Brief discussion on the basis for monitoring
- Indicate type and location of environmental parameters to be monitored
- Indicate the method of monitoring and equipment to be used
- 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 (Monitoring Results)			
			PM10 µg/m ³	PM2.5 µg/m ³	SO2 µg/m ³	NO2 µg/m ³

Surface Water Quality Results

S.No.	Parameters	Results		
		Location-1 (Name)	Location-2 (Name)	Location-3 (Name)
1.	pH			
2.	Turbidity			
3.	Total Hardness			
4.	DO			
5.	BOD			
6.	COD			
7.	Chloride			
8.	Iron			
9.	TSS			
10.	Arsenic			
11.	Cadmium			
12.	Fluoride			
13.	Potassium			
14.	Sodium			

15.	Calcium			
16.	Zn			
17.	Cr ⁺⁶			
18.	Magnesium			
19.	Copper			
20.	Manganese			
21.	Sulphate			
22.	Cyanide			
23.	Nitrate			
24.	Lead			
25.	Boron			
26.	Selenium			
27.	Aluminium			
28.	Total residual Chlorine			

Ground water Quality Results

S.No.	Parameters	Results		
		Location-1 (Name)	Location-2 (Name)	Location-3 (Name)
1.	pH			
2.	Total Alkalinity			
3.	Total Hardness			
4.	Chloride			
5.	Iron			
6.	TDS			
7.	Arsenic			
8.	Fluoride			
9.	Zn			
10.	Cr+6			
11.	Copper			
12.	Manganese			
13.	Sulphate			
14.	Phosphate			
15.	Nitrate			
16.	Lead			
17.	Phenolic Compound			

Noise Quality Results

Site No.	Date of Testing	Site Location	LA _{eq} (dBA) (Monitoring Results)	
			Day Time	Night Time

VII. SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

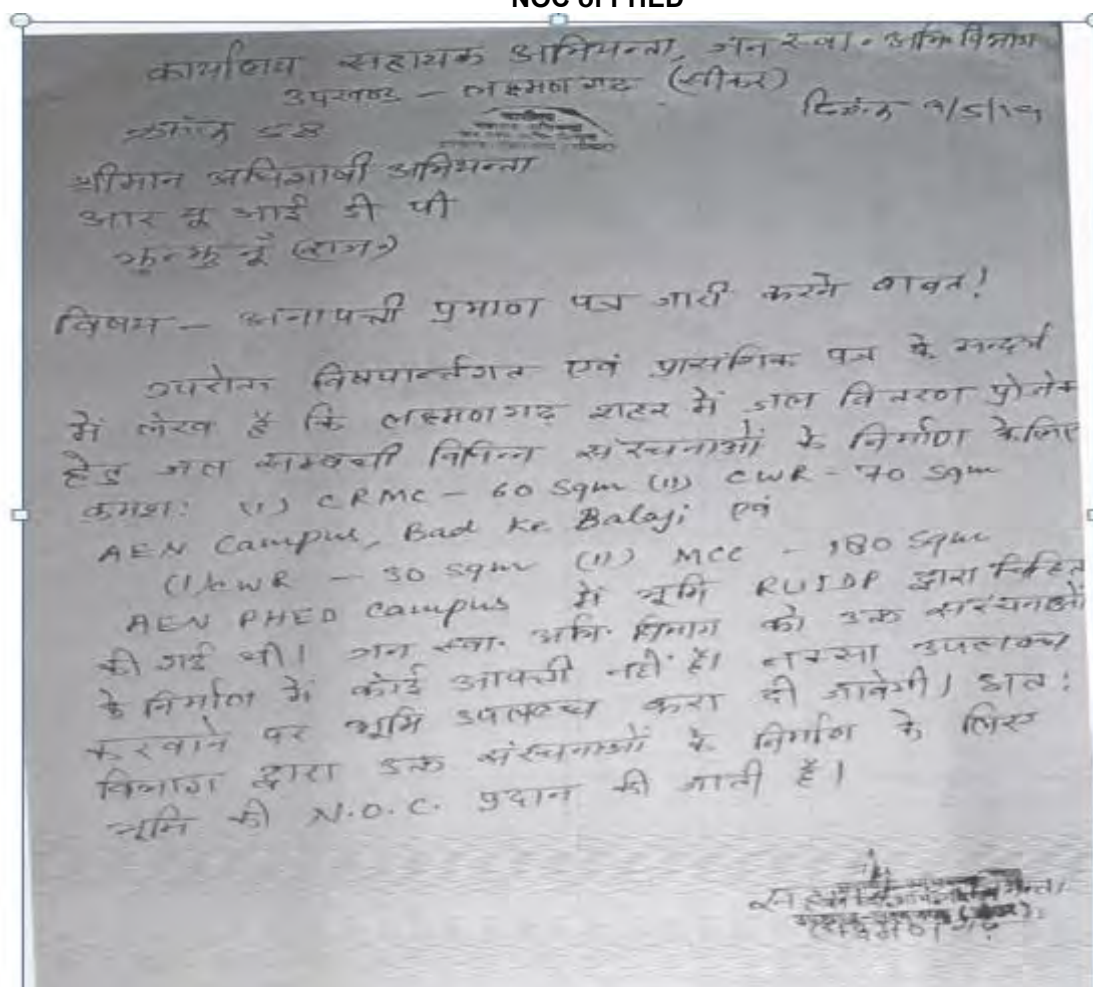
- Summary of follow up time-bound actions to be taken within a set timeframe.

APPENDIXES

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

Appendix 27: Details of land availability, ownership and NOCs for sites

Project Component	Location	Ownership	Area required (sq m)	Khasra No.	Remarks
construction of CWRs of 250 KL and Consumer relation management centre	Bad ke Balaji head works	PHED	Sufficient vacant land (not under any productive use) available in existing PHED campus		
construction of CWR 100 KL capacity, Consumer relation management centre (CRMC-1) and Master Control Centre	Assistant engineer PHED Campus	PHED	Sufficient vacant land (not under any productive use) available in existing PHED campus		
Construction of CRMC-2	In front of Executive Engineer PHED campus	PHED	Sufficient vacant land (not under any productive use) available under jurisdiction of PHED		

NOC of PHED

Transcript in English

To,
EE, RUIDP,
Jhunjhunu (Raj.)
Sub-Regarding NoC

With reference to the above subject, under RUIDP Phase-4, CWR proposed in the campus of Bad ke balaji and A.En campus for improvement of water supply project in Laxmangarh. PHED has no objection for construction of above works in their existing campus.

Assistant Engineer,
PHED, Laxmangarh

Appendix 29: WHO Interim Guidance on Water, Sanitation, Hygiene and Waste Management for the COVID19 virus



Water, sanitation, hygiene, and waste management for the COVID-19 virus

Interim guidance
19 March 2020

Background

This interim guidance supplements the infection prevention and control (IPC) documents by summarizing WHO guidance on water, sanitation and health care waste relevant to viruses, including coronaviruses. It is intended for water and sanitation practitioners and providers and health care providers who want to know more about water, sanitation and hygiene (WASH) risks and practices.

The provision of safe water, sanitation and hygienic conditions is essential to protecting human health during all infectious disease outbreaks, including the COVID-19 outbreak. Ensuring good and consistently applied WASH and waste management practices in communities, homes, schools, marketplaces, and health care facilities will help prevent human-to-human transmission of the COVID-19 virus.

The most important information concerning WASH and the COVID-19 virus is summarized here:

- Frequent and proper hand hygiene is one of the most important measures that can be used to prevent infection with the COVID-19 virus. WASH practitioners should work to enable more frequent and regular hand hygiene by improving facilities and using proven behavior-change techniques.
- WHO guidance on the safe management of drinking-water and sanitation services applies to the COVID-19 outbreak. Extra measures are not needed. Disinfection will facilitate more rapid die-off of the COVID-19 virus.
- Many co-benefits will be realized by safely managing water and sanitation services and applying good hygiene practices.

Currently, there is no evidence about the survival of the COVID-19 virus in drinking-water or sewage. The morphology and chemical structure of the COVID-19 virus are similar to those of other human coronaviruses for which there are data about both survival in the environment and effective inactivation measures. This document draws upon the evidence base and WHO guidance on how to protect against viruses in sewage and drinking-water. This document will be updated as new information becomes available.

1. COVID-19 transmission

There are two main routes of transmission of the COVID-19 virus: respiratory and contact. Respiratory droplets are generated when an infected person coughs or sneezes. Any person who is in close contact with someone who has respiratory symptoms (sneezing, coughing) is at risk of being exposed to potentially infective respiratory droplets.¹ Droplets may also land on surfaces where the virus could remain viable; thus, the immediate environment of an infected individual can serve as a source of transmission (contact transmission).

Approximately 2–10% of cases of confirmed COVID-19 disease present with diarrhoea.^{2–4} and two studies detected COVID-19 viral RNA fragments in the faecal matter of COVID-19 patients.^{5,6} However, only one study has cultured the COVID-19 virus from a single stool specimen.⁷ There have been no reports of faecal-oral transmission of the COVID-19 virus.

2. Persistence of the COVID-19 virus in drinking-water, faeces and sewage and on surfaces

Although persistence in drinking-water is possible, there is no evidence from surrogate human coronaviruses that they are present in surface or groundwater sources or transmitted through contaminated drinking water. The COVID-19 virus is an enveloped virus, with a fragile outer membrane. Generally, enveloped viruses are less stable in the environment and are more susceptible to oxidants, such as chlorine. While there is no evidence to date about survival of the COVID-19 virus in water or sewage, the virus is likely to become inactivated significantly faster than non-enveloped human enteric viruses with known waterborne transmission (such as adenoviruses, norovirus, rotavirus and hepatitis A). For example, one study found that a surrogate human coronavirus survived only 2 days in dechlorinated tap water and in hospital wastewater at 20 °C.⁸ Other studies confirm that the human coronaviruses transmissible gastroenteritis coronavirus and mouse hepatitis virus demonstrated a 99.9% die-off in tap water at 23 °C in 2 weeks⁹ at 25 °C. Heat, high or low pH, sunlight, and common disinfectants (such as chlorine) all facilitate die-off.

It is not certain how long the virus that causes COVID-19 survives on surfaces, but it seems likely to behave like other coronaviruses. A recent review of the survival of human

coronaviruses on surfaces found large variability, ranging from 2 hours to 9 days.¹¹ The survival time depends on a number of factors, including the type of surface, temperature, relative humidity, and specific strain of the virus. The same review also found that effective inactivation could be achieved within 1 minute using common disinfectants, such as 70% ethanol or sodium hypochlorite (for details, see Cleaning practices).

3. Keeping water supplies safe

The COVID-19 virus has not been detected in drinking-water supplies, and based on current evidence, the risk to water supplies is low.¹² Laboratory studies of surrogate coronaviruses that took place in well-controlled environments indicated that the virus could remain infectious in water contaminated with faeces for days to weeks.¹³ A number of measures can be taken to improve water safety, starting with protecting the source water, treating water at the point of distribution, collection, or consumption; and ensuring that treated water is safely stored at home in regularly cleaned and covered containers.

Conventional, centralized water treatment methods that use filtration and disinfection should inactivate the COVID-19 virus. Other human coronaviruses have been shown to be sensitive to chlorination and disinfection with ultraviolet (UV) light.¹³ As enveloped viruses are surrounded by a lipid host cell membrane, which is not robust, the COVID-19 virus is likely to be more sensitive to chlorine and other oxidant disinfection processes than many other viruses, such as noroviruses, which have a protein coat. For effective centralized disinfection, there should be a residual concentration of free chlorine of ≥ 0.5 mg/L after at least 30 minutes of contact time at pH ≤ 8.0 .¹⁴ A chlorine residual should be maintained throughout the distribution system.

In places where centralized water treatment and safe piped water supplies are not available, a number of household water treatment technologies are effective in removing or destroying viruses, including boiling or using high-performing ultrafiltration or nanomembrane filters, solar irradiation and, in non-turbid waters, UV irradiation and appropriately dosed free chlorine.

4. Safely managing wastewater and faecal waste

There is no evidence that the COVID-19 virus has been transmitted via sewerage systems with or without wastewater treatment. Further, there is no evidence that sewage or wastewater treatment workers contracted the severe acute respiratory syndrome (SARS), which is caused by another type of coronavirus that caused a large outbreak of acute respiratory illness in 2003. As part of an integrated public health policy, wastewater carried in sewerage systems should be treated in well-designed and well-managed centralized wastewater treatment works. Each stage of treatment (as well as retention time and dilution) results in a further reduction of the potential risk. A waste stabilization pond (an oxidation pond or lagoon) is generally considered a practical and simple wastewater treatment technology particularly well suited to destroying pathogens, as relatively long retention times (20 days or longer) combined with sunlight, elevated pH levels, biological activity, and other factors serve to accelerate pathogen destruction. A final disinfection step may be considered if existing wastewater treatment plants are not optimized to remove viruses. Best practices for protecting the health of workers at sanitation treatment facilities should

be followed. Workers should wear appropriate personal protective equipment (PPE), which includes protective overwear, gloves, boots, goggles or a face shield, and a mask. They should perform hand hygiene frequently, and they should avoid touching eyes, nose, and mouth with unwashed hands.

WASH in health care settings

Existing recommendations for water, sanitation and hygiene measures in health care settings are important for providing adequate care for patients and protecting patients, staff, and caregivers from infection risks.¹⁵ The following actions are particularly important: (i) managing excreta (faeces and urine) safely, including ensuring that no one comes into contact with it and that it is treated and disposed of correctly; (ii) engaging in frequent hand hygiene using appropriate techniques; (iii) implementing regular cleaning and disinfection practices; and (iv) safely managing health care waste. Other important measures include providing sufficient safe drinking-water to staff, caregivers, and patients; ensuring that personal hygiene can be maintained, including hand hygiene, for patients, staff and caregivers; regularly laundering bedsheets and patients' clothing; providing adequate and accessible toilets (including separate facilities for confirmed and suspected cases of COVID-19 infection); and segregating and safely disposing of health care waste. For details on these recommendations, please refer to Essential environmental health standards in health care.¹⁶

1. Hand hygiene practices

Hand hygiene is extremely important. Cleaning hands with soap and water or an alcohol-based hand rub should be performed according to the instructions known as "My 5 moments for hand hygiene".¹⁷ If hands are not visibly dirty, the preferred method is to perform hand hygiene with an alcohol-based hand rub for 20–30 seconds using the appropriate technique.¹⁸ When hands are visibly dirty, they should be washed with soap and water for 40–60 seconds using the appropriate technique.¹⁷ Hand hygiene should be performed at all five moments, including before putting on PPE and after removing it, when changing gloves, after any contact with a patient with suspected or confirmed COVID-19 infection or their waste, after contact with any respiratory secretions, before eating; and after using the toilet.¹⁸ If an alcohol-based hand rub and soap are not available, then using chlorinated water (0.05%) for handwashing is an option, but it is not ideal because frequent use may lead to dermatitis, which could increase the risk of infection and asthma and because prepared dilutions might be inaccurate.¹⁹ However, if other options are not available or feasible, using chlorinated water for handwashing is an option.

Functional hand hygiene facilities should be present for all health care workers at all points of care and in areas where PPE is put on or taken off. In addition, functional hand hygiene facilities should be available for all patients, family members, and visitors, and should be available within 5 m of toilets, as well as in waiting and dining rooms and other public areas.

2. Sanitation and plumbing

People with suspected or confirmed COVID-19 disease should be provided with their own flush toilet or latrine that has a door that closes to separate it from the patient's room. Flush toilets should operate properly and have functioning drain traps. When possible, the toilet should be flushed with the lid down to prevent droplet splatter and aerosol clouds. If it is not possible to provide separate toilets, the toilet should be cleaned and disinfected at least twice daily by a trained cleaner wearing PPE (gown, gloves, boots, mask, and a face shield or goggles). Further, and consistent with existing guidance, staff and health care workers should have toilet facilities that are separate from those used by all patients.

WHO recommends the use of standard, well-maintained plumbing, such as sealed bathroom drains, and backflow valves or sprayers and faucets to prevent aerosolized fecal matter from entering the plumbing or ventilation system,²⁰ together with standard wastewater treatment.²¹ Faulty plumbing and a poorly designed air ventilation system were implicated as contributing factors to the spread of the aerosolized SARS coronavirus in a high-rise apartment building in Hong Kong in 2003.²² Similar concerns have been raised about the spread of the COVID-19 virus from faulty toilets in high-rise apartment buildings.²³ If health care facilities are connected to sewers, a risk assessment should be conducted to confirm that wastewater is contained within the system (that is, the system does not leak) before its arrival at a functioning treatment or disposal site, or both. Risks pertaining to the adequacy of the collection system or to treatment and disposal methods should be assessed following a safety planning approach,²⁴ with critical control points prioritized for mitigation.

For smaller health care facilities in low-resource settings, if space and local conditions allow, pit latrines may be the preferred option. Standard precautions should be taken to prevent contamination of the environment by excreta. These precautions include ensuring that at least 1.5 m exists between the bottom of the pit and the groundwater table (more space should be allowed in coarse sands, gravels, and fissured formations) and that the latrines are located at least 30 m horizontally from any groundwater source (including both shallow wells and boreholes).²⁵ If there is a high groundwater table or a lack of space to dig pits, excreta should be retained in impermeable storage containers and left for as long as feasible to allow for a reduction in virus levels before moving it off-site for additional treatment or safe disposal, or both. A two-tank system with parallel tanks would help facilitate inactivation by maximizing retention times, as one tank could be used until full, then allowed to sit while the next tank is being filled. Particular care should be taken to avoid splashing and the release of droplets while cleaning or emptying tanks.

3. Toilets and the handling of faeces

It is critical to conduct hand hygiene when there is suspected or direct contact with faeces (if hands are dirty, then soap and water are preferred to the use of an alcohol-based hand rub). If the patient is unable to use a latrine, excreta should be collected in either a diaper or a clean bedpan and immediately and carefully disposed of into a separate toilet or latrine used only by suspected or confirmed cases of COVID-19. In all health care settings, including those with suspected or confirmed COVID-19 cases, faeces must be treated as a biohazard and handled as little as possible. Anyone handling

faeces should follow WHO contact and droplet precautions¹⁸ and use PPE to prevent exposure, including long-sleeved gowns, gloves, boots, masks, and goggles or a face shield. If diapers are used, they should be disposed of as infectious waste as they would be in all situations. Workers should be properly trained in how to put on, use, and remove PPE so that these protective barriers are not breached.²⁶ If PPE is not available or the supply is limited, hand hygiene should be regularly practiced, and workers should keep at least 1 m distance from any suspected or confirmed cases.

If a bedpan is used, after disposing of excreta from it, the bedpan should be cleaned with a neutral detergent and water, disinfected with a 0.5% chlorine solution, and then rinsed with clean water; the rinse water should be disposed of in a drain or a toilet or latrine. Other effective disinfectants include commercially available quaternary ammonium compounds, such as cetylpyridinium chloride, used according to manufacturer's instructions, and peracetic or peroxycetic acid at concentrations of 500–2000 mg/L.²⁰

Chlorine is ineffective for disinfecting media containing large amounts of solid and dissolved organic matter. Therefore, there is limited benefit to adding chlorine solution to fresh excreta and it is possible that this may introduce risks associated with splashing.

4. Emptying latrines and holding tanks, and transporting excreta off-site

There is no reason to empty latrines and holding tanks of excreta from suspected or confirmed COVID-19 cases unless they are at capacity. In general, the best practices for safely managing excreta should be followed. Latrines or holding tanks should be designed to meet patient demand, considering potential sudden increases in cases, and there should be a regular schedule for emptying them based on the wastewater volumes generated. PPE (long-sleeved gown, gloves, boots, masks, and goggles or a face shield) should be worn at all times when handling or transporting excreta off-site, and great care should be taken to avoid splashing. For crews, this includes pumping out tanks or unloading pumper trucks. After handling the waste and once there is no risk of further exposure, individuals should safely remove their PPE and perform hand hygiene before entering the transport vehicle. Soiled PPE should be put in a sealed bag for later safe laundering (see Cleaning practices). Where there is no off-site treatment, on-site treatment can be done using lime. Such treatment involves using a 10% lime slurry added at 1-part lime slurry per 10 parts of waste.

5. Cleaning practices

Recommended cleaning and disinfection procedures for health care facilities should be followed consistently and correctly.²⁷ Laundry should be done and surfaces in all environments in which COVID-19 patients receive care (treatment units, community care centres) should be cleaned at least once a day and when a patient is discharged.²⁸ Many disinfectants are active against enveloped viruses, such as the COVID-19 virus, including commonly used hospital disinfectants. Currently, WHO recommends using:

- 70% ethyl alcohol to disinfect small areas between uses, such as reusable dedicated equipment (for example, thermometers);
- sodium hypochlorite at 0.5% (equivalent to 5000 ppm) for disinfecting surfaces.

All individuals dealing with soiled bedding, towels, and clothes from patients with COVID-19 infection should wear appropriate PPE before touching soiled items, including heavy-duty gloves, a mask, eye protection (goggles or a face shield), a long-sleeved gown, an apron if the gown is not fluid resistant, and boots or closed shoes. They should perform hand hygiene after exposure to blood or body fluids and after removing PPE. Soiled linen should be placed in clearly labelled, leak-proof bags or containers, after carefully removing any solid excrement and putting it in a covered bucket to be disposed of in a toilet or latrine. Machine washing with warm water at 60–90°C (140–194°F) with laundry detergent is recommended. The laundry can then be dried according to routine procedures. If machine washing is not possible, linens can be soaked in hot water and soap in a large drum using a stick to stir and being careful to avoid splashing. The drum should then be emptied, and the linens soaked in 0.05% chlorine for approximately 30 minutes. Finally, the laundry should be rinsed with clean water and the linens allowed to dry fully in sunlight.

If excreta are on surfaces (such as linens or the floor), the excreta should be carefully removed with towels and immediately safely disposed of in a toilet or latrine. If the towels are single use, they should be treated as infectious waste; if they are reusable, they should be treated as soiled linens. The area should then be cleaned and disinfected (with, for example, 0.5% free chlorine solution), following published guidance on cleaning and disinfection procedures for spilled body fluids.²⁷

6. Safely disposing of greywater or water from washing PPE, surfaces and floors.

Current WHO recommendations are to clean utility gloves or heavy-duty, reusable plastic aprons with soap and water and then decontaminate them with 0.5% sodium hypochlorite solution after each use. Single-use gloves (nitrile or latex) and gowns should be discarded after each use and not reused; hand hygiene should be performed after PPE is removed. If greywater includes disinfectant used in prior cleaning, it does not need to be chlorinated or treated again. However, it is important that such water is disposed of in drains connected to a septic system or sewer or in a soakaway pit. If greywater is disposed of in a soakaway pit, the pit should be fenced off within the health facility grounds to prevent tampering and to avoid possible exposure in the case of overflow.

7. Safe management of health care waste

Best practices for safely managing health care waste should be followed, including assigning responsibility and sufficient human and material resources to dispose of such waste safely. There is no evidence that direct, unprotected human contact during the handling of health care waste has resulted in the transmission of the COVID-19 virus. All health care waste produced during the care of COVID-19 patients should be collected safely in designated containers and bags, treated, and then safely disposed of or treated, or both, preferably onsite. If waste is moved off-site, it is critical to understand where and how it will be treated and destroyed. All who handle health care waste should wear appropriate PPE (boots, apron, long-sleeved gown, thick gloves, mask, and goggles or a face shield) and perform hand hygiene after removing it. For more information refer to the WHO guidance, Safe management of wastes from health-care activities.²⁸

Considerations for WASH practices in homes and communities.

Upholding best WASH practices in the home and community is also important for preventing the spread of COVID-19 and when caring for patients at home. Regular and correct hand hygiene is of particular importance.

1. Hand hygiene

Hand hygiene in non-health care settings is one of the most important measures that can prevent COVID-19 infection. In homes, schools and crowded public spaces – such as markets, places of worship, and train or bus stations – regular handwashing should occur before preparing food, before and after eating, after using the toilet or changing a child's diaper, and after touching animals. Functioning handwashing facilities with water and soap should be available within 5 m of toilets.

2. Treatment and handling requirements for excreta.

Best WASH practices, particularly handwashing with soap and clean water, should be strictly applied and maintained because these provide an important additional barrier to COVID-19 transmission and to the transmission of infectious diseases in general.¹⁷ Consideration should be given to safely managing human excreta throughout the entire sanitation chain, starting with ensuring access to regularly cleaned, accessible, and functioning toilets or latrines and to the safe containment, conveyance, treatment, and eventual disposal of sewage.

When there are suspected or confirmed cases of COVID-19 in the home setting, immediate action must be taken to protect caregivers and other family members from the risk of contact with respiratory secretions and excreta that may contain the COVID-19 virus. Frequently touched surfaces throughout the patient's care area should be cleaned regularly, such as bedside tables, bed frames and other bedroom furniture. Bathrooms should be cleaned and disinfected at least once a day. Regular household soap or detergent should be used for cleaning first and then, after rinsing, regular household disinfectant containing 0.5% sodium hypochlorite (that is, equivalent to 5000 ppm or 1-part household bleach with 3% sodium hypochlorite to 9 parts water) should be applied. PPE should be worn while cleaning, including mask, goggles, a fluid-resistant apron, and gloves,²⁹ and hand hygiene with an alcohol-based hand rub or soap and water should be performed after removing PPE.

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US Centers for Disease Control and Prevention, United States of America; David Berendes, US Centers for Disease Control and Prevention, United States of America; Lisa Casanova, Georgia State University, United States of America; David Cunliffe, SA Health, Australia; Rick Gelling, US Centers for Disease Control and Prevention, United States of America; Dr Thomas Handzel, US Centers for Disease Control and Prevention, United States of America; Paul Hunter, University of East Anglia, United Kingdom; Ana Maria de Roda Husman, National Institute for Public Health and the Environment, the Netherlands; Peter Maes, Médecins Sans Frontières, Belgium; Molly Patrick, US Centers for Disease Control and Prevention, United States of America; Mark Sobsey, University of North Carolina-Chapel Hill, United States of America.

WHO continues to monitor the situation closely for any changes that may affect this interim guidance. Should any factors change, WHO will issue a further update. Otherwise, this interim guidance document will expire 2 years after the date of publication.

Contributors

This interim guidance was written by staff from WHO and UNICEF. In addition, a number of experts and WASH practitioners contributed. They include Matt Arduino,

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WHO reference number: WHO/2019-nCoV/IPC_WASH/2020.2

Appendix 30: Site Visit for Due Diligence of Environmental Safeguards

Site visit of Laxmangarh town was conducted in the month of December 2020, for the orientation of PIU, consultant and contractor's team in town regarding requirements of environmental safeguard during project implementation, visit of sites for updating the IEE and RP for due diligence of ADB SPS. Following is the observations of site visit-

Report on Orientation for Environmental Safeguard Compliance at Laxmangarh

Date: 23.12.2020, 02.30 pm to 4.30 pm

Place: PIU's Office at Laxmangarh

Orientation done by: Mr. Abhay Srivastava, Environmental Safeguard Specialist, PMCBC, Jaipur

Participants: following participants were present during orientation-

- | | |
|--------------------|--|
| PIU: | 1. Mr. Surendra Godara, Junior Engineer, PIU, Laxmangarh |
| CMSC-2: | 1. Mr. V.K. Sharma, Senior Construction Engineer |
| | 2. Mr. Amit Bhardwaj, Social Safeguard Support |
| | 3. Mr. Sanjay Pal, Support Engineer |
| Contractor: | 1. Mr. Nitin Subramanian, Site Engineer |
| | 2. Mr. Ankur Sarkar, Site Engineer |
| | 3. Mr. Vinayak Dev, HSE Engineer-in-charge |
| | 4. Mr. Shivraj Singh Bhati, SOT head |
| | 5. Mr. Vishal Gorai, Site Engineers |
| | 6. Mr. Tadi Praveen Reddy, Town in-charge |

Attendance Sheet of Orientation program is attached as Annexure 1 with this report.

Photographs of orientation program is attached as Annexure 2.

Topics Discussed: A presentation was given by Environmental Safeguard Specialist, PMCBC, Jaipur to all participants covering following topics-

1. ADB SPS 2009 and RUIDP safeguards requirements
2. Contractual and legal requirements as per ADB, RUIDP, Govt. of Rajasthan and Govt. of India legislations, requirement of consents (CTE/CTO) from RSPCB for WTP/STP/DG set etc.,
3. Safeguard provisions in contract documents, pre-construction requirements
4. Safeguards implementation arrangements and roles and responsibility of different functionaries in the project
5. Assessment of environmental impacts and planning for mitigation measures, including best management practices, in the design, construction, operation and maintenance of water supply subprojects
6. Preparation, updating and review of IEE
7. Preparation of site-specific EMPs/EHS Plan
8. Occupational and community health and safety
9. Labor and public safety and labor laws
10. Heritage conservation, Biodiversity conservation, Asbestos Management
11. Solid waste (domestic, construction, and spoils) management
12. Environmental monitoring including air, noise, water and soil
13. Preparation of monitoring checklists and reports
14. Areas of safety concerns in construction works

15. Public consultations and grievance redress mechanism of RUIDP
16. Good practices, tree plantations
17. Probable pollutions during construction works and their mitigation measures
18. Discussions about site visit observations

Annexure-1 Attendance Sheet of Orientation program

ATTENDANCE SHEET

Town: Laxmangarh

Project: Water Supply Works

Date: 23.12.2020

Subject: Orientation for Environmental and Social Safeguards as per ADB SPS 2009

S.No.	Name	Designation	Mobile and email	Signature
1	SURENDRA GOHRA	Junior Engineer PIU	9867518549 SURENDRA.GOHRA@GOV.IN	
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5	Ankur Sachan	L&T	8995818718 S-ankur@intec.com	
6	VINAY DEV	L&T	9412313638 vdev@intec.com	
7	Sanjay Pal	Support Engineer CMSC-II	6376152462 es89njy9718@gmail.com	
8	SHIVRAJ SINGH BHATTI	L&T	8949658890 SHIVRAJBHATTI@GMAIL.COM	
9	VISHAL GORAI	L&T	7601457720 vgorai@intec.com	
10	Tadi Pooja Reddy	L&T	Prairiseale-56@gmail.com 9784719799	
11				
12				
13				
14				
15				

Signature of PMCBC

Signature of PIU

Annexure 2- Photographs of Orientation program



Sites Visited:

Proposed CRMC site near PHED Exn office- Proposed site for CRMC-1 is a vacant Govt. land in front of PHED Exn office campus. This is a vacant land under possession of PHED and well demarcated by boundary wall and barbed wire fencing. PHED has given their consent for this site. Demarcation for CRMC building is already done and there are no any environmental issues. No any tree is present at site, no habitation/shops exist near site and no any other significant issues noted at site. No physical works has been started at this site.



Proposed site for CRMC demarcated by pillars



Site is having boundary wall

Proposed CRMC site at PHED A.En office campus- There is an old abandoned building existing in PHED A.En. Campus which is proposed for demolition for the construction of CRMC-2 in Laxmangarh. This site belongs to PHED and they have given NOC for this site. People

frequently visit this office for their official works, therefore site is suitable for construction of CRMC. There are habitations beside the proposed site and mitigation measures will be required to avoid any adverse impact to nearby habitants. There is also existing CWR, pump house and A.En. Office working in this campus therefore all the precautions should be taken to reduce/avoid any adverse impact to the people and staff visiting this office during time of construction works. No physical works have been started at this site.



Existing old building proposed for demolition for construction of CRMC at PHED Aen campus



Habitations beside the proposed CRMC site

Due Diligence of compliance of environmental safeguards: Following is the compliance status of environmental safeguards as per ADB SPS-

1. Site specific EHS plan has been recently submitted by contractor, which has been reviewed by consultants and comments are conveyed to contractor. In the meanwhile, up to the approval of EHS plan; contractor has assured to follow the EMP as suggested in IEE and bid documents.
2. Contractor has mobilized full time EHS officer at site
3. No any WTP proposed in the town and therefore no cosents are required
4. No tree cutting was done for pipe laying works and contractor was informed to access the requirement of tree cutting and take prior permission before any tree cutting
5. Contractor informed that engineers team of contractor have consulted the nearby habitants about the nature of works and people are well aware about the works to be carried out
6. Workmen camps are under construction and contractor has engaged local people only as construction workers

Appendix 31: Environmental Monitoring Location and results in Laxmangarh

Ambient Air Quality Monitoring

Date of Monitoring	Locations	Results				
		CO (mg/m ³)	NO ₂ (µg/m ³)	SO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
National Standards for residential areas		4000	80	80	100	60
25/11/2020 to 26/11/2020	PHED A.En. Campus	0.74	19.99	11.94	87.77	42.15
25/11/2020 to 26/11/2020	Bad k Balaji PHED Campus	0.79	17.19	9.97	92.48	46.10
25/11/2020 to 26/11/2020	Murali Manohar Mandir (Zone 2&5)	0.82	18.56	10.78	88.96	41.92
25/11/2020 to 26/11/2020	Power House (Zone 4 & 8)	0.78	18.54	11.91	72.92	38.86
India Ambient Air Quality Standard		2,000 (8-hr) 4,000 (1-hr)	40 (Annual) 80 (24-hr)	50 (Annual) 80 (24-hr)	60 (Annual) 100 (24-hr)	40 (Annual) 60 (24-hr)
Applicable Per ADB SPS ^e (µg/m ³)		2,000 (8-hr) 4,000 (1-hr) 100,000 (15-min)	40 (Annual) 80 (24-hr) 200 (1-hr)	50 (Annual) 20 (24-hr) 500 (10-min)	20 (Annual) 50 (24-hr)	10 (Annual) 25 (24-hr)

Ambient Noise Level Monitoring

Date	Locations	Leq day time dB(A)	Leq night time dB(A)
National Standards for residential areas		55	45
25/11/2020 to 26/11/2020	PHED A.En. Campus	53.36	42.02
25/11/2020 to 26/11/2020	Bad k Balaji PHED Campus	56.21	45.04
25/11/2020 to 26/11/2020	Murali Manohar Mandir (Zone 2&5)	54.47	44.36
25/11/2020 to 26/11/2020	Power House	54.96	44.11

CPCB Limits for

Industrial area (I): Day Time= 75 dB(A), Night Time (10 PM to 6 AM)= 70 dB(A)

Commercial (C) area: Day Time= 65 dB(A), Night Time (10 PM to 6 AM)= 55 dB(A)

Residential (R) area: Day Time= 55 dB(A), Night Time (10 PM to 6 AM)= 45 dB(A)

Silence Zone (S): Day Time= 50 dB(A), Night Time (10 PM to 6 AM)= 40 dB(A)

IFC's limits for Noise Level

Residential; institutional; educational - Day Time= 55 dB(A), Night Time (10 PM to 7 AM)= 45 dB(A)

Industrial area and commercial : Day Time= 70 dB(A), Night Time (10 PM to 7 AM)= 70 dB(A)

Ground Water Quality Monitoring

(Date of sampling 25.11.2020)

S. No	Parameters	Units	Results	
			PHED A.En. Campus	Bad k Balaji PHED Campus
1	pH	-	7.68	7.64
2	Total Dissolved Solids (TDS)	mg/l	1090.00	254.00
3	Total alkanity (as CaCO ₃)	mg/l	355.52	117.16
4	Total Hardness (as CaCO ₃)	mg/l	154.44	71.28
5	Nitrate (as NO ₃)	mg/l	17.75	7.42
6	Chloride (as Cl)	mg/l	176.78	27.20
7	Sulphate (as SO ₄)	mg/l	111.49	6.59
8	Fluorides (as F)	Mg/l	1.09	0.28
9	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	BDL	BDL
10	Total Iron as Fe	mg/l	BDL	BDL
11	Arsenic (as As)	mg/l	BDL	BDL
12	Mercury (as Hg)	Mg/l	BDL	BDL
13	Lead (as Pb)	mg/l	BDL	BDL
14	Cadmium (as Cd)	mg/l	BDL	BDL
15	Zinc (as Zn)	mg/l	BDL	BDL
16	Manganese as Mn	mg/l	BDL	BDL
17	Dissolved oxygen	mg/l	4.40	4.10
18	Phosphate (as P)	mg/l	BDL	BDL
19	Hexavalent Chromium (as Cr+6)	mg/l	BDL	BDL

BDL= Below Detectible Limits

Soil Quality Monitoring

(Date of sampling- 25.11.2020)

S. No.	Parameters	Units	Results	
			Bad ke Balaji, PHED Campus	PHED A.En. Campus
1	pH	-	7.72	7.93
2	Electrical Conductivity (at 25°C)	mS/cm	0.261	0.324
3	Calcium (as Ca)	mg/Kg	156.87	132.10
4	Sodium (as Na)	mg/Kg	50.0	28.50
5	Potassium (as K)	Kg/hect.	62.3	119.65
6	Organic Carbon	%	0.36	0.82
7	Magnesium (as Mg)	mg/Kg	35.04	85.1
	Phosphorus	Kg/hect	42.0	46.34
8	Available Nitrogen	mg/Kg	142.23	280.71
9	Moisture Content	%	0.43	0.30
10	Permeability	Cm/sec	1.85*10 ⁻⁴	1.65*10 ⁻³
11	Oil and grease	Mg/kg	9.94	12.90

Locations of Environmental Monitoring conducted at Laxmangarh; in Google Map



Appendix 32: Tree Cutting Permission at CWR site at Laxmangarh

Email :- laxmangarh.jaipur@yahoo.com	Attachment 2 Tree Cutting Permission of Laxmangarh
क्रमांक. न.पा.ल/2020-21/1156	दिनांक-22/07/2020
श्रीमान सहायक अभियंता जन स्वास्थ्य अभियांत्रिकी विभाग उपखण्ड लक्ष्मणगढ़ सीकर।	
विषय - कार्यालय परिसर व बड़ का बालाजी परिसर में हरे पेड़ काटने की अनुमति प्रदान करने के संबंध में। प्रसंग - आपका पत्र क्रमांक 283-86 दिनांक 21.07.2020 के संबंध में।	
महोदय, उपरोक्त विषयान्तर्गत निवेदन है कि नगरपालिका क्षेत्र में RUIDP PHASE IV के तहत शटर सफाई का कार्य किया जा रहा है। जिसके लिए आप द्वारा कार्यालय परिसर व बड़ का बालाजी परिसर में हरे पेड़ काटने की अनुमति चाही गई थी। जिसमें जन स्वास्थ्य अभियांत्रिकी विभाग के कार्यालय परिसर एवं बड़ के बालाजी के पारा क्रमश 02 व 02 कुल 04 हरे पेड़ हैं। उपरोक्त कार्य करने हेतु पेड़ों को हटाया जाना अतिआवश्यक है अतः पेड़ काटने की अनुमति एतद द्वारा प्रदान की जाती है।	
 अधिकारी नगरपालिका लक्ष्मणगढ़ सीकर	