Environmental Assessment and Review Framework

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India: Rajasthan Secondary Towns Development Sector Project – Additional Financing

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

CURRENCY EQUIVALENTS

(as of 16 February 2023)

Currency unit	–	Indian rupee (₹)
₹1.00	=	$ 0.01
$1.00	=	₹ 81.56

ABBREVIATIONS

ACM	–	asbestos-containing material
ADB	–	Asian Development Bank
AMP	–	asbestos management plan
ASI	–	Archeological Survey of India
BOCW	–	Building and other Construction Workers
CAPPC	–	community awareness and public participation consultants
CLC	–	city-level committee
CPCB	–	Central Pollution Control Board
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
GOI	–	Government of India
GOR	–	Government of Rajasthan
GLSR	–	ground level service reservoir
IEE	–	initial environmental examination
LSGD	–	Local Self Government Department
MOEF&CC	–	Ministry of Environment, Forest and Climate Change
NOC	–	no objection certificate
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
RPCB	–	Rajasthan State Pollution Control Board
RSTDSP	–	Rajasthan Secondary Towns Development Sector Project
RUIDP	–	Rajasthan Urban Infrastructure Development Project
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
WTP	–	water treatment plant

WEIGHTS AND MEASURES

^{o}C	–	degree centigrade
dB	–	decibels
dia	–	diameter
kg	–	kilogram
kl	–	kiloliter
km	–	kilometer
kmph	–	kilometer per hour
km^2	–	square kilometer
ha	–	hectare
HP	–	horsepower
LPCD	–	liters per capita per day
lps	–	liters per second
m	–	meter
m^3	–	cubic meter
mg	–	milligram
mm	–	millimeter
mcm	–	million cubic meter
MLD		million liters per day

NOTE

In this report, "$" refers to United States dollars.

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I. INTRODUCTION

A. Background

1. ADB approved a loan of $300 million for the Rajasthan Secondary Towns Development Sector Project (RSTDSP, Loan 3972: IND) from its regular ordinary capital resources on 25 September 2020 and became effective on 4 January 2021. The closing date of the current project is 31 May 2028. This project is on track and has performed well consistently since the first quarter of 2021. Under this project, water supply systems are being improved in eight urban local body (ULB) towns (Output 1), and sanitation systems in 13 ULBs (Output 2). During the implementation, an additional 13 ULBs were added to the project for fecal sludge and septage management system development. Under Output 3, capacity building and training activities on sustainable and resilient water supply and sanitation (WSS) operations, hygiene, gender equality and social inclusion conducted.

2. The RSTDSP Additional Financing (RSTDSP-AF) project aims will expand the improved access to WSS services in at least ten urban local bodies (ULBs), benefiting 1.2 million people. Important value addition of the proposed project to the ongoing project is that it will provide innovative solutions to address climate change to respond to the growing climate risks and vulnerability and also to improve livability and prosperity through enhancing natural and/or built heritage at least ten ULBs in Rajasthan, benefiting 1.0 million people. The overall project is aligned with the following impacts: (i) access to potable, affordable, reliable, equitable, environmentally sustainable drinking water supply in all urban areas of Rajasthan improved, (ii) health status of urban population, especially the poor and under-privileged improved, and (iii) productivity, livability and prosperity for the citizens in Rajasthan cities and towns enhanced. Reflecting the additional measures to enhance climate resilience and heritage-sensitive urban development of the project, impact statement (iii) was added; the outcome statement is modified as quality, reliability, equity, and sustainability of urban assets and services in project towns of Rajasthan improved; and additional output was also added, resulting in four outputs.

(i) **Output 1: Resilient water supply systems developed or improved.** By 2028, the project will (i) At least 1,300 km of water supply pipelines will be commissioned through a district-metered area approach for effective non-revenue water (NRW) management, (ii) at least 79,000 households will be connected to an improved water supply system, including at least 95% below poverty line households, with 100% functional meters allowing for the introduction of volumetric billing, (iii) three new water treatment plants (WTPs) will be commissioned with a total capacity of at least 24 million liters per day (mld).

(ii) **Output 2: Resilient and inclusive sanitation systems developed or improved.** By 2028, (i) at least 500 km of sewers will be constructed; (ii) seven sewage treatment plants (STPs) with co-treatment of wastewater and fecal sludge and with a total capacity of at least 30 mld will be commissioned and one existing STP with 10 mld capacity will be upgraded to meet current effluent standards; and (iii) at least 54,000 new household connections (including at least 95% below poverty line households) to the sewer system will be installed.

(iii) **Output 3: Urban assets to enhance climate resilience and heritage living developed or improved.** By 2028, (i) at least 50 km of drainage networks will be constructed in five ULBs; (ii) at least five either kunds or baories rehabilitated and/or reconstructed in three ULBs that were heritage structures built for drainage, rainwater

harvesting, and reuse, but currently are not properly functioning; (iii) five water parks rehabilitated in one ULB to enhance water retention and storage capacity and/or to improve people's well-being, both residents and visitors; and (iv) at least four heritage structures are refurbished in five ULBs to improve the living environment and attract more tourists.

(iv) **Output 4: Institutional and human capacities strengthened for sustainable service delivery, gender equality, and improved public health.** The project will provide training to an additional 300 staff and 300 elected council members' of 10 project ULBs on urban infrastructure and services including water and sanitation, water conservation, financial sustainability, climate change impacts, gender equality, and social inclusion (GESI), and/or public health. It will continue supporting 10 ULBs with (i) a monitoring system on contractor performance and service levels, (ii) WSS O&M procedures, and (iii) data platforms with supervisory control and data acquisition and a geographic information system for efficient O&M and WSS asset management. The project will continue promoting gender equity by expanding the internship program for an additional 500 college-aged women and skills training to additional 100 women, including 50 women from scheduled caste, other backward castes, or scheduled tribes. Also, it will pilot an all-women O&M of two urban space/heritage structures/buildings.

3. **Implementation Arrangement.** The executing and implementing agencies will remain unchanged from the current project, which are GOR's Local Self Government Department (LSGD) acting through the Rajasthan Urban Drinking Water, Sewerage and Infrastructure Corporation (RUDSICO), respectively. The AF project retains the project management unit (PMU) at the implementing agency, as well as the two Zonal Offices in Jaipur and Jodhpur. Seven new project implementation units (PIUs) have been established. Together with existing PIU in Rantangarh, a total of eight PIUs will manage 18 ULBs under the AF Project. Consultants support will continue as in ongoing loan in activities such as contract management and supervision, project management, safeguards, capacity building consultant, community awareness and public participation,

4. **Project Components.** Similar to onging loan, RSTDSP-AF will improve the water and/or sewerage systems in the project towns. Besides, the AF project will also improve drainage network, rehabilitate old kunds or boaries (old/heritage tanks for water harvesting), rehabilitation of lakes/ponds in towns, and refurbishment of heritage structures. The main types of infrastructure components are shown in Table 1.

Table 1*:* Subprojects and Components Under Rajasthan Secondary Towns Development Sector Project

Subproject	**Components**	**Infrastructures** (New / Refurbishment)
Water Supply	Source augmentation	Intake wells in existing dam/reservoir
		Tube wells
		Sourcing clear water from existing water supply schemes of PHED
	Water treatment	Water treatment plant (WTP)
		Disinfection (chlorinator) units
	Water transmission	Raw water mains
		Clear water mains
		Pump houses

Subproject	Components	Infrastructures (New / Refurbishment)
	Storage	Raw and Clear water reservoirs (CWR)
	Distribution system	Overhead service reservoirs (OHSR)
		Ground level service reservoirs (GLSR)
		Distribution network
		House service connections
Sewerage	Sewage collection	Sewer property connection
		Sewerage network
	Sewage transmission	Sewage pumping stations
		Sewer mains
	Sewage treatment and disposal	Sewage treatment plant (STP)
		Outfall sewer
	Treated sewage reuse	Treated effluent storage reservoir (TESR)
		Treated effluent pumping station
		Treated effluent elevated reservoir (TEER)
FSSM	Septage collection and conveyance	Vehicle-mounted desludging tankers
	Septage treatment and discharge	Septage will be treated in sewage treatment plant or separate FSTP
Urban assets to enhance climate resilience and heritage living	Storm water drainage	Drainage network
		Pumping stations
		Outfall / disposal arrangements
	Kunds or boaries	Rehabilitation
	Lakes / Ponds beautification and amenities	Restoration of lakes/ponds
		Visitor amenities and beautification
	Heritage buildings / structures	Restoration of old buildings such as townhalls
		Installation of lights on heritage structures like city gates, temples and mosques
	Urban amenities	Improvement of parks & playgrounds

PHED = Public Health Engineering Department, FSSM = Fecal sludge and septage management

B. About this Updated Environmental Assessment and Review Framework

5. An environmental assessment and review framework (EARF) was developed for the ongoing RSTDSP in accordance with requirements per ADB SPS, Government of India and Government of Rajasthan's environmental laws and regulations and agreed between the ADB and the government. The EARF is updated to align with the scope of AF project and will be complied with in the AF project implementation.

6. **Purpose.** The EARF is a guiding document during implementation. The EARF will help project agencies ensure that all subprojects, in the entirety of their project cycle, will not deteriorate or interfere with the environmental sensitivity of a project area, but rather improve environmental quality. The EARF will guide each subproject's selection, screening and categorization, environmental assessment, preparation of environmental assessment reports, and implementation of environmental management plan (EMP). The EARF:

(i) includes environmental criteria to be used in selecting subprojects and/or components to be funded under RSTDSP;
(ii) specifies the environmental laws, rules and regulations, statutory clearances to be obtained and applicable environmental standards;
(iii) specifies the requirements in subproject screening and categorization, assessment, and planning;
(iv) explains the anticipated environmental impacts of the subprojects and

recommends mitigation and monitoring measures;

(v) specifies requirements for asbestos management and provides the outline asbestos management plan;

(vi) includes sample heritage impact assessment (HIA) as guide for subprojects with potential physical cultural resources (PCRs) and recommends mitigation measures to be considered in design of subproject components;

(vii) Includes results of integrated biodiversity assessment tool (IBAT) conducted to screen for likelihood of critical habitat areas, sample critical habitat assessment report to verify the IBAT result, and recommendations during implementation;

(viii) specifies requirements for meaningful consultation with affected person and other stakeholders, grievance redressal mechanism, and information disclosure;

(ix) indicates capacity development for project management and implementing units, ULB representatives, and other stakeholders;

(x) provides safeguards institutional arrangements, roles and responsibilities; and

(xi) specifies monitoring and reporting requirements including sample checklists and templates.

7. The EARF will be reviewed regularly and, if necessary, updated during implementation especially if unanticipated impacts arise or if there is any change in scope or change in legal and regulatory frameworks. None of the provisions of EARF will be relaxed or lowered in the subsequent revisions and updates.

C. Environmental Categorization of Rajasthan Secondary Towns Development Sector Project – Additional Financing

8. Similar to RSTDSP, the AF project is also classified as category B for environment per ADB SPS. Initial environmental examination (IEE) conducted for seven sample subprojects[1] During the AF project preparation indicate that RSTDSP-AF is unlikely to have any significant adverse environmental impacts that are irreversible, diverse, or unprecedented. The potential impacts are site-specific, are temporary in nature, and can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures. Subprojects projected to be categorized as A (potential impacts are significant, irreversible, diverse, unprecedented, or larger than the sites or facilities subject to physical works) will not be considered for implementation under the project. Assessment was conducted using tools such as ADB Rapid Environmental Assessment (REA) Checklist, , various technical discussions, and site visits. The IEEs concluded potential impacts are mainly due to land preparation, construction and operations and unlikely to affect areas larger than the sites or facilities subject to physical works.

9. While the IEEs are prepared based on preliminary designs for inclusion in bid and contract documents, the scope and sites are unlikely to be changed during detailed design and implementation. Thus, the potential impacts are expected to be of the same magnitude, duration and significance and will not affect the categorization. The IEEs will be updated during detailed design following this EARF and will be reviewed and disclosed prior to commencement of works.

[1] The sample subprojects are: ((i) Bharatpur sewerage (ii) Bharatpur City Beautification – restoration and development of heritage structures (iii) Jodhpur sewerage (iv) Jodhpur storm water drainage (v) Bundi Water supply and sewerage (vi) Sagwara Water supply and sewerage (vii) Sagawara City Beautification – conservation and development of lakes.

10. It is likely that future subprojects will replicate the sample subprojects and are thus expected to be category B. Subprojects projected to be categorized as A (potential impacts are significant, irreversible, diverse, unprecedented, or larger than the sites or facilities subject to physical works) will not be considered for implementation under the project.

D. Subproject Selection Guidelines

11. **Exclusion Criteria.** Similar to RSTDSP, the AF project will not include and/or involve any activities listed in ADB's Prohibited Investment Activities List.[2] The following criteria (Table 2) will be used to exclude subprojects which may cause impacts that are significant, irreversible, diverse, unprecedented, or larger than the sites or facilities subject to physical works. Subprojects that would directly affect environmentally sensitive areas and highly valued PCRs shall be strictly avoided or the subproject component(s) causing potential impacts will be relocated or assessed for suitable alternatives to lessen the potential impacts.

Table 2: Exclusion Criteria for Subproject Selection

S. No	Projects / Components to be Excluded from RSTDSP-AF
I	**Type of water supply projects excluded from RSTDSP-AF**
A	New water source development – Dams or reservoirs
II	**Projects that are located in the following environmentally sensitive areas excluded from RSTDSP-AF**
A	All new projects/components located within: • Wildlife sanctuaries • National parks • Tiger reserves • Elephant reserves • Core Zone of Biosphere reserves
B	Rehabilitation works of existing projects/facilities located in the environmentally sensitive areas (wildlife sanctuaries, national parks, tiger reserves, elephant reserves etc.), shall be excluded if the following criteria is not met: • Proposed rehabilitation works will be confined to the existing footprint, and within the right of way of existing infrastructure • Proposed rehabilitation works will not require any new clearance/permissions. A written confirmation to that effect from the local office of the respective protected area regulatory agency shall be obtained.
C	Any project sites / works in ancient monuments or archaeological sites notified as of national importance (protected monuments / places) under the Ancient Monuments and Archaeological Sites and Remains Act, 1958
D	Following lakes/wetlands shall be excluded from the project: (i) Wetlands notified under the Wetlands (Conservation and Management) Rules), 2017) (ii) Ramsar wetland, and (iii) Lakes in critical habitats
III	**Projects with significant adverse impacts**
A	Projects likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented, and may affect an area larger than the sites or facilities subject to physical works (i.e. category A projects as per ADB SPS 2009) will be excluded from RSTDSP-AF

12. **Environmental Guidelines for Subproject Selection.** In addition to the exclusion criteria, further guidance to avoid or minimize potential adverse environmental impacts will be followed for all subproject selection under the sector loan as shown in Table 3.

[2] ADB SPS Appendix 5.

Table 3: Environmental Guidelines for Subproject Selection

Components	Criteria	Design Considerations (if criterion is not met)
All subprojects		
	Subproject will avoid potentially significant adverse impacts that are diverse, irreversible or unprecedented (ADB SPS category A for environment).	
	Comply with all requirements of ADB SPS 2009 and follow procedures set in this EARF.	
	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	
	Reflect inputs from public consultations	Refer to ADB SPS requirements on meaningful consultations[3]
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 alignment to avoid resettlement impacts	If cannot be avoided, prepare Resettlement Plan.
	Avoid or minimize the cutting of trees	If tree is to be cut, consider plantations in the ratio of at least 1:3
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 criterion 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).
	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	

[3] Per 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)
	the direct involvement and approval of national and local bodies responsible for the subproject site.	
Physical Cultural Resources	Should not result in the destruction/damage of or encroachment onto physical cultural resources (PCR)[4] such as archaeological monuments; heritage sites and movable or immovable objects, sites, structures, group of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic or other cultural significance.	If town has potential PCR, conduct Heritage Impact Assessment (HIA). Appendix 3A provides a sample HIA prepared for a sample subproject (Khetri water and sewerage subproject under RSTDSP). For legally protected PCRs: (i) if location is within 300 m of notified PCRs such as protected monuments/sites and there is no alternative, permissions from the ASI or State Department of Archaeology shall to be obtained prior to finalization of detailed engineering design.
Existing Facilities to be rehabilitated or expanded	Conduct environmental audit of existing facilities[5] per ADB SPS	For non-compliances identified in the environmental audit, provide corrective action for each area of concern including cost and schedule to be included in the subproject EMP.
Associated Facilities[6]	Analyze environmental impacts and risks to be included in the IEE	
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 5 provides asbestos management plan. RUDSICO shall include AMP in all contracts.	If ACM is suspected, asbestos verification by Asbestos Management Expert is required. Prepare site-specific asbestos management plan (AMP) prepared. Appendix 5 provides a sample AMP prepared for a sample subproject (Sardarshahar water and sewerage subproject).
	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	

[4] 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.”

[5] ADB SPS Appendix 4 para 12 on Existing Facilities.

[6] 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)
	then be designed to avoid excavating or disturbing any ACM.	
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.	If criterion is not met, prepare Resettlement Plan according to Resettlement Framework
	Ensure that pipelines ROW do not require land acquisition from individual farmers that is a significant proportion of their total land holding (>10%).	If criterion is not met, prepare Resettlement Plan according to Resettlement Framework
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 concurrence from PHED should be provided in the subproject's IEE. For new wells, submit groundwater sustainability report and obtain permission from the Central Groundwater Board or the State Groundwater Board.
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.	
	Avoid using water sources that may be polluted by upstream users	Baseline raw water quality to be included in the IEE.
	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.
Location	As for as possible locate all new facilities – Water Treatment Plants (WTP), Tube Wells (TW), etc. away 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.	
	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 of damage to the WTP or the surrounding area	
Design	Ensure that the water supply system improvements are combined with improvements in sewerage to deal with the increased discharge of domestic wastewater.	
Sewage System		
Location	Previous projects considered 500 m as distance consideration from nearest habitation. This has been reduced to 100 m considering facilities will be located in developed areas and technology to be used. RSTDSP considered using Sequencing Batch Reactor (SBR) technology in STPs, which is proven to cause	In case of non-availability of suitable sites due to land and technical design constraints in already developed areas, where 100 m buffer is not available, following procedures shall be adopted and documented in

Components	Criteria	Design Considerations (if criterion is not met)
	minimal odor as compared to other treatment technologies such as Waste Stabilization Pond or Activated Sludge Process. As far as possible, new Sewage Treatment Plants (STP) should be preferably 100m away from any inhabited areas, in locations where no urban expansion is expected in the next 20 years, thus establishing a buffer to reduce effects of odor, visual appearance or other nuisance of the site (this may be reviewed depending on the technology adopted for the treatment of effluent).	order to finalize sites for implementation of project: (i) conduct alternate site analysis, justify the selected site; (ii) develop odor mitigation measures to prevent and control odor/air emissions – design measures, and operational practices that are feasible and practical in local conditions and include in IEE; (iii) develop layout plan with maximum buffer to nearby houses; (iv) provide a peripheral green buffer (at least three rows of trees within the STP compound); and (v) public information – consult local community, inform about the need, process adopted to select sites, its suitability, and measures adopted for odor prevention and control
	As far as possible Sewage Pumping Stations (SPS) and wet wells should be located preferably 50m from any inhabited areas and from sites such as hospitals, schools, temples, etc. to minimize nuisance impacts from odor, rodents, etc.	In case of non-availability of suitable sites due to land and technical design constraints in already developed areas, where 50 m buffer is not available, following procedures shall be adopted and documented in order to finalize sites for implementation of project: (i) conduct alternate site analysis, justify the selected site; (ii) develop odor mitigation measures to prevent and control odor/air emissions – design measures, and operational practices that are feasible and practical in local conditions and include in IEE; (iii) develop layout plan with maximum buffer to nearby houses; (iv) provide a peripheral green buffer (at least three rows of trees within the pumping station compound); and (v) public information – consult local community, inform about the need, process adopted to select sites, its suitability, and measures adopted for odor prevention and control
	Locate STP at sites where there is no risk of flooding or other hazards that might impair	

Components	Criteria	Design Considerations (if criterion is not met)
	function of the STP or present a risk of damage to the STP or the surrounding area	
Quality	Ensure that sewage is treated at all times to national wastewater discharge standards and confirm this by regular monitoring of effluent from the STP.	
Treated water	Ensure that no wastewater is discharged into a water course in which it could be a hazard to downstream users (e.g., a waterway that is used as a source of water for domestic or municipal supply)	Reuse of treated effluent and sludge for beneficial uses will be encouraged in the project. During final design options and method of reuse will be developed and updated in IEE.
Sludge	Include measures to ensure the safe disposal of sewage sludge and if possible, to promote its safe and beneficial use as an agricultural fertilizer	
Right-of-way for sewer network	Locate sewage pipelines within the right of way (ROW) of other linear structures (e.g., roads) wherever feasible, to reduce new land acquisition.	If criterion is not met, prepare Resettlement Plan according to Resettlement Framework
	Ensure that routes of sewage mains do not require land acquisition from individual farmers that is a significant proportion of their total land holding (10%)	If criterion is not met, prepare Resettlement Plan according to Resettlement Framework
Storm Water Drainage		
	Locate storm water outfalls and discharge arrangements where there is adequate capacity in receiving water body to accommodate design flood discharge to prevent overflow or flooding	
	Ensure that drains cater only to stormwater as per the design, and prevent wastewater discharge into drains from the houses, commercial and industrial establishments etc.,	Ensure that no sewage outlets are connected Do not allow direct connection to drain from sanitation facilities and/or wastewater with high organic load Ensure that no untreated / partially treated wastewater or industrial effluent is illegally discharged into drains by close coordination with Department of Environment Strictly follow the effluent discharge standard of DOE and consider introduction of small-scale treatment of polluted drain water before disposal (if needed)
Heritage and lake conservation works (heritage buildings, and water conservation structures such as Kunds or Boaries)		
	Restoration, conservation, repair or any other works involving protected monuments under the Ancient Monuments and Archaeological Sites and Remains Act, 1958 shall not be included the project.	

Components	Criteria	Design Considerations (if criterion is not met)
	For subprojects involving restoration and/or conservation works of heritage buildings of local importance: (i) Subproject is consistent with Heritage Conservation and Development Plan of particular monument/place or of the town, if any (ii) Ensure that the proposed interventions are unobtrusive and will form integral part of the ambience of the site; design, material and scale are compatible to the local architectural, physical, cultural and landscaping elements, with optimum minimalist design; prioritize the local materials for works (iii) Conduct HIA and include recommendations in design and implementation; HIA should be conducted by competent experts (e.g., conservation architects); (iv) Ensure wider consultation with community, public representatives, organizations engaged in conservation activities, including archaeological department	For heritage sites notified / protected under Rajasthan Monuments, Archaeological Sites and Antiquities Act, 1961 and/or Rajasthan Monuments, Archaeological Sites and Antiquities (amendment) Act 2007, obtain prior approval of Department of Archeology and Museums prior to commencement of works. PMU and PIU shall consult with the department from the feasibility / preliminary design stage to integrate their recommendations. Appendix 3B provides a HIA prepared for a sample subproject (Bharatpur beautification subproject under RSTDSP-AF)
	Lake conservation / beautification, projects shall exclude protected lakes, ponds, water bodies (notified under the Wetlands (Conservation and Management) Rules), 2017) shall not be included in the project Exclude lakes in critical habitats	Conduct biodiversity assessment, and ensure that it is not a critical habitat

13. **Asbestos-containing Materials (ACMs).** Based on (i) field visits in project towns[7] and (ii) preliminary design and available records during project preparation (see Appendix 5 – Observed ACM in RSTDSP Project Towns) indicate presence of asbestos materials in project sites. These include but not limited to existing asbestos cement pipes, roofing, insulation among others. International guidelines and national policies provide framework on the identification, management, handling and disposal of ACM in-situ or stored in existing RSTDSP and RSDSP-AF sites. These include the following:

(i) ADB's Good Practice Guidance for the Management and Control of Asbestos (Mar 2022) [8]
(ii) International Finance Corporation's Guidance Notes: Performance Standards on Environmental and Social Sustainability [Jan 2012];
(iii) World Bank Group's Good Practice Note: Asbestos: Occupational and Community Health Issues [May 2009];

[7] Project towns with observed ACMs are Abu Road, Khetri, Kuchaman, Sardarshahar, Banswara, Sirohi, Laxmangarh Mandawa (ongoing project), Nokha, Bundi, Nathdwara, Sagwara and Dungarpur (additional financing project).
[8] https://www.adb.org/sites/default/files/publication/783636/good-practice-management-control-asbestos.pdf

(iv) IS 11451: Safety and Health Requirements related to Occupational Exposure to Asbestos contaminated products;
(v) IS 11768: 1986/2005: Recommendations for disposal of asbestos waste material
(vi) IS 12081: Pictorial Warning to be implemented on equipment containing Asbestos Contaminated Products; and
(vii) IS 11450: Sampling of asbestos fiber has to be done regularly using personal sampler and determined using phase contrast microscope.

14. The EARF includes an outline asbestos management plan (see Appendix 5) specifying the requirements in identification, verification, removal, storage, and disposal/treatment. The IEEs and contract documents include specific provisions applicable to the contractors and subcontractors such as:

(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 Guidelines[9] 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;[10]
(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; and
(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.

[9] 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.

[10] 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 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.

15. 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.

16. **Natural,**[11] **Modified**[12] **or Critical Habitat.**[13] ADB SPS 2009 does not allow implementing subproject activities in areas of critical habitats or in areas that would lead to significant conversion and degradation of natural / modified habitats.[14] A precautionary approach shall be applied to management and use of renewable natural resources. Global database such as the IBAT has been used to conduct preliminary assessment on the site locations in reference to critical habitats, key biodiversity and key protected areas alongside the IUCN red list of species affected – critically endangered, endangered, endemic or restricted-range. The EARF included results of screening of all project towns for likelihood of critical habitat areas within or adjacent to project sites (see Appendix 1). A sample biodiversity assessment report is also included in the EARF as in (see Appendix 2)- Abu Road Biodiversity Assessment Report and IEE of Abu Road water supply and sewerage subproject show the project sites will not be within or adjacent to critical habitat areas. The biodiversity assessment report recommends specific actions related to species of interest and mitigation measures to be implemented by the contractor. During detailed design, the findings of the biodiversity assessment report will be further verified at field level. PMU will engage a Biodiversity Expert to verify on-site, consult with locals for actual sightings and/or historical records, recommend specific measures, and provide supervisory support during construction period.

17. **Physical Cultural Resources.** ADB SPS defines PCRs 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.

18. PMU will ensure subproject designs and implementation will avoid damage to PCRs within or adjacent to project sites. For subproject towns with potential PCRs, a HIA is to be conducted as part of the IEE. The HIA will document all PCRs, assess the potential impacts and recommends measures to avoid any negative impact. If an impact is unavoidable, mitigation measures and/or compensatory measures are to be implemented as part of the EMP. No works will be allowed until the HIA is completed. The HIA will also include the protocol and coordination arrangement

[11]Natural Habitat is land and water areas where the biological communities are formed largely by native plant and animal species, and where human activity has not essentially modified the area's primary ecological functions.

[12]Modified habitat is where natural habitat has apparently been altered, often through introduction of alien species of plants and/or animals;

[13] Critical habitat is a subset of both natural and modified habitat that deserves particular attention. Critical habitat includes areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or that are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic, or cultural importance to local communities. Critical habitats include those areas either legally protected or officially proposed for protection, such as areas that meet the criteria of the World Conservation Union classification, the Ramsar List of Wetlands of International Importance, and the United Nations Educational, Scientific, and Cultural Organization's world natural heritage sites.

[14]Significant conversion or degradation is (i) the elimination or severe diminution of the integrity of a habitat caused by a major, long-term change in land or water use; or (ii) the modification of a habitat that substantially reduces the habitat's ability to maintain viable populations of its native species. Significant conversion may include, for example, land clearing; replacement of natural vegetation (for example, by crops or tree plantations); permanent flooding (by a reservoir for instance); drainage, dredging, filling, or canalization of wetlands; or surface mining;

with the regulatory agency (Archaeology and Museum Department of Rajasthan) in case of chance find during execution of works.

19. The EARF and IEE of Khetri water supply and sewerage subproject includes an HIA (see Appendix 3) as a guide for developing subproject specific HIAs. The concepts and designs of structures will incorporate heritage, historical and cultural qualities to the extent possible to ensure new structures/facilities are harmonized with existing environment. PMU will also engage a Heritage Management Specialist to update the Khetri HIA based on detailed design, conduct HIAs of remaining heritage town (Mandawa), provide technical support in obtaining statutory clearances, advise the PMU and PIUs on matters related to PCRs, provide training and awareness and coordinate with the various stakeholders, review and approve the detailed architectural drawings prepared by the contractor, assist team leader and structural expert in review and approval of all drawings from architectural and heritage perspective, promptly address any site-specific issues regarding architectural and heritage aspects, and provide supervisory support in works within or adjacent to PCRs.

20. **Site preparation.** Project sites (such as in Ratangarh) are found to have solid wastes placed within and adjacent to the vicinity. PMU shall ensure that the construction and other work areas (e.g., temporary facilities) are cleared of solid waste and other nuisance materials prior to commencement of works. The PMU shall coordinate with the ULBs to implement and document a solid waste management plan (with details on the proper dumpsite or materials recovery facility). No works shall commence at project sites until the land is properly cleared of solid waste.

II. ASSESSMENT OF LEGAL FRAMEWORK AND INSTITUTIONAL CAPACITY

A. Country Environmental Safeguard Policies

21. Implementation of RSTDSP will be governed by applicable Government of India environmental acts, rules, policies, and regulations as shown in Table 4. Appendix 6 provides the government environmental standards for air, surface water, groundwater, emissions, noise, vehicular exhaust and disposal to land/agricultural use of sludge and bio-solids.

Table 4: Applicable Government of India Environmental Legislations and Specific Requirements for RSTDSP and RSTDSP-AF

Law	Description	Requirement
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”.
Rajasthan State Environment	Follows the National Environment Policy, 2006 and core objectives and policies are: -Conserve and enhance	Project implementation should adhere to the policy aims of: conservation and enhancement of environmental

Law	Description	Requirement
Policy, 2010 including And Rajasthan Environment Mission and Climate Change Agenda for Rajasthan (2010-14)	environmental resources; assure environmental sustainability of key economic sectors; and improve environmental governance and capacity building - it recommends specific strategies and actions to address the key environmental issues: water resources, desertification and land degradation, forest and biodiversity, air quality, climate change: adoption and mitigation, mining, industry, tourism, energy, urban development, etc. - Establishment of Environment Mission under the chairpersonship of the Chief Minister and a Steering Committee under the chairpersonship of Chief Secretary, Government of Rajasthan Tasks force set up for six key areas	resources, integration of environmental concerns into projects/plans, and capacity building in environmental management. Under water sector, major concerns, as the policy notes, are huge water losses and wastage, declining water availability, pollution. Relevant recommendations for the project include control of losses, integrated water resources management, control of raw water pollution[15], 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.
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. Category A projects require EC from the MOEF&CC. Category B projects require Environmental Clearance from the SEIAA.	None of the components of this subproject falls under the ambit of the notification
Central Ground Water Authority Public Notice 2/100	Public Notice specifies districts and areas where there are restrictions on the construction and installation of any new structure for extraction of groundwater resources without specific approval from the CGWA	Subprojects proposed in the CGWA Notified Areas and will require new structures on extracting groundwater should secure the permission from the Central Groundwater Authority
Public Health Engineering Department Office	PHED Office Order instructs that permits for any new tube wells, bore wells or any structures extracting	Subprojects with components that include any new tube wells, new bore wells or structures extracting

[15] Raw water quality, reuse and recycling is under responsibility of other government departments such as Water Resource Department (WRD) and public health engineering department (PHED).

Law	Description	Requirement
Order P5 (1) PHE-2010 (part 1) dated July 14 2011	ground water shall be secured from the competent authority	groundwater shall secure permit from the competent authority
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 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 RSPCB before starting implementation and Consent to Operate (CTO) before commissioning.	Construction of new and expansion/ rehabilitation of existing STPs and WTPs requires CTE before start of construction works and CTO before start of operation. All relevant forms, prescribed fees and procedures to obtain the CTE and CTO can be found in the RSPCB website. (http://environment.rajasthan.gov.in)
Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.	This Act was enacted to achieve prevention, control and abatement of air pollution activities by assigning regulatory powers to Central and State Boards for all such functions. The Act also establishes ambient air Quality standards The projects having potential to emit air pollutants into the atmosphere have to obtain CTE and CTO under Section 21 of the Act from RSPCB The occupier of the project/facility has the responsibility to adopt necessary air pollution control measures for abating air pollution.	The 16 specialized will require CTE and CTO from RSPCB: (i) diesel generators (more than 15 KVA); (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 RSPCB website (http://environment.rajasthan.gov.in) CTE and CTO will be required for batching plant, hot mix plant, crushers etc. if specifically established for this project. If contractor is purchasing ready mix concrete, asphalt/macadam and aggregates from third party, he has to be assured that third party is having CTE/CTO from RSPCB and should collect the copy of these and submit to PIU/consultants. Pollution Under Control (PUC) certificates should be available for all

Law	Description	Requirement
		the vehicles and construction equipment DG sets more than 15KVA should have authorization from RSPCB during construction or operation
Environment (Protection) Act, 1986 and CPCB Environmental Standards. For National Ambient Air Quality Standards 2009 (NAAQS)	Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards	Appendix 6 provides government environmental standards for air quality
Noise Pollution (Regulation and Control) Rules, 2000 amended up to 2010.	Rule 3 of the Act specifies ambient air quality standards in respect of noise for different areas/zones.	Appendix 6provides government environmental standards for noise levels.
Notification by the National Green Tribunal (NGT) Order dated 30 April 2019	NGT order dated 30thApril 2019 directs that all STPs should meet effluent discharge standards including but not limited to achieving BOD not to exceed 10mg/l, TSS not to exceed 10 mg/l and Fecal Coliforms desirable 100 MPN/100ml and permissible 230MPN/100ml.	Appendix 7 provides the NGT order dated 30 April 2019 All STPs are designed to meet the proposed standards.
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 300 meters (m) as regulated zones. 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).	Any works within 300 m of ASI sites will require prior clearance from ASI.
The Rajasthan Monuments, Archaeological Sites and Antiquities Act, 1961; the Rajasthan Monuments, Archaeological Sites and Antiquities (amendment) Act 2007	Any construction/excavation work in the ‘protected area’ (as declared by GoR under the Act) requires prior permission of Department of Archeology & Museums -Application under the Rules shall be submitted to Director, State Archeological Department, at least 3 months prior to the work. Department provides conditional permission, including time for completion, procedures to be followed during the work and for chance finds etc.	Any works within the notified area requires prior clearance from Department of Archeology & Museums

Law	Description	Requirement
State Sewerage and Wastewater Policy, Department of Local Self Government, Govt. of Rajasthan	Also, Rajasthan State Sewerage and Wastewater Policy-2016 states that: treated wastewater effluent is considered a water resource and is added to the water stock for reuse. priority shall be given to agricultural reuse of treated effluent for unrestricted irrigation. Treated effluent shall be priced and sold to end users at a price covering at least the operation and maintenance costs of delivery.	All efforts shall be taken for reuse of treated effluent, although responsibility lies on municipal body, RUDSICO will provide technical assistance and guidance to municipal body for reuse of treated effluent. (concerned pages of this policy are attached as Appendix 8)
Labor Laws	The contractor shall not make employment decisions based upon personal characteristics unrelated to job requirements. The contractor shall base the employment relationship upon equal opportunity and fair treatment and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment or retirement, and discipline. The contractor shall provide equal wages and benefits to men and women for work of equal value or type.	Applicable labor laws including amendments issued from time to time are applicable to all subprojects.
Wildlife Protection Act, 1972, amendment 1991	This overarching Act provides protection to wild animals, birds, plants and matters connected with habitat protection, processes to declare protected areas, regulation of wildlife trade, constitution of state and national board for wildlife, zoo authority, tiger conservation authority, penalty clauses and other important regulations.	Table 2 Exclusion Criteria states no new components are allowed in wildlife sanctuaries, national parks, tiger reserves, elephant reserves and core zone of biosphere reserves and rehabilitation of existing facilities are confined to the existing footprint. In Rajasthan State, there are four national parks (NP), 25 wildlife sanctuaries (WLS) and one community reserve.
Forest (Conservation) Act, 1980	The Forest (Conservation) Act prohibits the use of forest land for non-forest purposes without the approval of MOEF&CC.	Locating subproject facilities in forest lands will be avoided. However, in unavoidable cases like non-availability of suitable non-forest lands, and water supply rising mains/trunks mains traversing forest lands, the forest land conversion will follow the “Guidelines for Diversion of Forest Lands for Non-Forest Purpose” under Forest (Conservation) Act, 1980.

Law	Description	Requirement
Rajasthan Forest Act, 1953	This Act makes the basis for declaration of Reserved Forests, constitution of village forest committees, management of reserved forests and penalties and procedures.	Locating subproject facilities in forest lands will be avoided. However, in unavoidable cases like non-availability suitable non-forest lands, and water supply rising mains/trunks mains traversing forest lands, the forest land conversion will follow the “Guidelines for Diversion of Forest Lands for Non-Forest Purpose” under Forest (Conservation) Act, 1980. Cutting of trees in non-forest land, irrespective of land ownership, also requires prior permission from local administration.
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 No waste generator shall throw, burn or burry the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.	PMU and PIUs to ensure contractors follow requirements of the rules.
Construction and Demolition Waste Management Rules 2016	(i) Every waste generator shall segregate construction and demolition waste and deposit at collection Centre or handover it to the authorized processing facilities (ii) Shall ensure that there is no littering or deposition so as to prevent obstruction to the traffic or the public or drains. (iii) 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	PMU and PIUs to ensure contractors follow requirements of the rules.

Law	Description	Requirement
	authority before starting construction or demolition or remodeling work, (iv) 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. (v) Large generators shall segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar, (vi) Large generators shall pay relevant charges for collection, transportation, processing and disposal as notified by the concerned authorities;	
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 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 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 workplace and approach	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, 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&S 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 equipments Chapter XVI- concrete works Chapter XVII- demolition works Chapter XVIII- Excavation and tunneling

Law	Description	Requirement
	• 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 equipments • 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 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	Chapter XX- ladders and step ladders Chapter XXII- structural frame and formworks Chapter XXIV- medical facilities and first aid box
Hazardous Waste 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; façade recovery, 21 specialized 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 21 specialize actual user or shall be disposed of in an 21 specialize disposal facility. (4) The hazardous and other wastes shall be transported from an occupier's establishment to an 21 specialize actual user or to an	PMU and PIUs to ensure contractors follow requirements of the rules.

Law	Description	Requirement
	22 specialize 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 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.	
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 designated wetland area Wetlands/lakes notified under the Rules will not be included under the lake conservation / beautification component of additional financing project.
IS 11450 has to be done regularly using personal sampler and determined using phase contrast microscope.	Protocols on analysis and sampling of asbestos fiber.	Compliance to the details of sampling and analysis of asbestos samples.
IS 11451: Safety and Health Requirements related to Occupational Exposure to Asbestos contaminated Products.	These 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/day and 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 workplace shall be enforced.
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 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

Law	Description	Requirement
		nearest Total Sanitary Disposal Facilities (TSDF). The collection of ACM powder 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.
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 precautionary measures and make them aware of all the possible risk.	The following signs and personal protective equipment shall be used in handling ACM.  

22. Clearances to be obtained prior to start of construction. PMU will ensure all necessary regulatory clearances and approvals are obtained prior to commencement of works. Respective PIUs, with support of project consultants and 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. Table 5 shows the list of clearances or 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 5: Clearances and Permissions Required

Sr. No	Construction Activity	Clearance Required	Implementation	Supervision
1	Land for Project Activity	Allotment and Approval for specific land use in pre-construction stage	ULB	RUDSICO (PMU)
2	Construction of new and rehabilitation of WTP and STP	CTE and CTO under Water Act, 1974 from RSPCB	PIU and Contractor	PMU
3	Tree Cutting	State forest department or Revenue department	PIU	PMU
4	Hot mix plants, crushers, batching plants and DG sets (>15KVA)	CTE and CTO under Air Act, 1981 from RSPCB	Contractor	PIU/PMU
5	Storage, handling and transport of hazardous materials	Hazardous Wastes (Management and Handling) Rules. 2016 Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989 from RSPCB	Contractor	PIU/PMU
6	Sand mining, quarries and borrow areas	Permission from District Collector/ State Department of Mines & Geology	Contractor	PIU/PMU
7	New quarries and borrow areas	Environmental clearance under EIA Notification 2006 from MOEF&CC, GOI or SEIAA, GOR	Contractor	PIU/PMU
8	Temporary traffic diversion during construction	Temporary traffic diversion measures including use of alternate roads from District Traffic Police	Contractor	PIU/PMU
9	Establishment of construction camps	Approval for Land Use from ULB	Contractor	PIU/PMU
10	Storage, handling and transport of hazardous materials	Approval for all stages of Hazardous Materials Use and Disposal from RSPCB	Contractor	PIU/PMU
11	Construction waste and demolition debris disposal	Approval for use of land for disposal of construction waste and demolition debris from ULB	Contractor	PIU/PMU
12	Overall construction activity	Labour License from Labour Commissioner, GoR	Contractor	PIU/PMU
13	Use of vehicles and equipment	Pollution Under Control (PUC) Certificate from Transport Department of Rajasthan	Contractor	PIU/PMU
14	Providing water supply and sewerage connections to individual houses	Approval for entering private property from ULB	Contractor	PIU/PMU
15.	Pipe laying and other construction works (heritage/beautification)	ASI Clearance – Prior approval for works within 300m of ASI sites	PIU	PMU
16.	Pipe laying and other construction works (heritage/beautification)	Rajasthan Department of Archeology and Museums Clearance – Prior approval for works within state-protected sites	PIU	PMU
17	Use of Railways Right of Way for construction area/crossing	Approval for use of Railway right-of-way (ROW)	PIU	PMU

Sr. No	Construction Activity	Clearance Required	Implementation	Supervision
18	Use of construction area/ crossing in National Highway land	Approval for use of National Highway Authority of India Right of Way	PIU	PMU
19	Use of construction area/ crossing in State Highway land	Approval for use of Public Works Department Right of Way	PIU	PMU
20	Construction of new tube wells or any new extraction of ground water	Permission from the Central Groundwater Board per Public Notice for restricted areas and/or the competent authority per PHED Office Order P5 (1) PHE-2010 dated 14 July 2011 for the state of Rajasthan	PIU	PMU

23. 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.

B. International Environmental Agreements and Applicability to RSTDSP and RSTDSP-AF

24. India is a party to various international agreements and conventions related to environment, which include the following:

Table 6: International conventions and treaties and Applicability to RSTDSP

International Agreement	Description	Applicability to RUDSICO and Specific Requirements
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.	Not applicable as no Ramsar sites in any of the project towns If in future any of the activities are undertaken in the proximity of Ramsar wetlands shall follow the guidelines of the convention (The Ramsar Convention Handbooks for the wise use of wetlands, 4th ed. (2010), (http://www.ramsar.org/cda/en/ramsar-pubs-handbooks/main/ramsar/1-30-33_4000_0)
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	Recommendations of critical habitat to be considered if listed species are found on-site.

International Agreement	Description	Applicability to RUDSICO and Specific Requirements
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 Hydrochlorofluorocarbons (HCFCs)	Not applicable in this project as no ODS are involved in construction works
Basel Convention on Trans-boundary Movement of Hazardous Wastes, and their Disposal,1989	India is a signatory of this convention which aims to reduce trans-boundary movement and creation of hazardous wastes	Sludge/rejects generated from tertiary treatment process likely to have heavy metals and may fall in hazardous waste category. The sludge/rejects will disposed within the country, and therefore will not attract this convention Contractor to follow the provisions of Hazardous Waste Rules 2016 for storage, handling, transport and disposal of hazardous waste emerged during construction works
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 Façade 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 26 specialized global or regional agreements.	Not applicable to this project as no migratory species of wild animals are reported in the project areas.

C. ADB Safeguard Policy Statement's Environmental Requirements

25. **ADB SPS** requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all ADB investments.

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

27. **Environmental Audit of Existing Facilities.** For subprojects involving facilities that already exist or are under construction or proposed, environmental compliance audit will be conducted. The environmental audit will include on-site assessment to identify past or present environmental concerns, whether actions were in accordance with ADB's safeguard principles and requirements for executing and implementing agencies and identify and plan appropriate measures to address outstanding compliance issues. A corrective action plan in the IEEs will be agreed on by ADB and PMU. The plan will define the necessary remedial actions, the budget for such actions, and the timeframe for resolution of non-compliance. The environmental audit report (including the corrective action plan, if any) will be made available to the public in accordance with the information disclosure requirements of ADB SPS. If a subproject involves an upgrade or expansion of existing facilities that has potential impacts on the environment, the requirements for environmental assessments and planning specified in the EARF will apply in addition to compliance audit.

28. **Physical Cultural Resources.** ADB SPS environmental safeguard policy principles require conservation of physical cultural resources and avoid destroying or damaging them by using field-based surveys employing qualified and experienced experts during environmental assessment. It also emphasizes the use of chance find procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.

29. **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. A copy of the EMP or approved site EMP (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.

30. **Public Disclosure.** ADB will post the safeguard documents on its website as well as disclose relevant information in accessible manner in local communities:

(i) for environmental category A projects, 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 implementing agency during project implementation upon receipt.

31. **Consultation and Participation.** Meaningful consultation shall be carried out 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.

32. **Grievance Redress Mechanism.** RUDSICO shall establish a mechanism to receive and facilitate resolution of affected people's concerns, complaints and grievances about the subproject's environmental performance. The grievance mechanism shall be scaled to the risks and adverse impacts of the subproject.

33. **Occupational Health and Safety.** ADB requires that the borrowers ensure that the workers are provided with a safe and healthy environmental, considering risks inherent to the sector and specific classes of hazards in the subproject areas including physical, chemical, biological and radiological hazards.

34. **Unanticipated Environmental Impacts.** Where unanticipated environmental impacts become apparent during the implementation, RUDSICO shall update the EMP to assess the potential impacts, evaluate the alternatives and outline mitigation measures and resources to address those impacts.

35. **ADB SPS International Best Practice Requirements.** Following requirements of ADB SPS, PMU and PIUs shall apply pollution prevention and control technologies and practices consistent with international good practice. When the Government of India regulations differ from these levels and measures, PMU shall achieve whichever is more stringent. Appendix 6 provides applicable standards. If less stringent levels or measures are appropriate in view of specific subproject circumstances, PMU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

D. Compatibility between Country's and ADB Safeguard Policy

36. While the ADB SPS is in line with the multilateral development financing institutions, Government's policies are also comparable to international environmental framework including

that of ADB. Table 7 provides the comparison per ADB SPS policy principles, gaps and measures to be implemented by the project to address the gaps.

Table 7: Comparative Analysis of Government and ADB Safeguard Requirements

ADB SPS Requirement	ADB SPS Policy Principle	Government of India Regulation	Gap	Measures to Address Gap
Commensurate environmental screening of impacts and risks	1. Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.	The Environment (Protection) Act, 1986; National Environmental Policy 2006 The Environment Impact Assessment (EIA) Notification, 1994 and amended. National Environmental (Ambient Air, Water Quality and Noise) Standards, CPCB	EIA notification is applicable only to the projects listed in EIA Notification, and components of water supply, sewerage, and heritage / lake conservation / beautification projects are exempted for EIA act.	Implement the ADB SPS requirements and tools on screening and categorization, identification of risks and mitigation measures Requirements of the National Environmental Standards are compared with international standards and adapt the more stringent requirements.
Asses potential impacts and risks to physical, biological, socio-economic and physical cultural resources of the project affected area	2. Conduct an environmental assessment for each proposed project to identify potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential transboundary and global impacts,	The Environment Impact Assessment (EIA) Notification, 1994 and amended TOR released by the State Environment Appraisal Committee (SEAC), MoEF National Environment Policy, 2006.	EIA notification is applicable only to the projects listed in EIA act, and components of water supply and sewerage subprojects are exempted. Government of India policy at national level, and is a general guidance document.	Subproject selection criteria and environmental assessment process and categorization be in implemented with alignment with the NEP, the most relevant policy principle for this subproject is the principle of "enhancing and conservation of environmental resources and abatement of pollution".

ADB SPS Requirement	ADB SPS Policy Principle	Government of India Regulation	Gap	Measures to Address Gap
	including climate change. Use strategic environmental assessment where appropriate.			
Examine alternatives for project's location, design, technology and potential environmental impacts	Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative.	The Environment Impact Assessment (EIA) Notification, 1994 and amended In accordance with the comments of State Level Environment Impact Assessment Authority (SEIAA) as per EIA notification	EIA notification is applicable only to the projects listed in EIA act, and components of water supply and sewerage subprojects are exempted.	Adapt the ADB SPS requirements on analysis of alternatives and adapt into the subproject IEEs
Preparation of Environmental Management Plan	4. Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an environmental management plan (EMP) that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures,	National Environmental Policy 2006; The Building and Other Construction Workers (BOCW) Act 1996 and Rajasthan Building and Construction Workers Rules 2009	Government of India policy at national level, and is a general guidance document	In line with the general guidance, conduct the preparation of the environmental management plan using ADB tools (e.g., REA checklist). 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.

ADB SPS Requirement	ADB SPS Policy Principle	Government of India Regulation	Gap	Measures to Address Gap
	implementation schedule, cost estimates, and performance indicators. Key considerations for EMP preparation include mitigation of potential adverse impacts to the level of no significant harm to third parties, and the polluter pays principle.			
Carrying out Public Consultations and concerns	5. Carry out meaningful consultation with affected people and facilitate their informed participation. Ensure women's participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment.	Right to Information (RTI) act 2005 – sets out the rules and procedures regarding citizens' right to information. Under the provisions of RTI Act, any citizen of India may request information from a "public authority"	RTI act of 2005 specifies right to information upon request from public authority. ADB requires information carried out at various stages of the project.	Adapt the ADB requirements on meaningful consultation and documentation carried out with affected people and other concerned stakeholders including civil society and facilitate their informed participation.
Grievance redress mechanism	Establish a grievance redress	Executive Agency to facilitate	No specific government	Component of Environment

ADB SPS Requirement	ADB SPS Policy Principle	Government of India Regulation	Gap	Measures to Address Gap
	mechanism to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance.	resolution of affected people's concerns.	regulation on addressing grievances.	Assessment report on Grievance Redress Mechanism should be addressed in accordance with the ADB requirement.
Disclose a draft and final IEE reports	6. Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders.	Right to Information (RTI) act 2005 – sets out the rules and procedures regarding citizens' right to information. Under the provisions of RTI Act, any citizen of India may request information from a "public authority"	RTI act of 2005 specifies right to information upon request from public authority. ADB requires information carried out at various stages of the project.	Conduct public disclosure in accordance to ADB requirements such as posting the safeguard documents on its website as well as disclose relevant information in accessible manner in local communities.
Implementation of monitoring effectiveness	7. Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.	SEAC releases guidelines and recommendations for the mitigating environmental impacts	ADB requires Environmental Monitoring Plan monitoring of mitigation of environmental impacts.	ADB's monitoring and reporting requirements shall be implemented.
Protection of critical habitats and protected flora and fauna	8. Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there	Wildlife Protection Act, 1972 This overarching Act provides protection to wild animals, birds, plants and matters connected with habitat protection, processes to declare protected	The act is applicable to project components coming under environmentally sensitive zone of wildlife and national park.	Adapt the SPS requirements for natural, modified and critical habitat

ADB SPS Requirement	ADB SPS Policy Principle	Government of India Regulation	Gap	Measures to Address Gap
	is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.	areas, regulation of wildlife trade, constitution of state and national board for wildlife, zoo authority, tiger conservation authority, penalty clauses and other important regulations Forest (Conservation) Act, 1980 and Forest Conservation Rules, 2003 as amended – 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 – 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		
Application of pollution	9. Apply pollution prevention and	Environment (Protection) Act,	Compare with international	ADB requires the adaptation of the

ADB SPS Requirement	ADB SPS Policy Principle	Government of India Regulation	Gap	Measures to Address Gap
prevention and control technologies	control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phaseouts. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.	1986 and CPCB Environmental Standards. Emissions and discharges to be comply with the notified standards The Water (Prevention and Control of Pollution) Act, 1974 as amended; The Air (Prevention and Control of Pollution) Act, 1981 as amended Noise Pollution (Regulation and Control) Rules, 2000 amended up to 2010 Environmental Standards published by CPCB and SPCB As per The Motor Vehicles Act, 1988 – Rule no 115. Emission of smoke, vapor, etc. from motor vehicles and Rule no 116. Test for smoke emission level and carbon monoxide level for motor vehicles	standards and regulations	more stringent requirements between the international standard and government regulations.

ADB SPS Requirement	ADB SPS Policy Principle	Government of India Regulation	Gap	Measures to Address Gap
	10. Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.	National Policy on Safety, Health and Environment at Workplace The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996.- provide safety measures at the construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for workers near the workplace etc Other policies and acts which support the maintenance of Health and Safety at workplace are. National Policy on HIV/AIDS and the World of Work, Ministry of Labour and Employment, GoI; 2. National Policy on Safety, Health and Environment at Workplace, Ministry of Labour and Employment, GOI; 3. The Public Liability Insurance Act, 1991; and 4. The Factories Act, 1948 (Act No. 63 of 1948), as amended by the Factories (Amendment) Act,	Regulations are incorporated in the ADB requirements	ADB requires the consideration of site-specific hazards such as the presence of asbestos materials.

ADB SPS Requirement	ADB SPS Policy Principle	Government of India Regulation	Gap	Measures to Address Gap
		1987 (Act 20 of 1987).		
Conserve physical cultural resources and avoid destroying or damaging them	11. Conserve physical cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.	The ancient Monument and Archaeological Sites and remains (Amendment and validation) Act, 2010 – The Rules designate areas within a radius of 100 m and 200 m from the "protected property/ monument/ area" as "prohibited area" and "regulated area" respectively.	ADB defines physical cultural resources as any resources with cultural interest at any of the local, provincial, national or international level.	ADB SPS environmental safeguard policy principles require conservation of physical cultural resources and avoid destroying or damaging them by using field-based surveys employing qualified and experienced experts during environmental assessment.

E. Lessons learnt from the Previous ADB Projects implemented in Rajasthan

37. Since 2000, RUDSICO implemented three urban sector projects funded by ADB in Rajasthan covering 29 towns. While RUIDP Phase I covered the six major cities including the state capital, RUIDP Phase II and on-going Phase III covered 15 and 12 districts headquarter towns respectively. Experiences and lessons learnt from these projects – focusing on environmental safeguards, is presented in the table below, with possible remedies which can be included in the RSTDSP formulation.

Table 8: Lessons Learnt from RUIDP Phases I, II and III

Field	Details	Remedial Measures to be implemented in RSTDSP
Government approvals and clearances – delay	Obtaining approvals and clearances from Government regulatory agencies is time consuming and cumbersome, especially related to forest and environment For some projects, where forest land acquisition was necessary, the implementation was either delayed or alternative non-forest sites were to be identified as forest department denied approval. For instance in Bundi	Cumbersome and time-consuming process may be corrected to deter project agencies to go for forest lands. Therefore: RSTDSP-AF will avoid locating project facilities in forests or lands with any encumbrances Create awareness in ULB officials to avoid forest lands

Field	Details	Remedial Measures to be implemented in RSTDSP
	town in RUIDP Phase II, the Forest Department revoked the clearance issued for construction of a water reservoir in forest land, necessitating identification of alternative non-forest site that resulted in change in design and delay in implementation.	In unavoidable, liaise with local forest office right from site identification.
Documentation of IEE studies: non- inclusion of Project Associated Facilities in the IEE study.	In a RUIDP Phase II water supply subproject, a local NGO complained that IEE study did not consider presence of critically endangered species in the project area. The RUIDP Phase II subproject included works from WTP to consumer end, while the intake and raw water transmission works were part of a state funded project implemented by PHED to cover several towns. The intake is located in a River, which is a habitat for endangered species and declared as sanctuary. As the intake/source augmentation works are not in the scope, the issues related to intake were not considered in the IEE. PHED on its part obtained necessary clearances from Ministry of Environment and Forest and incorporated various measures in the project. These are duly incorporated in the IEE and resubmitted to ADB.	As per the ADB SPS 2009, environmental assessment study should include all associated facilities. Associated facilities may be funded 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.
Improvements in implementation of environmental safeguards during construction	It is observed that there is significant improvement in documentation of environmental studies during RUIDP Phases I, II and III, likewise implementation of EMP during construction has also been improved. In RUIDP Phase III, more emphasis is being given to the implementation of environmental safeguards. Improvements have been seen in use of personal protection equipment by workers, consent management system, public consultations and grievance	Creation of awareness in workers on workplace safety and public safety Awareness creation in staff, administrators, supervising staff and general public regarding EMP provisions and contractor's responsibilities. Increasing contractor accountability towards EMP implementation

Field	Details	Remedial Measures to be implemented in RSTDSP
	redress mechanism, safety in trench works. Contractors are more aware for implementation of measures including public safety, road blocks, traffic management and dust control. Regardless of above improvements, there are still some areas where improvement is required.	

III. ANTICIPATED ENVIRONMENTAL IMPACTS

38. RSTDSP-AF's potential impacts have been assessed based on seven sample subprojects using the ADB REA checklists (Appendix 11). Based on the IEEs, construction and operation are the two activities in which the project interacts physically with the environment Table 9 provide a summary of potential negative environmental impacts which may arise during project implementation and general measures to avoid, minimize and mitigate those impacts to acceptable levels. These are indicative impacts and will need to be further explored during detailed engineering design phase of each subproject.

39. Succeeding paragraphs provide discussion on impacts due to the location, design, construction and operation of the project. Planning principles, subproject selection criteria, 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. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. These were discussed with specialists responsible for the engineering aspects, and as a result significant measures have already been included in the subproject designs.[16] In most cases mitigation measures can be designed with uncomplicated measures commonly used at construction sites and known to civil works contractors. Once the subprojects are operating, the facilities will operate with routine maintenance, which shall not affect the environment. Improved system operation will comply with the operation and maintenance manual and standard operating procedures to be developed for all the subprojects.

40. **Impacts due to design – general risks.** These impacts include impacts arising from Investment subproject design, including technology used, scale of operation/throughput, waste production, discharge specifications, pollution sources and ancillary services. Design impacts may vary, and an alternative design may result in minimal or no impacts. The main design aspects of water supply subprojects that determine the significance of impacts include: selection of water source, level of water abstraction, raw water quality, potential pollution sources, conflicting uses

[16] For the water supply subprojects, various design-related measures suggested for: providing safe water following Government of India and WHO Guideline values, standard operating procedures for operation and maintenance; personal protection equipment for workers and water treatment plant (WTP) sludge handling, and development of green buffer zone around the WTP and pumping stations. For the sewerage subprojects, various design-related measures suggested for: providing safe reuse / disposal of treated wastewater; efficient treatment to meet disposal standards, odor control at facilities, uninterrupted power supply provision; standard operating procedures for operation and maintenance; and imparting necessary training to municipality staff; providing necessary safety, no manual cleaning of sewers, and personal protection equipment for workers (protection against oxygen deficiency, harmful gaseous emissions) and sludge handling, and development of green buffer zone around sewage pumping stations and treatment plants .

and users of water source, treatment process, treated water quality, energy and resource efficiency, generation of wastewater and sludge and their management, noise from pumping operations, water contamination during transmission and use of harmful/hazardous chemicals and materials, health and safety impacts. The design aspects of sewerage subprojects that determine the significance of impacts include: sewage treatment process efficiency, discharge standards, reuse potential, sludge management, receiving water quality and water uses, noise and odour nuisance resulting from system design and selected technology, use of harmful/hazardous chemicals, materials, inlet sewage quality and potential changes, health and safety impacts.

41. Proposed conservation and development of heritage buildings/structures may have adverse impacts if the proposed interventions are not appropriately designed or implemented. It shall therefore be necessary to ensure that proposed designs and improvements are unobtrusive, forming integral part of the ambience of the site, and design, material and scale are compatible to the local architectural, physical, cultural and landscaping elements with optimum minimalist design. A heritage impact assessment needs to be conducted during the IEE to assess these aspects and recommendations needs to be integrated into the designs. In the lake restoration projects, works and increased human movement during operation may disturb and degrade the water habitat. Proposed lakes are however not of high biodiversity value, and mostly support domestic species of flora and avifauna in limited numbers, proper design and implementation of works is likely to improve the water retention, vegetation and improve the water habitat. Prevention of entry of sewage into lakes by improving the sewerage systems in the towns, and removal of aquatic weeds covering the lake surface will benefit the lakes. Development of lakes into recreational places with nature-based activities will help conservation of water bodies. Proper construction method and schedule needs to be ensured to avoid any impacts, especially on water birds.

42. **Impacts due to design – risks of asbestos-containing materials**. Asbestos is recognized as a cause of various diseases and is considered health hazard if inhaled. In the existing water supply systems, which were built decades ago, asbestos containing material (ACM), mainly in the form of asbestos cement pipes, were widely used in transmission and distribution system. In the sample project towns of Abu Road, Kuchaman, Khetri, Sardarshahar Ratangarh, Nokha, Bundi, Nathdwara, Sagwara and Dungarpur asbestos cement pipes are of considerable lengths, and diameter typically ranges from 80-250 mm diameter. Most of these asbestos cement pipes are old, and asbestos cement pipes are no more used to create network, however, asbestos cement pipes are still being used for repairs and replacement of damaged sections in existing asbestos cement pipe network. Under the RSTDSP, the existing old and leaking water supply network is being completely replaced with new network of non-asbestos cement pipes. No new asbestos cement pipes are proposed. It is normal practice in Rajasthan to leave existing asbestos cement pipes as it is in the ground and lay new network in a new alignment. It is identified from sample subproject towns that as most of the existing asbestos cement pipes were laid long back, due to increased road levels, the asbestos cement pipes are now deep, more than 2 m in many places. In wider roads, there will be adequate space to lay the new pipelines, without touching / disturbing the AC pipes. However, complete avoidance may not be possible, especially in narrow lanes. 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. A rough estimate indicates that about 10%-20% of existing AC pipes may be required to be removed from its existing place/ground and disposed during the construction phase. 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 to any disturbance or removal. Appropriate measures are required to identify hazards, use of proper safety gear and disposal methods are necessary to avoid health impacts on workers and people living close to work sites.

43. **Impacts due to design – abstraction of water (sustainability).** The main design impact of water supply system in general are due to abstraction of water and quality of raw water. The existing water supply systems in project towns are mostly groundwater based, and water supply is inadequate. The new water supply scheme will mostly be based on surface water-based systems (existing canals and dams/reservoirs). In most cases, the water available from surface water sources is either inadequate or less than 100% dependable. Given this, it is necessary to continue the existing groundwater-based system partially and combine with the new system. Therefore, it is proposed to adopt conjunctive use approach, utilizing both surface and groundwater sources to meet the demand. Depending on the rainfall, and surface water availability, groundwater resources will be utilized. Source sustainability will be established, and downstream impacts, and user conflicts will be assessed and the same will be mitigated/avoided. Surface water allocation for the project from competent authority will be ensured to avoid conflicts. Proper planning measures will be included to avoid utilizing dead storage during the lean season. Existing tube wells and open well will be utilized, and new wells will be avoided. If unavoidable, groundwater source selection, will be preceded by feasibility studies. Groundwater abstraction will be restricted to recommended levels, along with implementation of groundwater augmentation as recommended by such studies. Central Groundwater Board (CGWB), and state Groundwater Department (GWD) recommendations for the area of interest will be duly considered in the design. Raw water quality will be carefully analyzed, and appropriate design and monitoring measures will be put in place to ensure that water supply to consumers always meet the drinking water standards. Planning principles and design considerations will be reviewed and incorporated into the site planning and design process wherever possible.

44. **Impacts due to location – general.** Located impacts are 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. Location of facilities- some facilities close to sensitive areas / human habitations may create nuisance and inconvenience local people from emitting bad odours and high noise.

45. **Impacts due to location – Alignment of Pipes.** Construction of water pipes and sewers is a main component of the subprojects. As the pipes and sewers will be laid linearly along the roads, and will almost cover entire town, will affect large areas and population during the construction works. In urban areas, such as project towns, the roads are often lined by commercial establishments, and/or congested by traffic, people and activities. Therefore, these linear works have potential to disturb the people and activities being carried out on the alignment, damage the infrastructure, buildings, and trees etc., that presently occupy the alignment. Tree cover along the roads is very minimal, and therefore tree cutting for pipelines will be minimal. It needs to be completely avoided by carefully selecting the alignment or making amendments locally where there are trees. It is proposed that pipelines will be laid underground along the existing roads within the right-of-way (ROW). Water pipes will be laid in the vacant space along the road or into the edge of carriage way, and sewers will be laid in the center of the road. There may be involuntary resettlement impacts if the ROW is encroached upon or used for any economic purpose, and if the access is denied to business during the construction works. Some pipelines may need to be laid outside the town, where there may be no existing roads. These include raw water mains, trunk sewers, outfall sewers, etc., if the source and/or sewage treatment plant is

located outside the town/municipal boundary. These may require private land acquisition. The issues related to Involuntary Resettlement needs to be assessed and compensated via resettlement planning.

46. **Impacts due to location – Critical Habitat.** Almost all of the design impacts can generally be mitigated while there can be significant impacts if the components will be located in environmentally-sensitive areas (in or near wildlife sanctuaries, national parks, forest areas, wetlands, etc.),or in or near physical cultural resources (protected monuments/sites or world heritage sites). RSTDSP will not undertake activities within such sensitive areas and will exclude projects which will cause significant environment impacts[17] such as construction of dams and reservoirs. Most of the facilities will be in government owned vacant unused lands, and where not possible, lands will be purchased from private parties on willing buyer willing seller principle at prevailing market rate. Pipelines will be laid along public roads, avoiding sensitive areas like forests. Tree cutting will be minimized. Locating components obstructing/encroaching natural drainage channels, ponds etc., will significantly impact natural drainage pattern and may lead to water logging and flooding, and related public health issues.

47. **Impacts due to location – Physical Cultural Resources.** Rajasthan state has a long history, rich heritage and culture. There are several places of archaeological, historical and cultural importance. As per the ASI, Government of India, there are 163 monuments / places / sites that are declared as notionally important protected monuments/sites and are protected and managed by ASI. Besides, there are 342 monuments of local/state importance that are protected by the Government of Rajasthan's Archaeology and Museums Department. In RSTDP project towns Khetri and Mandawa are among those heritage towns while other towns could also have known PCRs per ADB definition. Although it is unlikely to conduct any work within the protected area of the monuments, as there are habitations around the monuments that are located within the project towns, there will be some components such as pipelines and sewers that may be required to be laid close to the protected monument. Location of above ground structure, especially, overhead tanks may have adverse impacts on nearby monuments. Facilities like sewage pumping stations and sewage treatment plants may also have negative impacts from fugitive emissions, noise and odour. Excavation work near the monument may endanger the structures. Given the historical significance of Rajasthan, there is a risk of uncovering archaeological remains during the excavation works.

48. **Impacts due to location – Sensitive Receptors**. Proposed works are primarily located in urban areas and surroundings where there are various type of sensitive receptors. Given the nature of infrastructure proposed, most of the facilities will have no impacts on sensitive receptors except during the construction phase. However, facilities such as sewage pumping stations and sewage treatment plants, if located close to habitations will have adverse impacts, and may significantly affect the vulnerable groups like children and old people. Generation of bad odours and fugitive air emissions on the surrounding population needs to be considering in selecting the sites. For STPs, especially, a 500 m buffer distance, duly considering the future growth potential of towns, shall be ensured. This distance may be reviewed based on the proposed STP technology, and its odour potential. During the construction phase, especially during laying of pipelines and sewers along the roads, there may be significant disturbance. There are sensitive receptors like schools, hospitals, monuments, religious places etc., which may be negatively impacted from construction dust, noise, access blockage and safety risk. The sensitive receptors need to be identified prior to start of construction, specific measures to be put in place, including adoption of construction method and schedule that is appropriate for such sensitive locations.

[17] Project classified as Category A as per ADB SPS, 2009.

49. **Impacts during construction**. Most impacts of RSTDSP will result from considerable construction activities. Water pipelines will be laid along the public roads, while construction activities of other components like tanks, WTP, STP etc., will be confined to the selected sites, and the interference with the public and community around is minimal. There will be temporary negative impacts, arising mainly from construction dust and noise; hauling of construction material, waste and equipment on local roads (traffic, dust, safety, etc.), mining of construction material, occupation health and safety aspects. During the construction phase of pipeline, impacts arise from the invasive nature of excavation and trenching work along the public roads used by traffic, pedestrians etc., and may disturb residents and businesses adversely affecting the livelihoods However as most of the individual elements are relatively small and involve straightforward construction, the potential environmental impacts (i) will be mainly localized, temporary and not greatly significant; (ii) will not cause direct impact on biodiversity values and (iii) are common impacts of construction in public areas, and there are well-developed methods for their mitigation.

50. **Impacts during commissioning – Occupational Health and Safety.** Hydro testing of pipes for leaks and pressure prior to commissioning, poses safety risk to workers, to access the pipelines in the confined spaces (trenches). Risks include collapse of trench due to loose soil or under uncontrolled water pressure. Workers should be trained in confined space working. Often, improper planning, adopting ad-hoc methods of testing, and use of non-standardized equipment are the main reasons for accidents. Cleaning of pipes, sewers, manholes, etc., if required as per the contract prior to commission, shall be carried out mechanically, and manual cleaning must be avoided.

51. **Impacts due to operation and maintenance**. Anticipated impacts of water supply and Sewerage projects during O&M will be related to operation of WTP and STP, handling and application of chlorine, operation of pump houses and repair and maintenance activities. Provisions will be made in the design: to recirculate wastewater from WTP and STP; collect, thicken and dispose sludge; chlorine safety; use energy efficiency equipment. Water supply system will need to be operated using the standard operating procedures following an operating manual. Application and handling of chlorine gas will involve certain risks, and appropriate measures for safe application including safety measures and equipment, PPEs, awareness programs and mock drills will need to be included. Thus, considering the design and operational procedures that will be considered in implementation, it is unlikely that there will be any significant negative impacts due to operation of water supply system. Routine repairs and maintenance works will be very small in scale, to conducted manually by small teams and works will be very short thus will not cause significant physical impacts. Municipal waste and sewage may contain disease-causing organisms that may be dispersed in water or air. Disinfection and containment will follow WHO's interim guidance on water sanitation, hygiene and waste management for the COVID19 virus (Appendix 17) and to be considered in the detailed engineering design to avoid and risks of diseases or illnesses to the workers and the community such as the spread of viruses.

52. WHO's Interim Guidance (see Appendix 17) provides information regarding the infection prevention and control (IPC) on water, sanitation and health care waste regarding viruses (including coronaviruses). Operators should be trained on the guidance on water, sanitation and hygiene risks and practice so as to avoid and minimize the exposure of the work area and the community to biological hazards. For example, the document provides discussions on how to protect against viruses in sewage and drinking water by understanding: (i) COVID19 transmission, (ii) persistence of the COVID19 virus on drinking water, feces and sewage and on surfaces, (iii) keeping water supplies safe and(iv) safely managing wastewater and fecal waste.

Table 9: Subproject Potential Environmental Impacts, Issues and Concerns (No Mitigation Measures Scenario)

Design and Pre-Construction Stage

Field	Anticipated Impact	Environmental Issues and Concerns
All sites		
Location	Land use change	permanent or temporary change in land use or topography including increases in intensity of land use
	Loss or damage to environmentally sensitive areas	Impact to critical habitat and biodiversity value
	Impairment of physical cultural resources	Damage to heritage sites, baoris, temples, old houses and other physical cultural resources
	Social and community impacts	• dislocation or involuntary resettlement of people • disproportionate impacts on the poor, women and children, indigenous peoples or other vulnerable groups • social conflicts arising from displacement of communities
	Disruption of services due to shifting of utilities	• Disruption to traffic flow and sensitive receptors • Issues on telephone lines, electric poles and wires, water lines within proposed project area
Water Supply		
Design of water supply	Non-compliance or non-adherence with the environmental considerations proposed in preliminary designs	• inadequate buffer zone around pumping and treatment plants • increased sewage flow due to increased water supply
Water Source and Allocation	Overexploitation of groundwater	• hazard of land subsidence caused by excessive groundwater pumping • excessive abstraction of water affecting downstream water users
	Water users	• competing uses of water • conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters
Water Quality	Water contamination	• pollution of raw water supply from upstream wastewater discharge
	Health impacts due to unsatisfactory water supply	• Unsatisfactory treated water quality
Intake Wells and Structures	Damage to infrastructure	• inadequate protection of intake works or wells, leading to pollution of water supply

Field	Anticipated Impact	Environmental Issues and Concerns
Occupational Health and Safety	Health impacts due to air borne asbestos	• health hazards arising from inadequate design of facilities for receiving, storing and handling of chlorine and other hazardous chemicals
Sewerage		
Sewage Treatment Plant	Odor nuisance and aesthetics	• nuisance to neighbouring areas due to noise, smell, and influx of insects, rodents, etc. • inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities
	Hazardous or harmful chemicals	• impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage • discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers
	Mixing of industrial effluent with sewage	• increase in production of sewage beyond capabilities of community facilities
	Sludge management and reuse	• environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers
	Poor design leading to overflows, blockages and creating nuisance	• overflows and flooding of neighbouring properties with raw sewage

Construction Stage

Field	Anticipated Impact	Environmental Issues and Concerns
All sites		
Location	Noise and vibration from construction activities	• noise and vibration due to blasting and other civil works
	Increased dust from construction activities	• dust
	Increased vehicle-related pollutants	• Vehicle exhaust and emissions
	Continuing soil erosion near construction sites	• Soil erosion and silt runoff
	Water and land chemical contamination from fuels and lubricants	• Disposal of chemicals to natural waterways
	Water and land contamination from solid waste	• solid wastes such as spoils, overburden, etc. • solid wastes from worker's camp
	Increased road traffic in the town	• traffic
	Road blocking / closure due to excavation works	• cut and fill or excavations • working in stream crossings • interference with other utilities and blocking of access to buildings
	Social conflicts	• social conflicts if workers from other regions or countries are hired

Field	Anticipated Impact	Environmental Issues and Concerns
		• population influx that causes increased burden on social infrastructure and services (such as water supply and sanitation systems) • changes in occurrence of disease or affect disease vectors (e.g. insect or water-borne disease) due to worker's camp • dislocation or involuntary resettlement of people • disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable groups
	Safety risks	• risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards • Exposure to hazardous materials (e.g. AC pipes) • risks to community health and safety due to transport, and use and/or disposal of materials such as explosives, fuel and other chemicals • community safety risks due to both accidental and natural hazards, especially where structural elements or components of the project are accessible to the members of the affected community or where failure could result in injury to the community
	Loss or damage to environmentally sensitive areas	• Impact to critical habitat and biodiversity value
	Impairment of physical cultural resources	• Damage to heritage sites, baoris, temples, old houses and other physical cultural resources
	Site clearing	• clearance of existing land, vegetation or building

Operations Stage

Field	Anticipated Impact	Environmental Issues and Concerns
All Sites		
	Social conflicts	• population influx that causes increased burden on social infrastructure and services (such as water supply and sanitation systems) • social conflicts if workers from other regions or countries are hired
Water Supply		
	Health Impacts due to Unsatisfactory Raw Water Supply	• unsatisfactory raw water supply (e.g., excessive pathogens or mineral constituents) • delivery of unsafe water to distribution system
	Health and Safety Hazards to Workers Handling of Chlorine	• health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards • accidental leakage/spillage of chlorine
	Inadequate Disposal of Sludge	• increase in production of sewage beyond capabilities of community facilities inadequate disposal of sludge from water treatment plants

Field	Anticipated Impact	Environmental Issues and Concerns
		• increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant
	Quality of Treated Water	• excessive algal growth in storage reservoir
	Ineffective chlorination treatment	• inadequate chlorination due to lack of adequate monitoring of chlorine supply
• Sewerage		
	Odor nuisance	• nuisance to neighbouring areas due to noise, smell, and influx of insects, rodents, etc.
	Unsatisfactory treated water quality and sludge	• impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage • deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water • contamination of surface and ground waters due to sludge disposal on land
	Overflow and flooding	• overflows and flooding of neighbouring properties with raw sewage
	Inefficient sludge disposal	• environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers
	Occupational health and safety risks	• risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards • discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers • health and safety hazards to workers from toxic gases and hazardous materials which may be contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and unstabilized sludge
	Exposure to biological hazard (e.g. viruses) and spread to the community	• transmission of biological hazards to the workers and the community • outbreak and spread of diseases and illnesses or other impact to health
	Community health and safety	• hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system • 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 • 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

53. Table 10 summarizes the anticipated impacts and the corresponding avoidance and mitigation measures at different stages of the project – design, construction, O&M.

Table 10: Anticipated Environmental Impacts and Proposed Measures to Avoid and Mitigate Impacts

Anticipated Impacts	General Mitigation Measures
Design Period	
Loss or damage to environmentally sensitive areas	• Avoid locating components in or near environmentally sensitive areas. • Design surface water intake structures to minimize impacts on aquatic life. Limit maximum through-screen design intake velocity to limit entrainment of aquatic organisms. • If there are threatened, endangered, or other protected species within the hydraulic zone of influence of the surface water intake, ensure reduction of impingement and entrainment of fish and shellfish by the installation of technologies such as barrier nets (seasonal or year-round), screens, and aquatic filter barrier systems
Impacts on natural or modified or critical habitats	• Conduct screening of project influence area to identify protected areas/sites and conservation status of species. • Utilize tools like Integrated Biodiversity Assessment Tool (IBAT) and data from government sources, and international agencies like World Database of Key Biodiversity Areas website (WPDA), Important Bird Areas (Birdlife International); Ramsar website; IUCN Redlist; etc. • Carryout critical habitat assessment (CHA) in case of screening confirms protected areas and/or species with protection status within 10 km of project influence area • Engage biodiversity expert to conduct assessment and develop mitigation measures. • Engage a local biodiversity expert to verify findings on-site; and • Conduct field-level site visits for the review and updating of the Environmental Management Plan • If species of interest are found on-site, ensure that the findings are recorded and reported to the PIU. No disturbances or works on the site should start/continue until PIU issues clearance to proceed. Measures to restrict poaching or hunting shall be put in place. • If species of interest are present, PIU shall coordinate with the Forest Department for the translocation of the animals.
Impairment of physical cultural resources (PCRs)	• Avoid locating components in or near physical cultural resources. If cannot be avoided, consult with Archaeological Survey of India (ASI) (for ASI-protected PCRs) or State Archaeological Department (for state-protected PCRs) • Do not locate components in the protected areas; avoid locating components within 300 m of ASI protected monuments • In unavoidable cases, conduct heritage impact assessment studies by engaging independent experts, • Obtain prior permission from ASI or state Department of Archaeology and Museums where necessary; • Develop “chance find” procedures that include a pre-approved management and conservation approach for materials that may be discovered
Exposure to ACM (e.g., AC pipes or sheets)	• Avoid any repairs or new connections to/from existing asbestos cement pipes • No Asbestos Cement pipes to be used

Anticipated Impacts	General Mitigation Measures
	• Develop and implement the ACM Management Plan (AMP) that includes identification of hazards, the use of proper safety gear and disposal methods. • 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 • Refer to the instructions of the Asbestos Expert
Social conflicts arising from displacement of communities.	• Avoid land acquisition to maximum extent possible. For potential involuntary resettlement impacts, prepare a Resettlement Plan
Disturbance of services due to shifting of utilities (electric poles, wires, water pipes, etc.)	• Ensure all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultation and disclosures.
Hazardous or harmful chemicals	• Reduce the use of chemicals in the treatment process to the extent possible (water treatment); provide non-chemical alternatives or easily recoverable and/or reusable chemicals or biocompatible alternatives. • Establish proper handling / storage / application system according to the relevant standards, safety precautions and prevent accidental release / spill • Provide leak/spill detection, collection / capture and safe disposal facilities such as chlorine absorption and neutralization facility • Provide ventilation, lighting, entry and exit facilities; visible and audible alarm facilities to alert chemical/chlorine leak • Facility for isolation in the event of major leakages • Eye wash and shower facility • Personal protection and safety equipment for the operators (masks, oxygen cylinders, gloves, etc.) • Provide training to the staff in safe handling and application of chemicals, material safety, and standard operating procedures and emergency responses • Develop emergency response procedures
Water Supply – Pollution of source water from upstream anthropogenic activities and soil erosion runoff	• Conduct extensive sanitary survey to avoid locating new water supply sources downstream of pollution sources (sewage and/or drainage outfall, catchment of area of extensive agricultural activities/nutrient runoff, waste dumpsites, pit latrines, toilets, or sewerage treatment plant discharge point)
Water Supply – Impacts due to excessive/unsustainable groundwater extraction	• Conduct groundwater tests to estimate the sustainable yield • Utilize existing dams/reservoirs as water source subject to technical and economic feasibility

Anticipated Impacts	General Mitigation Measures
(land subsidence, degradation of water quality, etc.)	• Modify extraction rates and locations as necessary to prevent unacceptable adverse current and future impacts, considering realistic future increases in demand.
Water Supply – Impacts due to excessive/unsustainable surface water withdrawal	• Evaluate potential adverse effects of surface water withdrawal on the downstream ecosystems and use appropriate environmental flow assessment to determine acceptable withdrawal rates.
Water Supply – Risk of pollution of source water due to inadequate protection of intake works or wells	• Develop water source protection plan. It is important to involve the urban local body (ULB), water regulating authorities, property owners, farmers, industry (if present in the ULB), businesses, community groups, and public health officials. • Locate new facilities at sites where there is low risk of flooding or other hazards that might impair functioning of, or present a risk of damage to water treatment plants, tanks/reservoirs, or their environs.
Water Supply – Health impacts due to unsatisfactory water supply	• Follow design criteria in the Ministry of Urban Development's (MOUD) Central Public Health and Environmental Engineering Organization (CPHEEO) Manual on Water Supply and Treatment
Water Supply – Social conflicts from abstraction of raw water for water supply from other water uses of same surface/groundwater sources	• Avoid sources with such conflicts; if unavoidable Water Resource Review Committee to initiate dialogue and resolve issues before investments
Sewerage – Odour nuisance and aesthetics	• Provide a green buffer zone of 10-20 m wide all around the STP with trees in multi-rows. This will act as a visual screen around the facility and will improve the aesthetic appearance. Treated wastewater shall be used for plantation. • Develop layout plan of STP such that odour generating units (such as sludge / solids handling facilities) are located away from the surrounding area with future development potential.
Sewerage – Inefficient sewage treatment, treated effluent characteristics	• Ensure that the selected process in appropriate for the town and meets discharge standards and facilitate reuse
Sewerage – Use of treated wastewater for reuse	• Identify potential reuse application in Sardarshahar, and establish quality criteria for each of the use • For applications that use treated wastewater directly (e.g., agriculture), the quality required for such application in safe manner considering health, environment and crop yield concerns shall be ensured; • Prepare a reuse plan for agriculture, if that is the priority use or one of the applications as per the CLC in Sardarshahar, clearly indicating the limits (geographical / crops / type of application / type of soils etc.,); adopt international good practice suggested by agencies like World Health Organization (WHO), Food and Agricultural Organization (FAO) of the United Nations. • Plan should include awareness and training provisions and responsibilities; these can be conducted by concerned department (e.g., Agricultural Department, District Collectorate) • Carryout regular / online monitoring of critical quality parameters of treated wastewater to ensure that they meet the preset standards established for reuse
Sewerage – Sludge management and reuse	• Prepare a sludge management plan • Prepare a dried Sludge utilization plan for Sardarshahar within the help of Agriculture Department / CLC; plan should also include if any additional processing is required for sludge to use as soil conditioner

Anticipated Impacts	General Mitigation Measures
	• Plan should clearly various potential uses and demand in Sardarshahar and surroundings • Establish usage limits, where required, (geographical / crops / type of application / type of soils etc.,); adopt international good practice suggested by agencies like World Health Organization (WHO), Food and Agricultural Organization (FAO) of the United Nations. • Identify a landfill / suitable site for disposal of surplus dried sludge • Monitor sludge quality during operation phase as per the Environmental Monitoring Plan, ensure that it meets the quality parameters established by FCO • In case of sludge not meeting the quality parameters, it shall not be used as soil condition, and shall be disposed at appropriate disposal site (if it falls under hazardous category, it shall be disposed as per the Hazardous Waste Management Rules, 2016)
Construction Period	
Noise and vibration from construction activities	• Schedule noisy or otherwise invasive activities during periods of the day which will result in least disturbance • Use of high noise generating equipment shall be stopped during night time. • In unavoidable case of night works (due to local rules) provide prior information to public on work schedule, noisy activities and need to conduct the works at night. Use best construction methods to minimize noise to possible extent. • Vehicle horns should not be used unless it is necessary • All vehicles and equipment to be used in construction shall be fitted with exhaust silencers. • Use silent-type generators (if required) • If it is not practicable to reduce noise levels to or below noise exposure limits, post warning signs in the noise hazard areas. • 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
Increased dust from construction activities	• Use dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles • Use of water suppression for control of loose materials on paved or unpaved road surfaces. Ensure unpaved surfaces used for haulage of materials within settlements are dust-free
Increase in vehicle-related pollutants	• Use modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions and ensure that these are maintained to manufacturers' specifications at all times.
Continuing soil erosion/silt runoff in or near construction sites	• Measures to minimize soil erosion/silt runoff to be incorporated when conducting earthworks during monsoon season
Water and land chemical contamination from fuels and lubricants	• Place storage areas for fuels and lubricants away from any drainage leading to water bodies
Water and land contamination from solid and liquid wastes	• Prioritize re-use of excess spoils and materials in construction activities. • Take all precautions to prevent entering of wastes into streams, watercourses, fisheries ponds or irrigation systems • Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas

Anticipated Impacts	General Mitigation Measures
Increased road traffic in the town due to construction activities	• Prepare traffic management plan and ensure sufficient financial provisions for road restoration
Road blocking/closure due to excavation works	• Ensure effective advance communications with the affected residents • Prepare traffic management plan • For affected livelihood, prepare a resettlement plan
Social conflicts between construction workers from other areas and community workers	• Employ labor force from local communities to maximum extent possible • Restrict activities and movement of staff only within designated construction areas.
Safety risks due to deep excavation (workers and public)	• Prepare health and safety plan • Prepare community awareness plan. Consult with local community to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed. • Provide sign boards
O&M Period	
Safety risks due to pipe repairs (workers and public)	• Provide billboards, signages and barricades
Water Supply – Health impacts due to unsatisfactory raw water supply	• Conduct water quality monitoring at intake, water treatment plant and at strategic points in the distribution system • Ensure standard water quality surveillance procedures and protocols as a key obligation of the Contractor with third party checks
Water Supply – Health and safety hazards to workers from the handling of chlorine and public safety risks from accidental leakage of chlorine gas	• Prevent, minimize, and control potential impacts associated with the storage, handling and use of disinfection chemicals (e.g., chlorine) • Minimize the amount of chlorination chemicals stored on site while maintaining a sufficient inventory to cover intermittent disruptions in supply • Ensure that all site personnel have a basic level of health and safety training and protective equipment
Sewerage – Health and environment issues of sewage treatment plant and discharge of treated water and sludge	• Ensure that treated wastewater meets the established discharge standards all times; Conduct regular wastewater quality monitoring (at inlet and at outlet of STP) to ensure that the treated effluent quality complies with design standards; • Conduct baseline water quality assessment of receiving water body prior to start of operation • Ensure implementation of Reuse Plan, and ensure intended quality for each direct reuse • Assess composition and characteristics of sludge from the first batch operation at the initial phases, and confirm the handling, management and disposal/reuse actions suggested in the management plan • Conduct periodic testing of dried sludge/compost to check presence of heavy metals and confirming the concentrations to use as compost as specified in the Standards for Composting, Schedule II A, Solid Waste Management Rules, 2016, FCO = Fertilizer Control Order, 1985, amendments in 2009 and 2013. It shall not be used for food crops. • Ensure valid consent to operate (CTO) from RSPCB for operation of STP • Ensure that all conditions/standards prescribed by RSPCB are compiled duly • Ensure that chlorinator facility is operated only by trained staff and as per the standard operating procedures; in case of any accident and/or

Anticipated Impacts	General Mitigation Measures
	maintenance activity, ensure that the staff follows documented procedures only • Implement Emergency Response System (ERS) for the chlorine leakage; Guidelines and Emergency plan for handling and storing chlorine. Ensure proper knowledge transfer, hands-on training to municipal staff engaged in STP operation has been provided by contractor prior to handover of facility; • Operate and maintain the facility following standard operating procedures of operational manual; • Undertake preventive and periodic maintenance activities as required; • Conduct periodic training to workers; ensure that all safety apparatus at STP including personal protection equipment are in good condition all times; and are at easily accessible and identifiable place; periodically check the equipment, and conduct mock drills to deal with emergency situations; • No wastewater from industrial premises (including domestic wastewater) shall be allowed to dispose into municipal sewers; monitor regularly and ensure that there is no illegal discharge through manholes or inspection chambers; conduct public awareness programs; in coordination with RSPCB:
Sewerage – Health and environment issues of sewage treatment plant and discharge of treated water and sludge	• Establish regular maintenance program, including: • Regular cleaning of grit chambers and sewer lines to remove grease, grit, and other debris that may lead to sewer backups. Cleaning should be conducted more frequently for problem areas. • Inspection of the condition of sanitary sewer structures and identifying areas that need repair or maintenance. Items to note may include cracked/deteriorating pipes; leaking joints or seals at manhole; frequent line blockages; lines that generally flow at or near capacity; and suspected infiltration or exfiltration; and • Monitoring of sewer flow to identify potential inflows and outflows • Conduct repairs on priority based on the nature and severity of the problem. Immediate clearing of blockage or repair is warranted where an overflow is currently occurring or for urgent problems that may cause an imminent overflow (e.g. pump station failures, sewer line ruptures, or sewer line blockages); • (Review previous sewer maintenance records to help identify “hot spots” or areas with frequent maintenance problems and locations of potential system failure, and conduct preventative maintenance, rehabilitation, or replacement of lines as needed; • When a spill, leak, and/or overflow occurs, keep sewage from entering the storm drain system by covering or blocking storm drain inlets or by containing and diverting the sewage away from open channels and other storm drain facilities (using sandbags, inflatable dams, etc.). Remove the sewage using vacuum equipment or use other measures to divert it back to the sanitary sewer system. • Prohibit/prevent disposal of wastewater/effluent from industrial units in the sewers; ensure regular checking to ensure no illegal entry of industrial wastewater into sewers • Develop an Emergency Response System for the sewerage system leaks, burst and overflows, etc. • Provide necessary health and safety training to the staff • Provide all necessary personnel protection equipment

Anticipated Impacts	General Mitigation Measures
	• During cleaning/clearing of manholes and sewer lines great precautions should be taken for the safety of workers conducting such works. • As far as possible use remote / CCTV mechanism to identify/detect the problems in sewers and do not engage persons for this purpose • As far as possible use mechanized cleaning of manholes and sewers by using modern techniques and machines and do not engage persons for this purpose • Ensure that maintenance staff and supervisors understand the risks; provide proper instructions, training and supervision. • Use gas detector to detect any hazardous or inflammable gas in confined areas like sewers /manholes prior to maintenance process • Provide suitable personal protective equipment that may include waterproof / abrasion-resistant gloves, footwear, eye and respiratory protection. Face visors are particularly effective against splashes. Equipment selection and a proper system for inspection and maintenance are important. • Provide adequate welfare facilities, including clean water, soap, nail brushes, disposable paper towels, and where heavy contamination is foreseeable, showers. • For remote locations portable welfare facilities should be provided. • Areas for storage of clean and contaminated equipment should be segregated and separate from eating facilities. • Provide adequate first-aid equipment, including clean water or sterile wipes for cleansing wounds, and a supply of sterile, waterproof, adhesive dressings. • Make effective arrangements for monitoring the health of staff. • Keep emergency preparedness plan ready before starting the work of sewage system cleaning
Exposure to biological hazards (e.g. viruses)	• Conventional and centralized water treatment that use filtration and disinfection that inactivates disease-causing vectors • Final disinfection step considered if treatment plant technologies are not able to destroy pathogens and remove viruses • Workers should wear appropriate PPE which includes protective outerwear, gloves, boots, goggles or a face shield and a mask • Perform hand hygiene frequently, avoid touching eyes, nose, mouth with unwashed hands

IV. ENVIRONMENTAL ASSESSMENT OF SUBSEQUENT SUBPROJECTS

54. Subsequent subprojects are expected to be within the same range of scope, scale and setting as with the sample subprojects and producing generally the same impacts at same or lesser magnitude. 1. Subsequent subprojects shall comply with the discussed selection guidelines (i), Table 2 – Exclusion Criteria and (ii) Table 3 – Environmental Guidelines for Subproject Selection Criteria. The succeeding paragraphs provide the environmental assessment process, preparation of reports, and safeguards requirements for subsequent subprojects. These are also applicable for any change in scope and/or location due to detailed design during implementation.

F. Environmental Assessment Process for Subprojects

55. **Screening and Categorization.** As soon as sufficient information on a subproject is available, screening is to be conducted using the ADB's REA checklist (Appendix 11). Requirements as per the government regulations (clearances, approvals, consent etc.) shall also be identified at this stage, including the statutory clearance requirements.

56. In addition to the REA Checklists (Appendixes 11), the following questionnaire in Table 11 will be used. The PMCBC will include technical experts on biodiversity, asbestos management and heritage impact assessment to conduct the respective requirements detailed in Table 11.

Table 11: Specific Issues or Concerns for Succeeding Subprojects

Issues and Concerns	Required Actions
Is the subproject site within likely critical habitat?	• Conduct IBAT preliminary screening • If in a likely critical habitat, conduct Biodiversity Assessment (see Appendix 2) and identify mitigation measures and action plans. • Follow suggested mitigation measures.
Are there existing ACM in component locations and pipeline networks?	• Conduct inventory of ACM in the project site • If ACM is to be removed, follow Asbestos Management Plan (see Appendix 5) and implement mitigation measures • If ACM is to be left in-situ, ensure documentation and recording as laid out in Asbestos Management Plan (see Appendix 5) • RUDSICO to report to ADB the extent of AC for removal and left in-situ.
Are there physical cultural resources in the within or near the subproject sites?	• Conduct heritage impact assessment (see Appendix 3A and 3B) for the affected physical cultural resources in the subproject site • Implement mitigation measures as recommended

57. Based on the screening, subprojects are to be classified into one of the following categories.

(i) **Category A.** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. Category A subprojects will not be allowed under RSTDSP;

(ii) **Category B.** A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An IEE is required; and

(iii) **Category C.** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.

58. **Preparation of IEE.** Outline and content of an IEE Report is given in Appendix 12 The seven sample IEEs prepared can be used as model documents for future subprojects.

59. **Environmental Management Plan.** The IEEs of the sample subprojects include more detailed EMPs which describe and address the potential impacts and risks identified by the environmental assessment. The EMPs included mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators. Where impacts and risks cannot be avoided or prevented, mitigation measures and actions will be identified so that the subproject is designed, constructed, and operated in compliance with applicable laws and regulations and meets the requirements specified in the EMP. The level of detail and complexity of the EMP and the priority of the identified measures and actions shall be commensurate with the subproject's impacts and risks. Key considerations include mitigation of potential adverse impacts to the level of "no significant harm to third parties," the "polluter pays" principle, the precautionary approach, and adaptive management. A template for environmental management process and monitoring plan is provided in Appendix 13 as a guide for preparing an EMP.

60. If some residual impacts are likely to remain significant after mitigation, the EMP will also include appropriate compensatory measures (offset) that aim to ensure that the project does not cause significant net degradation to the environment. Such measures may relate, for instance, to conservation of habitat and biodiversity, preservation of ambient conditions, and greenhouse gas emissions. Monetary compensation in lieu of offset is acceptable in exceptional circumstances, if the compensation is used to provide environmental benefits of the same nature and is commensurate with the project's residual impact.

61. **Pollution prevention and applicable standards.** Pollution prevention for conservation of resources, particularly technology for management of sludge, chlorine safety, occupational and community health and safety, shall be addressed in the IEEs. During the design, construction, and operation of the project, the executing agency shall apply 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 guidelines (EHS). 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 proposed alternatives that are consistent with the requirements presented in ADB SPS.

62. The IEEs and EMPs will be included in bidding and contract documents with specific provisions requiring contractors to (i) comply with all other conditions required by ADB,[18] and (ii) to submit a site-specific environmental management plan (SEMP), including (a) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (b) specific mitigation measures following the approved EMP; (c) monitoring program as per SEMP; and (d) budget for SEMP implementation.

63. **Environmental Audit of Existing Facilities.** For subprojects involving facilities that already exist or are under construction, an environment audit shall be undertaken, including on-site assessment, to identify past or present concerns related to impacts on the environment. The

[18] 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 with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites.

objective of the compliance audit is to determine whether actions were in accordance with the EARF, and to identify and plan appropriate measures to address outstanding compliance issues. Where noncompliance is identified, a corrective action plan will be prepared. The plan will define necessary remedial actions, the budget for such actions, and the time frame for resolution of noncompliance. The audit report (including corrective action plan, if any) will be made available to the public in accordance with the information disclosure requirements of the EARF.

64. **Public Consultation, Information Disclosure and Grievance Redress.** Public consultation and information disclosure is mandatory as part of the environmental assessment process for RSTDSP projects. The adequacy of the public consultation and disclosure during the environmental assessment process will be one of the criteria used to determine the project compliance with ADB safeguard policies. Similarly, a grievance redress mechanism (GRM) to receive, evaluate, and facilitate the resolution of affected person's concerns, complaints, and grievances about the social and environmental performance at project level is to be established and detailed out in the IEE Report. GRM should be made operation during the EMP implementation phase. The process of public consultation and information disclosure, which is to be carried through the project preparation and implementation, is presented in detailed in the following section V.

65. **Review of Environmental Assessment Reports.** IEE including EMPs, prepared/updated by consultants/contractors, will be reviewed and approved by PMU. Approval of safeguard documents of respective subproject is pre-requisite to initiate the bidding process.

66. All IEEs shall be prepared and EMPs prepared prior to invitation of the bids for construction contracts. The bid documents shall include the requirement to incorporate necessary resources to implement the EMP. The EMP will form part of the contract document, and, if required, will need to be further updated during the construction phase of a subproject. IEE shall be updated once (i) detailed design is completed, (ii) when change in scope, location, alignment, design is needed or (iii) due to unanticipated environmental impacts occurs. PMU will submit all IEEs to ADB for review and disclosure. ADB will review and disclose on its website the final reports (IEEs) of all subprojects.

67. Environmental assessment for subprojects must follow both the ADB SPS and the Government processes. Table 12 discusses the steps in complying with these processes per subproject stage.

Table 12: Environmental Assessment Process for Subprojects

Project Stage	Environmental Assessment and Review Framework Procedure	Government of India Procedure
Subproject identification Feasibility/ preliminary design	Subproject selection criteria (Table **3**) Rapid Environmental Assessment Checklist (REA) will be prepared by the PIU assisted by the CMSC environmental specialist and submitted to PMU for concurrence of categorization and scope of the IEE. Initial assessments must include information on site-specific observations such as state of the existing site and land preparation needed,	Categorization according to schedule and general/specific conditions in the government's Environmental Impact Assessment (EIA) Notification, 2006 (as amended till date)

Project Stage	Environmental Assessment and Review Framework Procedure	Government of India Procedure
	asbestos materials, physical cultural resources and critical habitat assessment.	
	Categorization (B or C): project management unit (PMU) to review the REA checklists and reconfirm the categorization. Preparation of draft IEEs with EMP for Category B and environmental due diligence report for Category C. Information and assessment related to ACM, PCRs and Critical Habitats should be incorporated.	PMU to review the subproject proposals and classify (A/B1/B2) as per the schedule. As of now, none of the subprojects to be proposed under the RSTDSP are currently listed in the Schedule of EIA Notification 2006, and therefore EIA study and environmental clearance is not required. Liaise with the State Environmental Impact Assessment Authority (SEIAA)/MOEF&CC regularly for future policy changes in the EIA Notification and its applicability to the RSTDSP and RSTDSP-AF. Identify other environmental related regulatory requirements based on the nature and location of the subproject (consent from RSPCB, clearance/approvals from ASI, Forest Department etc.,)
	For projects involving facilities and/or business activities that already exist or are under construction, undertake an environment and/or social compliance audit, including on-site assessment, to identify past or present concerns related to impacts on the environment, and involuntary resettlement. Where non-compliance is identified, a corrective action plan shall be prepared, and agreed on by ADB and RUDSICO, and implemented accordingly.	Check the regulatory compliance of such facilities, in case of non-compliance, obtain clearances/approvals as required
	Public consultation will be carried out in a manner commensurate with the impacts of affected communities. The consultation process and its results are to be documented and reflected in the IEE.	Public (hearing) consultation and disclosure is required for A and B1 projects and consists of (i) a public hearing at or near the proposed site, and (ii) responses in writing from stakeholders.
	Disclosure: For category B: Disclosure of the draft IEE; updated IEEs and corrective action plans; and environmental monitoring reports. In addition, environmental information will be in an accessible place and in a form or language understandable to affected person and other stakeholders. For illiterate people, other suitable communication methods will be used.	Disclosure is part of the consultation. Regulatory agency discloses the Summary EIA report on their website and invites responses from stakeholders. The Draft EIA report is made available on request until the public hearing.
	Identify and incorporate environmental mitigation and monitoring measures	An EMP is required, identifying mitigation measures and specifying administrative

Project Stage	Environmental Assessment and Review Framework Procedure	Government of India Procedure
	(including the EMP) into bid/contract documents	arrangements to ensure that mitigation measures are implemented, and their effectiveness is monitored after approval of the EIA. A budget for the EMP should also be provided
Appraisal and Approval	EMP and other environmental covenants (budget, personnel, etc) are incorporated into the legal agreement, loan or project agreement, and project administration memorandum (PAM).	EIA Report is reviewed by an Expert Appraisal Committee (EAC), constituted by MOEF&CC for category A projects and SEIAA for B1 projects. Applications for other clearances/approvals will be apprised by respective agencies based on submissions and site reconnaissance
	ADB will review draft final reports of all IEEs.	Based on the EAC recommendation, MOEF&CC or SEIAA will issue an environmental clearance, stipulating the conditions to be met during the implementation. Concerned agencies will issue clearances/approvals, stipulating conditions
Contract award	Confirm that all necessary environmental clearances, consents, and no-objection certificates (NOCs) as per the legal framework are in place prior to contract award. Implementation of EMP, including monitoring plans based on IEE findings to be incorporated into civil works contracts.	There is no regulatory condition on contract award, but as per the EIA Notification, environmental clearance is to be obtained before any construction work or land preparation (except land acquisition) may commence. All other clearances are also to be obtained before the start of work including land clearance.
Detailed design	Finalization of draft IEE based on detailed design	Submit application in the prescribed format to SEIAA for Category B and to MoEF&CC for category A projects, for issue of TOR for the EIA study. Prepare EIA Report as per the TOR and submit to SEIAA and MoEF&CC. For B2 projects, no EIA Report is required; appraisal and issue of environmental clearance will be based on the application form. Submit applications for other environmental related approvals to respective agencies (RSPCB, ASI etc.,)
	For projects involving facilities and/or business activities that already exist or are under construction, undertake an environment and/or social compliance audit, including on-site assessment, to identify past or present concerns related to impacts on the environment, and	Check the regulatory compliance of such facilities, in case of non-compliance, obtain clearances/approvals as required

Project Stage	Environmental Assessment and Review Framework Procedure	Government of India Procedure
	involuntary resettlement. Where non-compliance is identified, a corrective action plan shall be prepared, and agreed on by ADB and RUDSICO, and implemented accordingly.	
	Public consultation will be carried out in a manner commensurate with the impacts of affected communities. The consultation process and its results are to be documented and reflected in the IEE.	Public (hearing) consultation and disclosure is required for A and B1 projects and consists of (i) a public hearing at or near the proposed site, and (ii) responses in writing from stakeholders.
	Disclosure: For category B: Disclosure on ADB's website of the final IEE; updated IEEs and corrective action plans; and environmental monitoring reports. In addition, environmental information will be in an accessible place and in a form or language understandable to affected person and other stakeholders. For illiterate people, other suitable communication methods will be used.	Disclosure is part the consultation. Regulatory agency discloses the Summary EIA report on their website and invites responses from stakeholders. The Draft EIA report is made available on request until the public hearing.
	Mitigation measures specified in IEE study incorporated in project design	Mitigation measures specified in EIA/IEE study incorporated in project design
	Identify and incorporate environmental mitigation and monitoring measures (including the site-specific EMP and appointment of an EHS supervisor) into bid/contract documents	An EMP is required, identifying mitigation measures and specifying administrative arrangements to ensure that mitigation measures are implemented, and their effectiveness is monitored after approval of the EIA. A budget for the EMP should also be provided
Implementation	EA will submit to ADB the following documents for disclosure on ADB's website: • Updated IEE (if applicable due to change in scope or detailed design) • corrective action plan prepared during project implementation, if any • semi-annual environmental monitoring reports EA to ensure the effective implementation of the following: • Safeguards induction of Contractors • Information disclosure • GRM establishment • EMP monitoring and supervision. • Reporting corrective actions.	Project proponent to submit half-yearly compliance reports in respect of the stipulated environmental clearance conditions. MOEF&CC or SEIAA will initiate necessary action in case of non-compliance.

[a]The plan will define necessary remedial actions, the budget for such actions, and the period for resolution of noncompliance. The audit report (including corrective action plan, if any) will be made available to the public in accordance with the information disclosure requirements of Safeguard Requirements 1–3.

V. CONSULTATION, INFORMATION DISCLOSURE, AND GRIEVANCE REDRESS MECHANISM

A. Public Consultation and Information Disclosure

68. ADB SPS requires meaningful consultation with affected people that:

(i) Begins early in the project preparation stage and is carried out at 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.

69. Meaningful stakeholder consultation and participation is part of the project preparation and implementation strategy. A consultation and participation program will be implemented with the assistance of consultants. By addressing stakeholder needs, there is greater awareness of the benefits and "ownership" of the project among stakeholders, which in turn contribute to sustainability. The consultation process during the project preparation has solicited inputs from a wide range of stakeholders, including government officials, NGOs, residents of the three towns, marginalized/vulnerable beneficiary groups, and project-affected persons.

70. Consultation, participation, and disclosure will ensure that information is provided and feedback on proposed subproject design is sought early (within three months of the IEE preparation), right from the subproject preparation phase, so that the views/preferences of stakeholders including potential beneficiaries and affected people can be adequately considered, and continue at each stage of the subproject preparation, processing, and implementation.

71. Affected persons will be consulted at various stages in the project cycle to ensure: (i) incorporation of their views/concerns on compensation/resettlement assistance and environmental impacts and mitigation measures; (ii) inclusion of vulnerable groups in project benefits; (iii) identification of help required by affected persons during rehabilitation, if any; and (iv) avoidance of potential conflicts for smooth project implementation. It will also provide adequate opportunities for consultation and participation to all stakeholders and inclusion of the poor, vulnerable, marginalized, and affected persons in the project process.

72. Relevant information about any major changes to project scope will be shared with beneficiaries, affected persons, vulnerable groups, and other stakeholders.

73. A variety of approaches can be adopted. At minimum, stakeholders will be consulted regarding the scope of the environmental and social impact studies before work commences, and they will be informed of the likely impacts of the project and proposed mitigation once the draft IEE and resettlement plan reports are prepared. The reports will record the views of stakeholders and indicate how these have been taken into account in project development. Consultations will be held with a special focus on vulnerable groups.

74. The key stakeholders to be consulted during project preparation, EMP implementation, and project implementation include:

(i) project beneficiaries;
(ii) elected representatives, community leaders, religious leaders, and representatives of community-based organizations;
(iii) local non-government organizations;
(iv) Rajasthan State Pollution Control Board
(v) local governments and relevant government agency representatives, including local authorities responsible for land acquisition, protection, and conservation of
(vi) forests and environment, archaeological sites, religious sites, and other relevant
(vii) government departments;
(viii) residents, shopkeepers, and businesspeople who live and work alongside the roadswherepipeswillbelaidandnearsiteswherefacilitieswillbebuilt; custodians, and users of socially and culturally important buildings;
(ix) stakeholders within impact zone from any sanitation and sewerage components;
(x) stakeholders in physical cultural resources (PCRs);
(xi) stakeholders in areas with biodiversity concerns;
(xii) Stakeholders in areas with asbestos materials;
(xiii) RUDSICO PMU and consultants; and
(xiv) ADB, Government of Rajasthan and the Government of India.

75. A variety of approaches can be adopted, and stakeholders should be consulted throughout the project implementation. At minimum, the following consultation activities (Table 13) should be conducted. This is indicative and project agencies can also adopt more effective methods and approaches, which are locally appropriate. Consultations shall be conducted in an atmosphere which is conducive to the development of the subprojects and beneficial to the affected persons and other stakeholders. The implementing agency will ensure that the consultations are free of cohesion and intimidation, gender-inclusive, and tailored to the needs of disadvantaged and vulnerable groups.

Table 13: Public Consultation Activities

Project Stage	Consultation Activities	Remarks
Subproject preparation	Household level consultations through sample questionnaire surveys on service levels, needs, priorities for project preparation	At the start of the project
	Focus group discussions with people residing/working near the project sites	During the visits to project sites
	A subproject level consultation workshop with all key stakeholders (Community Development block-wise or district-wise, as appropriate)	Once the draft IEE report is prepared

Project Stage	Consultation Activities	Remarks
	Consultations with affected persons: affected persons shall be consulted to ensure: • incorporate their views/concerns on compensation/resettlement assistance • inclusion of vulnerable groups in project benefits; • identify assistance required by affected persons during rehabilitation, if any; and • Avoid potential conflicts for smooth project implementation. It will also provide adequate opportunities for consultation and participation to all stakeholders and inclusion of the poor, vulnerable, marginalized, and affected persons in the project process	At various stages, especially during, the preparation and implementation of resettlement plan
Subproject Implementation	Focus group discussions with the people residing/working near the project sites	During the EMP monitoring at work sites
	Informal discussions with the construction workers and construction supervision staff (contractor, consultants and PIU)	During the EMP monitoring at work sites
	Informal discussions with commuters and general public along the roads where works are implemented	During the EMP monitoring at work sites

76. **Information Disclosure.** 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.

77. At minimum, 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. The documents will be submitted to ADB for disclosure on ADB website. PMU will send written endorsement to ADB for disclosing these documents:

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

78. A concise summary of project and draft IEE report (in local language), providing all necessary details of proposals, implementation arrangements, subproject locations, likely issues and mitigation and monitoring measures and GRM, 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.

B. Grievance Redress Mechanism

79. A project-specific, three-tier 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)[19] the system was effective in timely resolution of grievances in a transparent manner.[20] The multichannel, project-specific, three-tier GRM is functional at RUSDP, hence the design of GRM for RSTDSP takes into account the proposed institutional structure for RSTDSP and the positive features and learnings from the previous GRM.[21]

80. **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/DDRs/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.

81. 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.

82. 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 at contractor's work site[22] or by sending a WhatsApp message to the PIU[23] or by dialling the phone

[19] 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.

[20] 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.

[21] 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.

[22] 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.

[23] 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.

number of town level PIU/CAPPC or by dialling a toll-free number.[24] 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.[25] 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 /Assistant Engineer 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)[26] 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 compliant/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).

(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 up.[27] In its role as a GRC, the CLC will meet whenever there is an urgent, pending

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

[25] http://www.sampark.rajasthan.gov.in/RajSamWelcome.aspx

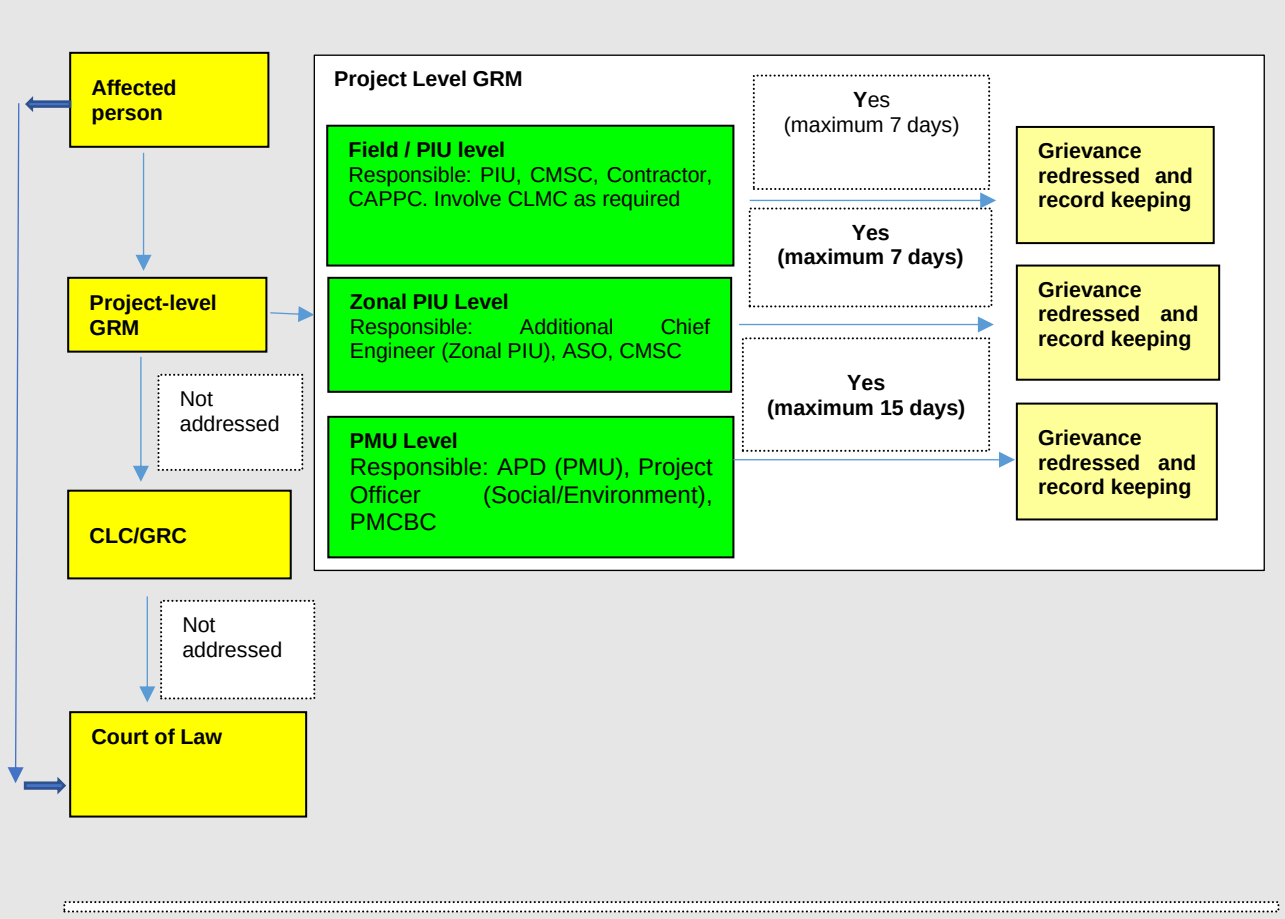
[26] The CLMC has been formed at the town/city level for planning and monitoring of work, resolve issues related to departmental coordination etc. It is headed by Commissioner/Executive Officer ULB (Chairman) and city engineer of public health engineering department (PHED), public works department (PWD)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

[27] 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.

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 1), 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 1: Grievance Redress Mechanism-RSTDSP



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.

81. 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 proposed under the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (RFCTLARRA), 2013.[28]

82. 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 Mechanism.[29]

83. **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 14.

84. **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.

85. **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.

VI. INSTITUTIONAL ARRANGEMENTS AND RESPONSIBILITIES

A. Overall Project Implementation Arrangement

86. The executing and implementing agencies will remain same for the additional financing project. The Local Self Government Department (LSGD) 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 proposed to monitor the project implementation. The PMU is at state-level and headed by a dedicated Project Director. The PIUs have two zonal offices (1 in Jaipur and 1 in Jodhpur). Each zonal office will be headed by an Additional Chief Engineer. ULBs will be the final custodian and user of the created infrastructure. As primary

[28] The Authority admits grievance only with reference to the Land Acquisition and R&R issues under the RFCTLARRA, 2013.
[29] Accountability Mechanism. http://www.adb.org/Accountability-Mechanism/default.asp.

stakeholders, the ULBs will be involved and engaged in the day-to-day monitoring and implementation.

87. 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.

88. 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.

89. 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; and
(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 ant site-specific issues regarding architectural and heritage aspects.

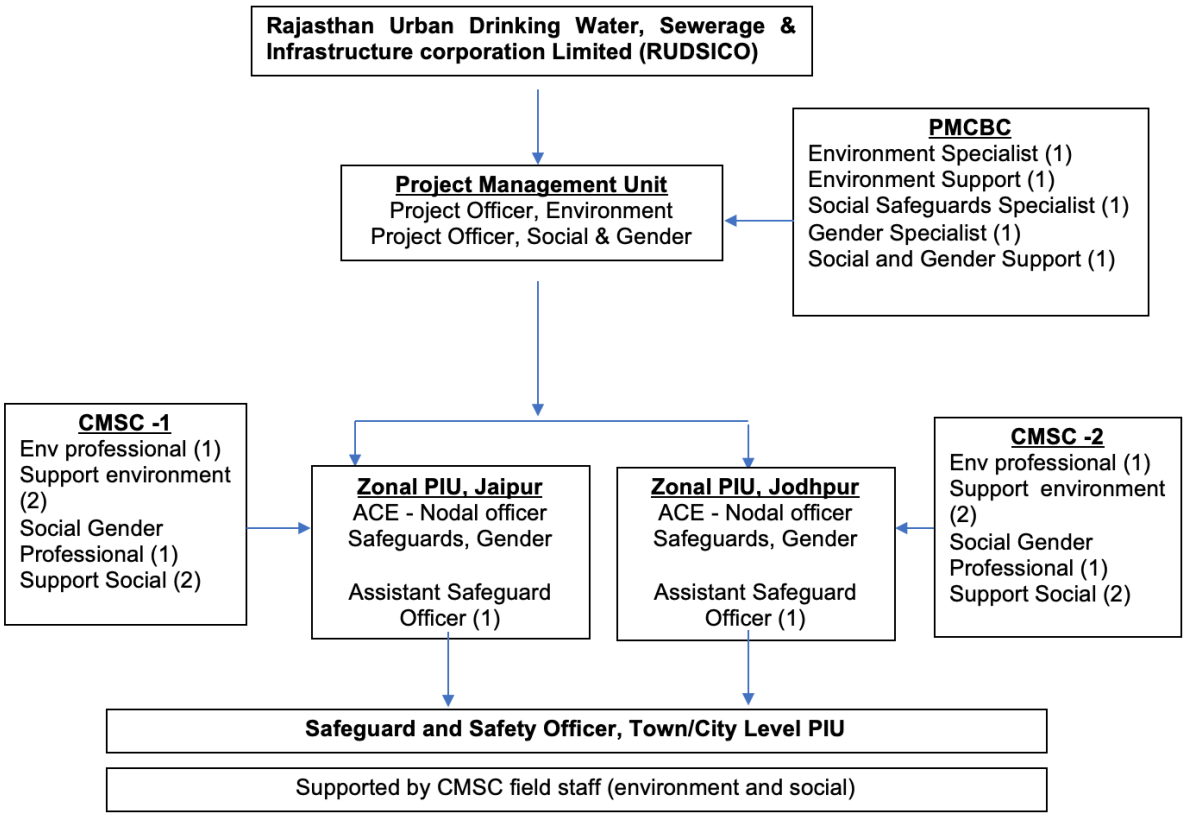
90. There will be two zonal PIUs and a PIU at every town. PIUs at the town-level shall be headed by a Superintending Engineer / Executive Engineer, who shall work as Project Manager and shall sign the contract documents, manage the contract and disburse payments as Drawing and Disbursing Officer.

91. 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 propose 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.

92. 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, sewerage and metering. CAPPC shall also undertake various IEC activities to promote and pursue health and hygiene among the communities. The scope of works of CMSC and CAPPC consulting firms engaged under the ongoing project (RSTDSP) covers a total of 42 towns, and cover both the RSDSP and the RSDSP-AF projects.

93. Table 14 to 15 summarize the institutional responsibility of environmental safeguards implementation at all stages of the project.

Figure 2: Safeguards Implementation – RSTDSP



94. **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) OHS, I 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; and
(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.

95. 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.

96. **Zonal Project implementation units (Zonal PIUs).** There will be 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.

97. 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.

98. **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 or Assistant Engineer) 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, , baseline environmental surveys to support screening and categorization per EARF;
(ii) Submit proposed 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.

99. **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,[30] consultations with interested/affected people, (iv) field-level grievance redress; and (iv) reporting.

100. The contractor will be required to submit to RUDSICO, for review and approval, a site-specific environmental management plan (SEMP) including (i) proposed 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.

101. 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.

102. 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.

[30] Reasonable size social outreach team (SOT) to be appointed by contractor to facilitate community liaison, consultations and R&R implementation (including resolution of grievances). Requirement of SOT will be included in bid document.

Table 14: 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, Government of Rajasthan 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 Government of Rajasthan, 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	**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).

Implementation Arrangements	Roles and Responsibilities
PMU Staff • 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	• 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 Government of Rajasthan • Supervise **a**nd Monitor PMCB Consultants and approve their invoices
Project Implementation Units • 2 zonal PIUs (1 in Jaipur, 1 in Jodhpur) A. PIU Staff • Project Manager (SE level) • Executive Engineer / Assistant Engineer (2 or 3) at	**Project Management** • Responsible for implementation management of sub-projects. • Responsible for day-to-day implementation, monitoring and reporting. **Safeguards Compliance (with CAPPC)** • Ensure compliance with safeguard frameworks and plans

Implementation Arrangements	Roles and Responsibilities
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)	• 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 CAPPC 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 LSGD, RUDSICO, PIUs etc. through various capacity building activities.

Table 15: 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.	(i) Over-all environmental safeguards compliance of the project (ii) Monitor and ensure compliance of EMPs as well as any other environmental provisions and conditions. (iii) Review monthly monitoring report.	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**
	(iv) Ensure approved IEEs are disclosed in RSTDSP/PMU websites and summary posted in public areas accessible and understandable by local people. (v) Ensure environmental management plans (EMPs) are included in the bid documents and contracts. (vi) Organize an orientation workshop for PMU, PIU, ULB and all staff involved in the project implementation on (a) ADB SPS, (b) Government of India national, state, and local environmental laws and regulations, (c) core labor standards, (d) OH&S, façade 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	(iv) Prepare and submit to ADB semi-annual monitoring reports. (v) If necessary, prepare Corrective Action Plan and ensure implementation of corrective actions to ensure no environmental impacts. (vi) Review and submit Corrective Action Plans to ADB (vii) Organize capacity building programs on environmental safeguards. (viii) Coordinate with national and state level government agencies. (ix) Assist in addressing any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs. (x) 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**
	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 ensure compliance with the IEE.		
PIU, Assistant Safeguard Officer	(i) Ensure IEE is included in bid documents and contract agreements. (ii) Ensure cost of EMP implementation is provided. (iii) Disclose of approved EIAs/IEEs. (iv) Obtain all necessary clearances, permits, consents, NOCs, etc. (v) 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 –	(i) Review IEE/EMP submitted by CMSC and	(i) Monitor EMP implementation.	

Responsible Agency	Responsibility		
	Pre-Construction Stage	**Construction Stage**	**Post-Construction**
1.PMCBC-Environmental Safeguard Specialist – 1 no. Asbestos Expert – 1no. Heritage Expert – 1no. Biodiversity Expert – 1no.	revise report to submit to PMU. (ii) (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	(ii) Assist in addressing any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.	
Consultant-2. CMSC-2 nos. Environmental safeguards professional	(i) Update initial environmental assessment for proposed 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.	(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	(i) Ensure EMP post-construction requirements are satisfactorily complied. (ii) Request certification from PIU

Responsible Agency	Responsibility		
	Pre-Construction Stage	**Construction Stage**	**Post-Construction**
	(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.	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.	

B. Capacity Building and Development

103. Executing and implementing agencies need to have a sustained capacity to manage and monitor environmental safeguards. Although specialist consultants support will be available to PMU and PIUs, it is necessary to mainstream safeguards in day-to-day working. Therefore, PMU and PIUs require capacity building measures for (i) a better understanding of the project-related environmental issues; and (ii) to strengthen their role in preparation of IEE, implementation of mitigation measures, and subsequent monitoring. Trainings and awareness workshops are included in the project with the primary focus of enabling the PMU and PIU staff to understand impact assessments and carry out environmental monitoring and implement EMPs. After participating in such activities, the participants will be able to review environmental assessments, conduct monitoring of EMPs, understand government and ADB requirements for environmental assessment, management, and monitoring (short- and long-term), and incorporate environmental features into future project designs, specifications, and tender documents and carry out necessary checks and balances during project implementation.

104. PMCBC's ESS shall assess the capabilities of the target participants, customize the training modules accordingly and provide the detailed cost.

105. Typical modules would be as follows: (i) sensitization; (ii) introduction to environment and environmental considerations in water supply and wastewater projects; (iii) review of IEEs and integration into the project detailed design; (iv) improved coordination within nodal departments;

and (v) monitoring and reporting system. Specific modules customized for the available skill set will be devised after assessing the capabilities of the target participants and the requirements of the project. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. The proposed training project, along with the frequency of sessions, is presented in Table 16.

Table 16: Capacity Building Program on EMP Implementation

Sl. No.	Description	Target Participants and Venue	Cost and Source of Funds
1	Introduction and Sensitization to Environmental Issues (1 day) - ADB Safeguards Policy Statement -EARF of RSTDSP -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, ULBs and consultants involved in the project At PMU, Jaipur	PMU cost
2	Treated Effluent Reuse Concepts, Design and Management	All staff at PMU and ULBs	PMU cost
3	Sludge Reuse Concept, Design and Management	All staff at PMU and ULBs	PMU cost
4	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 subproject. All contractors before start of construction works. At PIU	PMU cost
5	Plans and Protocols (1 day) -Construction site standard operating procedures (SOP) - Asbestos Management Plan -Heritage Impact Assessment -Biodiversity and Critical Habitat Assessment - 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 before start of construction works or during mobilization stage. At PIU	PMU cost Contractors cost as compliance to contract provisions on EMP implementation
6	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	PMU Cost

Sl. No.	Description	Target Participants and Venue	Cost and Source of Funds
7	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	Contractors cost as compliance to contract provisions on EMP implementation

C. Staffing and Budget

106. Costs required for implementing the EARF will cover the following activities:

(i) conducting environmental assessments of new subprojects, preparing and submitting reports, and public consultation and disclosure;
(ii) application for government regulatory consents, approvals; and
(iii) implementation of EMP and long-term surveys.

107. For budgeting purposes, it is assumed that all new subprojects will be classified by ADB as category B (requiring IEE). Some subprojects may require a simpler environmental review, but this is discounted for budgeting purposes.

108. Preparation of IEE requires an experienced environmental specialist for conducting the following activities: (i) site visit to assess environmental conditions and potential impacts of the scheme; (ii) liaison with ULBs and others to obtain any environmental/social data that might be available locally (e.g., population figures, designated sites, etc.); (iii) consultation with the local community to inform them about the scheme and identify their views and concerns; (iv) assessment of impacts and development of mitigation; and (v) desk study and report preparation. Site-specific assessments on asbestos, heritage and biodiversity shall also be included in the IEEs.

109. The infrastructure involved in each scheme is generally straightforward and will take 4 years to build. Environmental monitoring during construction will also be straight forward and will involve periodic site observations and interviews with workers and others, plus checks of reports and other documents. This will be conducted by PMCBC environment safeguard specialist). The PMCBC environment safeguard specialist will review the updated IEEs, or environmental reviews for new subprojects. The budget therefore includes the full cost of the environment specialist.

110. The cost of mitigation measures and surveys during construction will be incorporated into the contractor's costs, which will be binding on him for implementation. The surveys will be conducted by the contractors.

111. The operation phase mitigation measures are again of good operating practices, which will be the responsibility of the ULBs. All monitoring during the operation and maintenance phase will be conducted by government regulatory agencies like RSPCB as per their mandate therefore, there are no additional costs. The indicative costs of EARF implementation are shown in Table 17. An implementation period of 48 months is considered for the preparing following costs.

Table 17: Indicative Cost of Environmental Assessment and Review Framework Implementation

Component	Description	Number	Cost Per Unit (INR)	Cost (INR)	Source of Funds
A. Consultants Costs					

Component	Description	Number	Cost Per Unit (INR)	Cost (INR)	Source of Funds
PMCBC environmental safeguards specialist – 1 no.	Responsible for environmental safeguards of the project	50 person months (spread over entire project implementation period)	2,25,000 per month	11,250,000	Remuneration and budget for travel covered in the PMCBC contract
PMCBC environmental support staff – 1nos	Responsible for environmental safeguards at PMU level	56 person months for each (spread over entire project implementation period)	80,000 per month	44,80,000	Remuneration and budget for travel covered in the CMSC contract
PMCBC Asbestos expert	Responsible for: (i) conduct of asbestos impact assessment and preparation of management plan; (ii) training and capacity building tasks, (iii) monitoring and reporting	12 person months (spread over entire project implementation period)	3,00,000 per month	36,00,000	Remuneration and budget for travel covered in the PMCBC contract-by variation
PMCBC Heritage expert	Responsible for: (i) conduct of heritage impact assessment and preparation of management plan; (ii) training and capacity building tasks, (iii) monitoring and reporting	12 person months (spread over entire project implementation period)	300,000 per month	36,00,000	Remuneration and budget for travel covered in the PMCBC contract-by variation
PMCBC Biodiversity expert	Responsible for: (i) screening and conduct of biodiversity assessment (ii) training and capacity building tasks, (iii) monitoring and reporting	12 person months (spread over entire project implementation period)	300,000 per month	36,00,000	Remuneration and budget for travel covered in the PMCBC contract-by variation
CMSC Environment safeguards professional-2 Nos (one in each CMSC contract)	Responsible for environmental safeguards at field level	80-person month (40 person months each CMSC for each (spread over entire project implementation period)	1,20,000 per month	96,00,000	Remuneration and budget for travel covered in the each CMSC contract.
CMSC environmental support staff – 4	Responsible for environmental safeguards at PIU	112-person month (56 person months	60,0000 per month	67,20,000	Remuneration and budget for travel

Component	Description	Number	Cost Per Unit (INR)	Cost (INR)	Source of Funds
nos. (2 nos. in each CMSC contract)	level	each CMSC contract) for each (spread over entire project implementation period)			covered in the each CMSC contract.
B. Administrative Costs					
Legislation, permits, and agreements	Consent fee for STPs/WTPs, forest permission etc.	All subprojects	Lump sum	20,00,000	Included in the overall project cost.
C. Environmental Monitoring Costs					
Mitigation Measures	During pre-construction (one time) and construction (Quarterly as per IEE/EMP)	All subprojects	Lump sum	713,796	Contractor's cost (included in project cost)
Monitoring Measures	During pre-construction (one time) and construction (Quarterly as per IEE/EMP)	All subprojects	Estimated per subproject	97,11,080	Contractor's cost (included in project cost)
Barricading, water sprinkling, rainwater harvesting and other civil works-related activities	During construction	All subprojects	Estimated per subproject	383,625,749	Contractor's cost (included in project cost)
Asbestos Management	During construction	Subprojects with known ACMs	Estimated per subproject	39,200,000	Contractor's cost (included in project cost)
Heritage Management	During construction	Subprojects with physical cultural resources value	Estimated per subproject	2,800,000	Contractor's cost (included in project cost)
Other Costs					
Public consultations and information disclosure	Information disclosure and consultations during pre- construction and construction phase, including public awareness campaign through media	As per requirement	Lump sum	20,00,000	PIU costs – part of incremental administration

Component	Description	Number	Cost Per Unit (INR)	Cost (INR)	Source of Funds
Capacity development in environmental safeguards	Awareness and training programs – venue and other arrangements	Training workshops to all program agencies	325,000 per town	45,50,000	PMU costs – part of incremental administration
GRM implementation	Costs involved in resolving complaints (meetings, consultations, communication, and reporting/information dissemination)	Part of administration cost of PMUs	350,000 per town	49,00,000 per year	PMU cost
Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction phase and defect liability period	Lump sum	Contractor's liability	As per insurance requirement	Contractor's Insurance
Total				**492,350,625/-**	

VII. MONITORING AND REPORTING

112. RUDSICO will monitor and measure the progress of EMP implementation. The monitoring activities will correspond with the project's risks and impacts. In addition to recording information on the work and deviation of work components from original scope, PMU, PIUs, and PMCBC will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome.

113. Prior to commencement of the work, the DBO contractor will submit a compliance report to PIU ensuring that all identified pre-construction environmental impact mitigation measures as detailed in the EMP will be undertaken. PIU with the assistance of the project officer (environmental safeguard) and ESS of PMCBC Consultant will review the report and thereafter PIU will allow commencement of works.

114. During construction, results from internal monitoring by the DBO contractor will be reflected in their monthly EMP implementation reports submitted to the PIU and environmental specialist of CMSC. They will review and advise contractors for corrective actions if necessary. Monthly report summarizing compliance and corrective measures taken will be prepared by ASO (PIU)with the assistance of environmental specialist of CMSC and submitted to PMU.

115. Quarterly report shall be prepared by CMSC and PIU and submitted to PMU for review and further actions. The quarterly report shall include the Quarterly Progress Report checklist (Appendix 16 to ensure completeness of safeguards requirements.

116. Based on monthly and quarterly reports and measurements, PMCBC will draft semi-annual reports and submit to PMU for their review and further submission to ADB (see Appendix 13). Once concurrence from the ADB is received the report will be disclosed in the project website.

117. ADB will review project performance against the LSGD, GOR, 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. ADB will monitor projects on an ongoing basis until a project completion report is issued. ADB will carry out the following monitoring actions to supervise project implementation:

(i) conduct periodic site visits for projects;
(ii) conduct supervision missions with detailed review by ADB's safeguard Specialists /officers or consultants for projects with significant adverse social or environmental impacts;
(iii) review the periodic monitoring reports submitted by Eas to ensure that adverse impacts and risks are mitigated, as planned and agreed with ADB;
(iv) work with Eas to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the legal agreements, and exercise remedies to re-establish compliance as appropriate; and
(v) prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

118. ADB's monitoring and supervision activities are carried out on an ongoing basis until a Project Completion Report (PCR) is issued. Thus, semi-annual monitoring report, which may cover O&M of completed packages, will be submitted to ADB until PCR is issued. ADB issues a PCR within 1-2 years after the project is physically completed and in operation.

Appendix 1: Sample IBAT Report for Abu Road

IBAT

Integrated Biodiversity Assessment Tool

WORLD BANK GROUP BIODIVERSITY RISK SCREEN

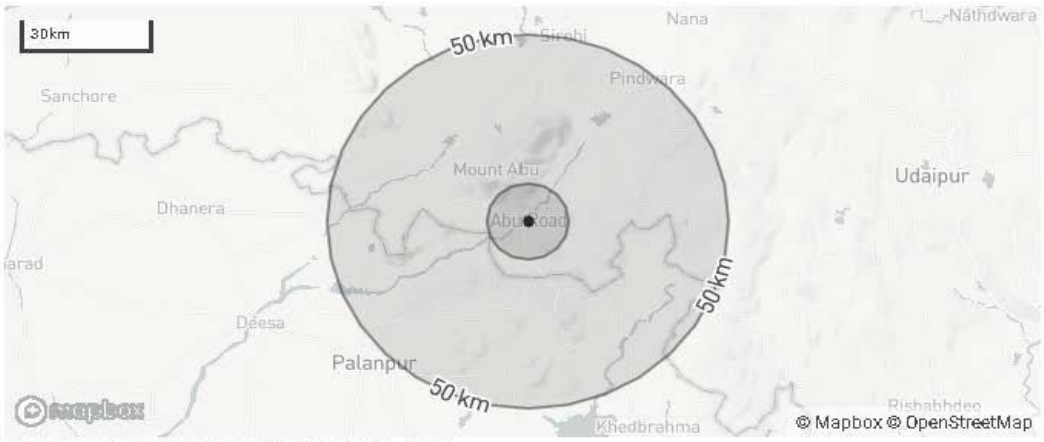
Report generated on 14/10/2019 by Ninette Pajarillaga under the license number 954-4562 held by ADB. www.ibat-alliance.org

Project Name: IND RSTDSP Abu Rd

Location: [24.5, 72.8]

Overlaps with:

Protected Areas	3
Key Biodiversity Areas	3
IUCN Red List	12
Critical Habitat	Likely



Displaying project location and buffers: 10km, 50km

WORLD BANK GROUP

This report is based on IFC Performance Standard 6 (PS6) but applies to World Bank Environmental and Social Standard 6 (ESS6)

About this report

IBAT provides initial screening for critical habitat values. Performance Standard 6 (PS6) defines these values for critical habitat (PS6: para. 16) and legally protected and internationally recognized areas (PS6: para. 20). PS6 will be triggered when IFC client activities are located in modified habitats containing "significant biodiversity value," natural habitats, critical habitats, legally protected areas, or areas that are internationally recognized for biodiversity. References to PS6 and Guidance Note 6 (GN6) are provided to guide further assessment and detailed definitions where necessary. Please see https://www.ifc.org/ps6 for full details on PS6 and GN6.

The report screens for known risks within a standard 50km buffer of the coordinates used for analysis. This buffer is not intended to indicate the area of impact. The report can be used to:

- Scope risks to include within an assessment of risks and impacts
- Identify gaps within an existing assessment of risks and impacts
- Prioritize between sites in a portfolio for further assessment of risks and impacts
- Inform a preliminary determination of critical habitat
- Assess the need for engaging a biodiversity specialist
- Identify additional conservation experts or organizations to inform further assessment or planning

WARNING: IBAT aims to provide the most up-to-date and accurate information available at the time of analysis. There is however a possibility of incomplete, incorrect or out-of-date information. All findings in this report must be supported by further desktop review, consultation with experts and/or on-the-ground field assessment as described in PS6 and GN6. Please consult IBAT for any additional disclaimers or recommendations applicable to the information used to generate this report.

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Priority Species

Habitat of significant importance to priority species will trigger critical habitat status (See PS6: para 16). IBAT provides a preliminary list of priority species that could occur within the 50km buffer. This list is drawn from the IUCN Red List of Threatened Species (IUCN RL). This list should be used to guide any further assessment, with the aim of confirming knownor likely occurrence of these species within the project area. It is also possible that further assessment may confirm occurrence of additional priority species not listed here. It is strongly encouraged that any new species information collected by the project be shared with species experts and/or IUCN wherever possible in order to improve IUCN datasets.

IUCN Red List of Threatened Species - CR & EN

The following species are potentially found within 50km of the area of interest.
For the full IUCN Red List please refer to the associated csv in the report folder.

Species name	Common name	IUCN Category	Group
Vanellus gregarius	Sociable Lapwing	CR	AVES
Gyps bengalensis	White-rumped Vulture	CR	AVES
Sarcogyps calvus	Red-headed Vulture	CR	AVES
Gyps indicus	Indian Vulture	CR	AVES
Manis crassicaudata	Indian Pangolin	EN	MAMMALIA
Sypheotides indicus	Lesser Florican	EN	AVES
Sterna acuticauda	Black-bellied Tern	EN	AVES
Haliaeetus leucoryphus	Pallas's Fish-eagle	EN	AVES
Neophron percnopterus	Egyptian Vulture	EN	AVES
Aquila nipalensis	Steppe Eagle	EN	AVES
Falco cherrug	Saker Falcon	EN	AVES

Species name	Common name	IUCN Category	Group
Leptoptilos dubius	Greater Adjutant	EN	AVES

Restricted Range Species

	Common name	IUCN Category	Group

Biodiversity features which are likely to trigger Critical Habitat

Protected Areas

The following protected areas are found within 10km and 50km of the area of interest.
For further details please refer to the associated csv file in the report folder.

Area name	Distance	Recommendation
Balaram Ambaji	10km	Assess for biodiversity risk
Mount Abu	10km	Assess for biodiversity risk
Jessore	50km	Assess for biodiversity risk

Key Biodiversity Areas

The following key biodiversity areas are found within 10km and 50km of the area of interest.
For further details please refer to the associated csv file in the report folder.

Area name	Distance	Recommendation
Mount Abu Wildlife Sanctuary	10km	Assess for critical habitat
Phulwari Wildlife Sanctuary	50km	Assess for critical habitat
Sei Dam reservoir and surrounding environs	50km	Assess for critical habitat

Species with potential to occur

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
AVES	305	25	4	7	14	15	265	0
MAMMALIA	74	6	0	1	5	3	65	0
REPTILIA	15	2	0	0	2	0	11	2
MAGNOLIOPSIDA	36	1	0	0	1	0	34	1
LILIOPSIDA	48	1	0	0	1	0	45	2
ACTINOPTERYGII	31	0	0	0	0	3	27	1
AMPHIBIA	9	0	0	0	0	0	9	0
INSECTA	30	0	0	0	0	0	29	1
GASTROPODA	19	0	0	0	0	0	19	0
POLYPODIOPSIDA	3	0	0	0	0	0	3	0
BIVALVIA	7	0	0	0	0	0	7	0
MALACOSTRACA	3	0	0	0	0	0	3	0

Country-level summary

Coming soon

Recommended Experts and Organizations

For projects located in critical habitat, clients must ensure that external experts with regional expertise are involved in further assessment (GN6: GN22). Clients are encouraged to develop partnerships with recognized and credible conservation organizations and/or academic institutes, especially with respect to potential developments in natural or critical habitat (GN6: GN23). Where critical habitats are triggered by priority species, species specialists must be involved. IBAT provides data originally collected by a large network of national partners, while species information is sourced via the IUCN Red List and affiliated Species Specialist Groups. These experts and organizations are listed below. **Please note that this is not intended as a comprehensive list of organizations and experts. These organizations and experts are under no obligation to support any further assessment and do so entirely at their discretion and under their terms. Any views expressed or recommendations made by these stakeholders should not be attributed to the IFC or IBAT for IFC partners.**

Relevant national or regional organizations

IBAT integrates information developed by a global network of conservation agencies, organizations and experts. These efforts are coordinated by the IBAT Alliance (BirdLife International, Conservation International, IUCN and UNEP-WCMC) who compile and maintain this information as globally standardized databases. The local partners most relevant to the area of analysis are:

Wild Bird Society of Japan Address: Maruwa Building, 3-9-23 Nishi-Gotanda, Shinagawa-ku, Tokyo 141-0031, JapanWeb: http://www.wbsj.org/

BirdLife Asia Regional Office Address: 354 Tanglin Road, #01-16/17, Tanglin International Centre, Singapore 247672 Email: singapore.office@birdlife.org Web: http://www.birdlife.org/asia

Directory for Species Survival Commission (SSC) Specialist Groups and Red List Authorities

URL: http://www.iucn.org/about/work/programmes/species/who_we_are/ssc_specialist_groups_and_red_list_authorities_directory/

Appendix 2: Biodiversity Assessment Report

SC Environment Ltd

[Subject]

[Title]

Date: 19 January 2020

For Asian Development Bank

Ref: SCE – ADB TL09-11-19 01

Rev: 01

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Author Stephen Crute
Signed
Date 07 December 2019

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Acronyms

ADB	Asian Development Bank
AoA	Area of Analysis
CH	Critical Habitat
CR	Critically Endangered
EN	Endangered
IBA	Important Bird Area
IBAT	Integrated Biodiversity Assessment Tool
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
SPS	Safeguard Policy Statement
VU	Vulnerable
WPDA	World Database on Protected Areas

1 INTRODUCTION

1.1 *Preamble*

The Asian Development Bank (ADB) is considering a loan/grant for a series of water and sewerage infrastructure improvements within the Indian State of Rajasthan. As part of the due diligence process for the loan/grant, ADB wishes to have information on the potential presence of Critical Habitat within the proposed projects potential Area of Influence. In addition, general information on the biodiversity value of the areas where the projects will take place is required for the project development phases if the loan/grant is processed.
Asian Development Bank (ADB) has requested an initial screening study for ecological constraints and in particular for Critical Habitat within the AoA of the project areas. This report sets out the outcomes of the conducted screening for one of the projects in an area referred to as Abu Road. The determination of the presence of Critical Habitat is a fundamental part of ADB Safeguard Policy Statement (Asian Development Bank, 2009).

2 PROJECT DESCRIPTION

2.1 *Preamble*

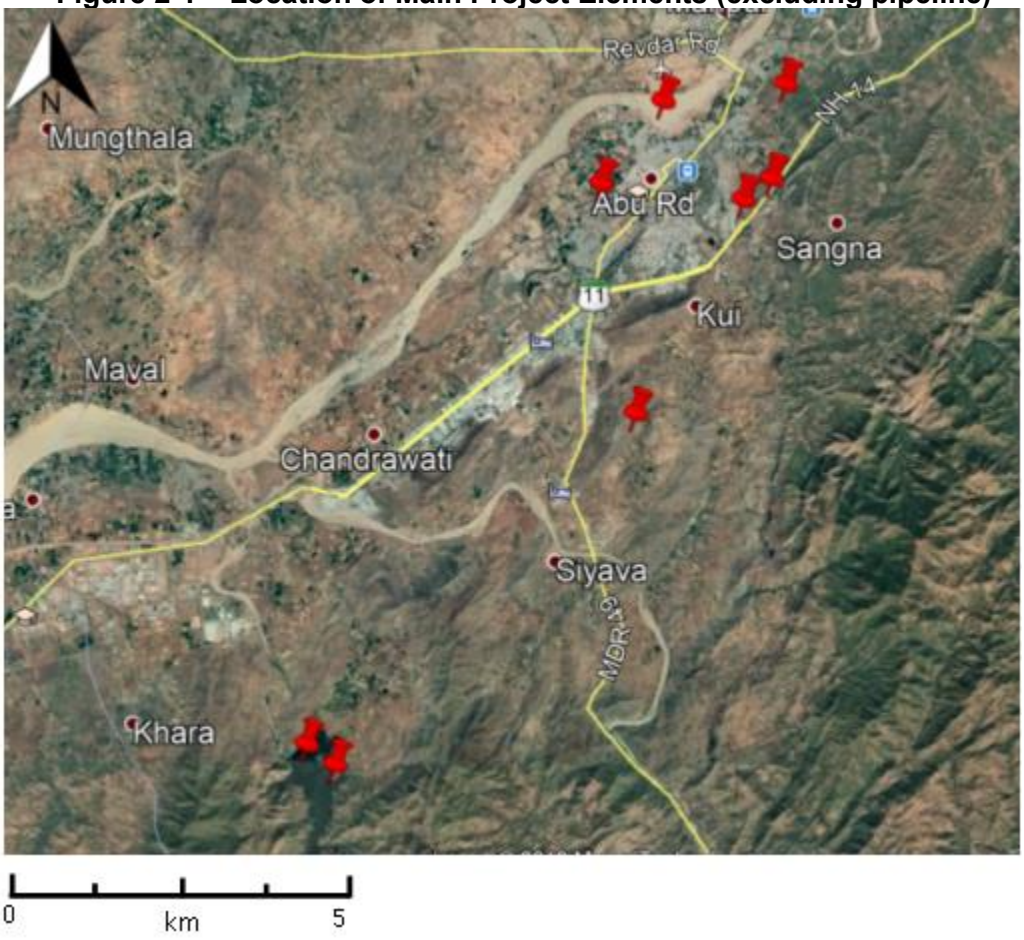
The following text provides an overview of the proposed project relating to the development of infrastructure at Abu Road. This description is provided only for contextual information as the determination of the presence of or potential presence of Critical Habitat is independent of the proposed project, construction activities and operational/maintenance features.

2.2 *Project Location*

Abu Road is located in the State of Rajasthan and is situated southern part of the State some 15 km from the border with Gujarat.

The project site is shown in Figure 2-1. This shows the main project elements including an intake well and pumping station in Bhaisa Singh Dam, a Water Treatment Plant and two Sewage Treatment Plants. Additionally, a water supply pipe will run from the dam to the Water Treatment Plant. This is planned to run in the utility corridor of an existing highway.

Figure 2-1 – Location of Main Project Elements (excluding pipeline)



Source: Base Map – Google Earth

2.3 *Project Description*

The Abu Road project elements, as noted above, include a water intake well at Bhaisa Singh Dam which lies some 9 km south of the urban area of Abu Road. A pumping station at the dam will provide water supply to a new Water Treatment Plant for the town of Abu Road. The connecting pipes and distribution lines form part of the overall project.
In addition, two Sewage Treatment Plants will be developed to serve the needs of Abu Road.

3 SCREENING PROCESS FOR CRITICAL HABITAT

3.1 *Process*

Two related aspects have been screened. The first is the presence of protected or designated areas which may affect the loan/grant decision making process and the second the potential presence of Critical Habitat[31] based on an initial risk assessment of the presence of Threatened species (Critically Endangered (CR) and Endangered (EN) species as defined by the IUCN, and to a lesser extent Vulnerable (VU) species).
The process has utilised the International Finance Corporation's (IFC) recommended approach to identification of Critical Habitat but at a more preliminary screening level. The method is presented as part of the IFC's Performance Standard No 6 of 2012, within the Guidance Note for the Performance Standard which was last updated in June 2019 (IFC, 2019).

3.2 *Data Sources*

The screening process has involved review of publicly available sources of data relating to protected sites and species conservation status.
The following primary sources of data were utilised:

- Integrated Biodiversity Assessment Tool (IBAT);
- The World Database of Key Biodiversity Areas website (WPDA);
- Important Bird Areas (Birdlife International);
- Ramsar website.
- IUCN Redlist;
- UNEP-WCMC (2017) Global Critical Habitat screening layer.

These were supported by general searches for information and data on the project area. Such sources are quoted within the Bibliography section of the report.

[31] Note the use of the term Critical Habitat refers to the definition utilised by ADB in the Safeguard Policy Statement of 2009 and the International Finance Corporation Performance Standard No 6 – Biodiversity.

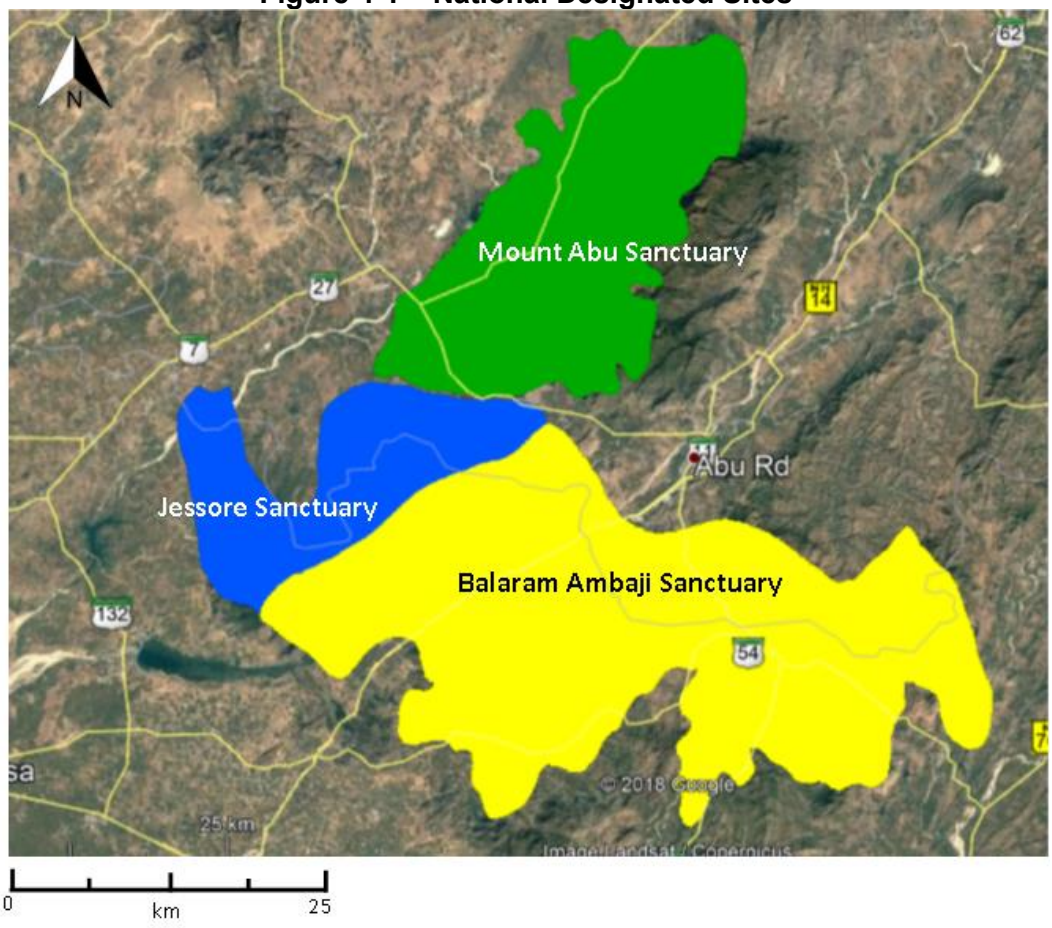
4 RESULTS

4.1 *Protected Areas*

4.1.1 National Sites

A review of national sites based on IBAT and WPDA data indicates that there are three formally designated areas. These are shown in Figure 4-1.

Figure 4-1 – National Designated Sites



Mount Abu Sanctuary

This site is located in the State of Rajasthan and is a mountain sanctuary. It was designated in 1960 and has an area of 326 km^2. It has a rich flora with sub-tropical thorn scrub and forest present.

The site is reported to be under the management responsibility of Chief Wildlife Warden, State Forest Department of Rajasthan.

Jessore Sanctuary

This sanctuary is located within the State of Gujarat and is some 181 km^2 in area, consisting mainly of forest habitat and was notified in 1978. The sanctuary's main interest is the Sloth Bear, but there are a range other mammal and bird species of note within the area.

The site is reported to be under the management responsibility of Chief Wildlife Warden, State Forest Department of Gujarat.

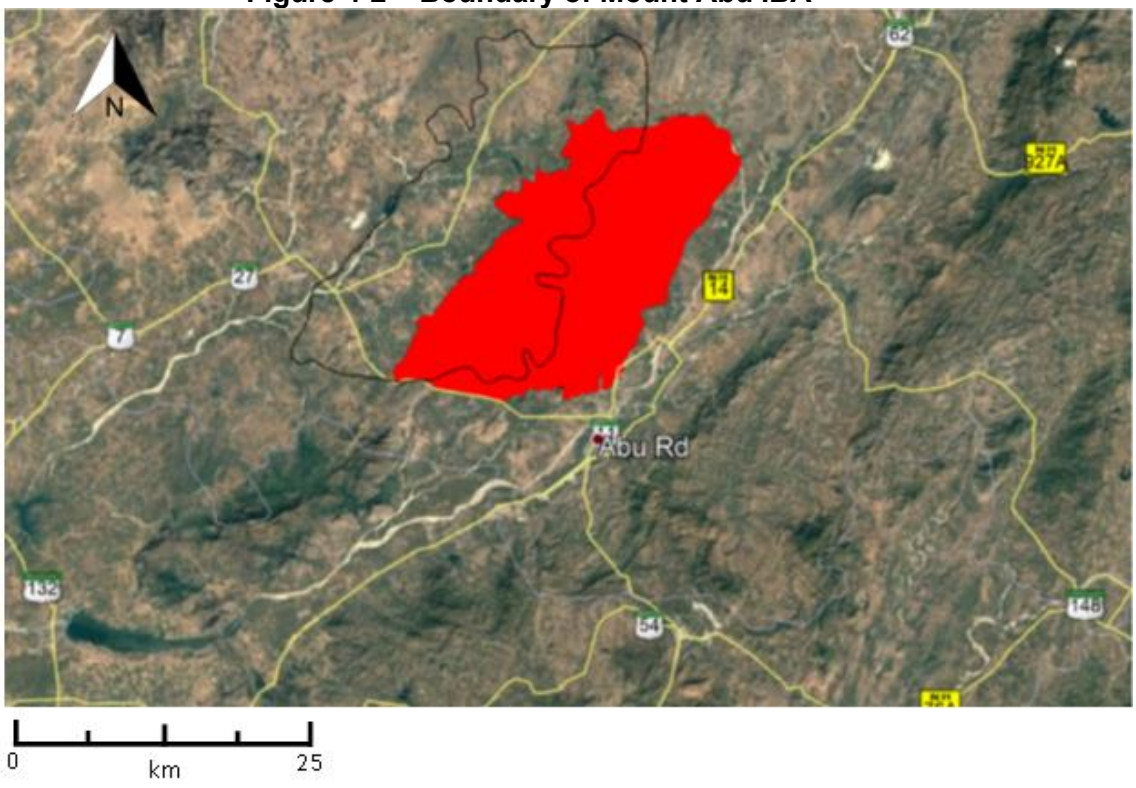
Balaram Ambaji Sanctuary

This sanctuary is located mainly within the State of Gujarat and is some 542 km^2 in area, consisting mainly of forest habitat. The site was initially notified as a sanctuary in 1989. Parts of the site are degraded and in 2013 the National Board for Wildlife undertook surveys to determine exclusion of areas from the sanctuary as they had been degraded. The site boundary provided on the WPDA shows some areas extending into Rajasthan. The site is reported to be under the management responsibility of Chief Wildlife Warden, State Forest Department of Gujarat.

4.1.2 Key Biodiversity Areas

There is one Key Biodiversity Area in addition to the National Designations discussed above. This is an Important Bird Area (IBA) as declared by Birdlife International. This site is referred to as Mount Abu IBA. This is shown in
Figure 4-2. A substantial part of the site coincides with Mount Abu Sanctuary but the IBA does not extend as far west and extends further east than the National Site boundary. The outline of the National Boundary is also presented in
Figure 4-2 for comparison purposes.

Figure 4-2 – Boundary of Mount Abu IBA



Source – Base Map Google Earth

4.2 *Potential Critical Habitat Qualifying Species*

4.2.1 IFC Process for Critical Habitat Assessment

The screening for Critical Habitat has been conducted based on species which may qualify the habitat as Critical. This has been based on the approach as set out in the 2019 IFC updates to Performance Standard No 6 Guidance note (IFC, 2019). This utilises five criterion to determine if the area under consideration would qualify as Critical Habitat. Three of the criterion (1-3) relate to species and have thresholds which are based on the risk of extinction of species as designated by the IUCN Red List status for each species. Criteria 4 and 5 relate to ecosystems and evolutionary processes and do not utilise thresholds. A summary of the criteria are set out below.

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 (≥ 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.
I As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species.

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 km^2.
- For marine systems, restricted range species are provisionally being considered those with an EOO of less than 100,000 km^2.
- 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:

(i) Areas that regularly hold ≥10% of the global population size AND ≥10 reproductive units of a species.

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 104 special 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.

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, recognised academic institutions and/or other relevant qualified organizations (including internationally recognised Non-Government Organisations (NGOs)).

The thresholds for Criterion 4 are the following:

a) Areas representing ≥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.

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.

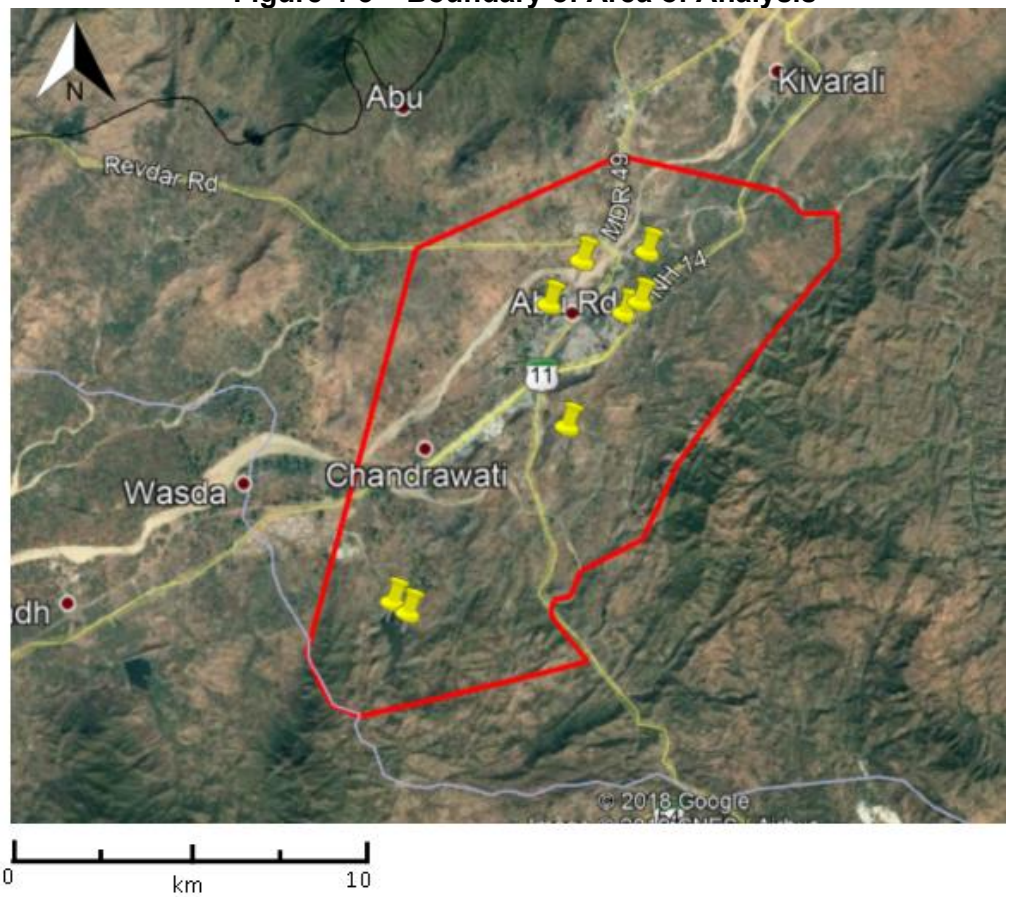
4.2.2 Area of Analysis

The IFC Approach to Critical Habitat Assessment requires the establishment of an Area of Analysis (AoA) to be determined for the assessment. For this initial screening, based on the proposed project layout with its discontinuous elements and pipelines, a single AoA which encompasses all of the project elements has been selected.

As set out in the IFC Guidance on Critical Habitat Assessment (CHA), the AoA will be based on the general location of the project but the selected AoA should not reflect the projects potential impacts or risks. The AoA is not synonymous with the projects Area of Influence. The guidance suggests selecting boundaries which represent ecological units and/or are physical features within the landscape such as roads or rivers. The selected AoA for the Abu Road project elements is shown in

Figure 4-3. This has been based on a number physical/topographical features. To the east the boundary generally follows a ridge line, before turning westwards, partially following a small road and then crossing to the west of the project elements. A natural alignment to the west would have been along the wadi which runs through Abu Road area. However, some project elements lie close to the east side of the wadi and it was considered that allowing a buffer of 2 km from the western edge of the wadi was more appropriate. The boundary then turns south and allows a buffer of 2 km around Bhaisa Singh Dam.

Figure 4-3 – Boundary of Area of Analysis



4.2.3 Results Criteria 1 – 3 – IBAT Species Output

Based on an IBAT search for species, a long list of Threatened Species (Critically Endangered (CE), Endangered (EN) and Vulnerable (VU) have been identified as potentially present in the AoA. The screening has used an initial buffer of 50 km from the Abu Road project area.

The long list of CR, EN and VU species which may be present is shown in Table 4-1. This shows that there are four CR species, eight EN species and 23 VU species.

Table 4-1 – Long List of Species based on 50 km Buffer

Scientific Name	Common Name	IUCN Status
Vanellus gregarius	Sociable Lapwing	CR
Gyps bengalensis	White-rumped Vulture	CR

Scientific Name	Common Name	IUCN Status
Sarcogyps calvus	Red-headed Vulture	CR
Gyps indicus	Indian Vulture	CR
Manis crassicaudata	Indian Pangolin	EN
Sypheotides indicus	Lesser Florican	EN
Sterna acuticauda	Black-bellied Tern	EN
Haliaeetus leucoryphus	Pallas's Fish-eagle	EN
Neophron percnopterus	Egyptian Vulture	EN
Aquila nipalensis	Steppe Eagle	EN
Falco cherrug	Saker Falcon	EN
Leptoptilos dubius	Greater Adjutant	EN
Crocodylus palustris	Mugger	VU
Lutrogale perspicillata	Smooth-coated Otter	VU
Melursus ursinus	Sloth Bear	VU
Panthera pardus	Leopard	VU
Tetracerus quadricornis	Four-horned Antelope	VU
Geochelone elegans	Indian Star Tortoise	VU
Rusa unicolor	Sambar	VU
Anacyclus pyrethrum	Atlas Daisy	VU
Marmaronetta angustirostris	Marbled Teal	VU
Aythya ferina	Common Pochard	VU
Columba eversmanni	Yellow-eyed Pigeon	VU
Antigone antigone	Sarus Crane	VU
Clanga clanga	Greater Spotted Eagle	VU
Aquila rapax	Tawny Eagle	VU
Aquila heliaca	Eastern Imperial Eagle	VU
Saxicola macrorhynchus	White-browed Bushchat	VU
Machlolophus nuchalis	White-naped Tit	VU
Chaetornis striata	Bristled Grassbird	VU
Amandava formosa	Green Avadavat	VU
Ciconia episcopus	Asian Woollyneck	VU
Clanga hastata	Indian Spotted Eagle	VU
Chlamydotis macqueenii	Asian Houbara	VU
Oryza malampuzhaensis		VU

IFC PS No 6 approach focuses initially on CR and EN for Criterion No 1 and these have been reviewed using IUCN distribution maps, other literature and likely habitat requirements.

A summary of the screening of the CR and EN species is presented in Table 4-2. This provides a note on each species and then an initial assessment of that species likelihood of qualifying the AoA as Critical Habitat based on Criteria 1-3.

Table 4-2 – Summary of IBAT CR and EN Species and Potential as Critical Habitat Qualifying Species (Criteria 1 – 3)

Scientific Name	Common name	IUCN Status	Notes	1	2	3	Qualifying Species?
Vanellus gregarius	Sociable Lapwing	CR	The IUCN Redlist mapping of this species suggests that it may be extinct within the project area. The IBA listing for Mount Abu (BirdLife International , 2019) does not include this species. This would be a non-breeding species within this area if present	X	X	X	Not considered to be a qualifying species
Gyps bengalensis	White-rumped Vulture	CR	A rare species with wide distribution which has, at least historically included the project area. These are birds with a large home range – Stated to be present in Mount Abu IBA in 2004 account. Chhangani showed this species to be widespread across Rajasthan in surveys conducted between 2005 and 2007 (Chhangani, 2009). Unlikely to be meet IUCN breeding criteria	X	X	?	Possible qualifying species based on congregatory basis as this species will form aggregations in suitable locations
Sarcogyps calvus	Red-headed Vulture	CR	The IUCN species mapping shows that Abu Road lies close to the line of extant and possibly extinct. Chhangani conducted survey for this species within Rajasthan and found it to be present within the state in low numbers, although not specifically within Abu Road location (Chhangani, 2007). The World Bird Database presents a checklist of species at Mount Abu and Surrounding area and *Sarcogyps calvus* is on the checklist (Lepage, 2019)	X	X	?	Possible as a congregatory species
Gyps indicus	Indian Vulture	CR	Abu Road is located at the boundary of the IUCN mapping of this species as Extant and Likely Extinct. It is not listed as a qualifying species for the Mount Abu IBA but is listed within the Mount Abu and Environs species checklist (Ibid)	X	X	?	Possible as a congregatory species

Scientific Name	Common name	IUCN Status	Notes	1	2	3	Qualifying Species?
Manis crassicaudata	Indian Pangolin	EN	Present across India and reported to be present in the Mount Abu IBA (BirdLife International , 2019). Utilises a range of habitats including degraded sites and agricultural areas	?	X	X	Low potential to fulfil Criterion 1 but further survey would be required to confirm presence/absence of this species with the AoA
Sypheotides indicus	Lesser Florican	EN	A grassland bird species which has been recorded in the Abu Road area previously but is not mentioned in the IBA (ibid) qualifying species description. This species is congregatory on breeding grounds – no specific records for the Abu Road area but potentially present	?	X	?	Low potential to fulfil Criterion 1/3 but further survey would be required to confirm presence/absence of this species with the AoA
Sterna acuticauda	Black-bellied Tern	EN	The AoA is located at the northern edge of the IUCN distribution mapping for this species – it is not listed on the Avi Base checklist for Mount Abu and its environs (Lepage, 2019). Main habitats are large rivers and sometimes smaller lakes	X	X	X	Considered unlikely to be a qualifying species
Haliaeetus leucoryphus	Pallas's Fish-eagle	EN	IUCN mapping shows that the AoA is within a possible extinct, not listed in IBA qualifying species or the Avi Base checklist (Lepage, 2019)	X	X	X	Not considered to be a qualifying species
Neophron percnopterus	Egyptian Vulture	EN	Reported to be present within the Mount Abu area (Lepage, 2019), this is a species which nests on cliffs and high areas, but will forage over a wide area including in villages. Usually solitary but will form congregations at feeding areas	X	X	?	Considered low risk of being a qualifying species but will need further survey to confirm assumption
Aquila nipalensis	Steppe Eagle	EN	A widespread species which prefers high ground and open plains. This species is not mentioned in the IBA citation (BirdLife International , 2019) but is listed as present within area (Lepage, 2019). Considered unlikely to meet the thresholds for Criterion 1 – 3	X	X	X	Not considered to be a qualifying species
Falco cherrug	Saker Falcon	EN	This species is a migrant, non-breeding bird within the areas around Abu Road. It	X	X	X	Not considered to be a qualifying species

Scientific Name	Common name	IUCN Status	Notes	1	2	3	Qualifying Species?
			is not recorded on the avi database (Lepage, 2019). This species would not fulfil the breeding thresholds of Criterion 1 or 2 and is considered unlikely to meet Criterion 3 thresholds				
Leptoptilos dubius	Greater Adjutant	EN	The IUCN distribution mapping for this species indicates that it is considered extinct in the north of India	X	X	X	Not considered to be a qualifying species

4.2.4 Vulnerable Species

For the 24 Vulnerable species identified through the IBAT search, a review of these indicates that none would reach the threshold for Criterion 1, namely loss of a population which would push the IUCN status from VU to either CR or EN.

4.2.5 Results – Criteria 1 – 3 – Other Data Sources

Preamble

In addition, to the above records from IBAT, a review of other potential CR, EN or relevant VU species was conducted, mainly directly through IUCN Red List but also a literature search. This also allowed account of regionally CR and EN species. The IUCN Redlist was filtered for the States of Gujrat and Rajasthan. This listing including some marine based species which were excluded from the screening process.

Table 4-3 shows the list of other CR and EN species identified outside of the IBAT searches. Each of these has been considered for their potential to qualify the AoA as CH. None is considered to qualify the AoA as CH for Criteria 1 – 3.

Table 4-3 – Non IBAT Species (CR and EN) Considered in Screening

Scientific Name	Status	Notes
Commiphora wightii	Critically Endangered	A rare desert species found in the west of Rajasthan, not considered to be a CH qualifying species for the AoA
Chlorophytum borivilianum	Critically Endangered	Annual plant species favouring forest systems – not considered likely to be present in AoA
Tribulus rajasthanensis	Critically Endangered	A plant species of desert and arid rocky areas – not considered likely to be present in AoA
Dalbergia congesta	Endangered	A climbing shrub found at elevations higher than 800 m normally. The AoA sits at about 250 – 300 m above sea level – not considered likely to be present in AoA
Tephrosia jamnagarensis	Endangered	Distribution is restricted to the Jamnagar and Junagadh districts of Gujarat state. Not a qualifying species for CH in the AoA
Tor putitora	Endangered	A fresh water fish species recorded only in the northern parts of Rajasthan in the Himalaya foothills and streams Not a qualifying species for CH in the AoA

4.3 *Criterion 4 – Highly Threatened or Unique Ecosystems*

In addition to the assessment of the extinction threat to species, the IUCN has commenced a program of assessing ecosystems in a similar manner.
The ecosystem within the project area has not been assessed to date.
The ecosystem within the AoA is not considered to be highly threatened, with much of it in urban or agricultural land use. Therefore, the Area of Influence does not meet the thresholds set out in Criterion 4, namely:

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

4.4 *Criterion 5: Key Evolutionary Processes*

There are no known key evolutionary processes within the AoA. Such processes often occur where habitats and ecosystems have become isolated, for example on islands. Indicative of key evolutionary process areas would be the presence of a high number of endemic or range restricted species. This area of India does not match this profile. The AoA is therefore not considered to meet this criterion.

4.5 *Protected Areas*

ADB SPS states that designated or proposed designation at an international level should be considered as Critical Habitat. Within the AoA there are no internationally designated sites such as Ramsar Sites.
However, the AoA includes part of one Nationally Designated site, the Balaram Ambaji Sanctuary. In addition, there are two other Nationally designated sites within the general area.
SPS (2009) states that sites which are of international designation, such as Ramsar and UNESCO sites should be considered as Critical Habitat. However, SPS does not extend this to nationally designated sites.
Based on the SPS definition, the nationally designated sites do not qualify the AoA as Critical Habitat.

5 CONCLUSIONS

5.1 *Summary*

The Screening Study for CH indicates that within the AoA there are no known species which would qualify the area as CH for Criterion 1 – 3. However, within the AoA there is the potential species of vultures to utilise the wider area for feeding.
The AoA does not qualify as CH under Criteria 4 and 5.
The above determinations are based on IFC requirements and definitions. As noted, ADB includes the statement that internationally recognised designations of sites should be considered as CH.

5.2 *ADB SPS Requirements*

Assessment of Risk of Impacts on Critical Habitat
In addition, to the potential impacts on identified local biodiversity and ecosystems, ADB's SPS requires demonstration that the project will not adversely affect the identified Critical Habitat.
ADB SPS states that projects should not be developed within Critical Habitat areas unless all of the below criterion are met.

(i) There are no measurable adverse impacts, or likelihood of such, on the critical habitat which could impair its high biodiversity value or the ability to function.
(ii) 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 host ecosystem be compromised.
(iii) Any lesser impacts are mitigated.

The text presented here represents an assessment of potential impacts of the project on the habitats present which may or may not be classed as Critical Habitat depending upon the outcome of furthermore detailed survey and assessment.
There are five species which have been identified as potentially qualifying the identified Area of Analysis (AoA) as Critical Habitat. These are:

- *Gyps bengalensis*
- *Sarcogyps calvus*
- *Gyps indicus*
- *Manis crassicaudata*
- *Sypheotides indicus.*

Based on the proposed project design and activities an initial assessment of the risk of significant effects on the potentially qualifying species has been conducted.
To ensure that no measurable adverse impacts on biodiversity is achieved, the main recommendations are as follows:

1. Engage a local biodiversity expert to verify findings on-site; and

2. Conduct field-level site visits for the review and updating of the Environmental Management Plan

3. If species of interest are found on-site, ensure that the findings are recorded and reported to the PIU. No disturbances or works on the site should start/continue until PIU issues clearance to proceed. Measures to restrict poaching or hunting shall be put in place.

4. If species of interest are present, PIU shall coordinate with the Forest Department for the translocation of the animals.

The below table provides potential impacts, proposed mitigation and a review of Criterion 1 and 2 from above. For Criterion 3, it is considered that all lesser impacts have been mitigated so that effects or risks are an at acceptable, non -significant level. It is stressed that this is an initial assessment of impacts on potential Critical Habitat. If any of the five species are present and qualify the AoA as Critical Habitat then a fully detailed assessment will be required.
The main risk of significant effects for all five species will relate to the construction phase, and in particular the pipeline construction activities. Once operational, assuming a fully buried pipeline is constructed with no permanent access along the route, just a protected wayleave, then operational impacts are not considered to represent a risk to the five species which potentially represent Critical Habitat qualifying species.
From the table it can be seen that provided suitable design mitigation project design and that the construction and operational phases are effectively managed, that no adverse impacts on the potential Critical Habitat or the qualifying species is likely to occur.

Receptor	Potential Impacts	Mitigation	Criterion 1 – no measurable adverse impacts on CH	Criterion 2 – no reduction in the population of CR and EN	Monitoring/Comment
Gyps bengalensis *Sarcogyps calvus* *Gyps indicus*	Loss of habitat and breeding trees Change in food availability – carcasses Induced impacts of improved water supply leading to increased agriculture and cattle rearing in location which in turns increases local use of chemicals harmful to vultures Disturbance of vultures at feeding locations during construction phase	Before starting any construction activities, conduct pre-construction survey for presence of this species. If these species are present, the findings should be recorded and reported. No disturbance or works on the site should start/continue until PIU issues clearance to proceed. PIU should coordinate with the Forestry Department to coordinate the translocation of the affected species. If these vulture species are present, the design shall ensure that breeding areas are not directly affected by the proposed pipeline routes and permanent infrastructure. Changes in route alignment, timing of works and avoidance of tree felling	Based on full implementation and avoidance of impacts and risks through the proposed mitigation measures it is considered that there will be no measurable effects on this group of Criterion 1 qualifying species	Based on full implementation and avoidance of impacts and risks through the proposed mitigation measures it is considered that there will be no measurable effects on this group of Criterion 1 qualifying species	If such species are present the project shall take the opportunity to monitor vulture activities within the project area and develop a local community awareness program to support conservation of the species

Receptor	Potential Impacts	Mitigation	Criterion 1 – no measurable adverse impacts on CH	Criterion 2 – no reduction in the population of CR and EN	Monitoring/Comment
		will reduce risk and impacts Construction work shall be timed to avoid the breeding season if specimens of the these birds are found to be using the AoA during the breeding season			
Manis crassicaudata	Direct loss of habitat due to pipeline work Disturbance of breeding pairs during courtship and rearing of chicks	Before starting any construction activities, conduct pre-construction survey for presence of this species. If these species are present, the findings should be recorded and reported. No disturbance or works on the site should start/continue until PIU issues clearance to proceed. PIU should coordinate with the Forestry Department to coordinate the translocation of the affected species. The design shall ensure that breeding areas are	Based on full implementation and avoidance of impacts and risks through the proposed mitigation measures it is considered that there will be no measurable effects on this group of Criterion 1 qualifying species	Based on full implementation and avoidance of impacts and risks through the proposed mitigation measures it is considered that there will be no measurable effects on this group of Criterion 1 qualifying species	Monitor potential presence of this species throughout construction period

Receptor	Potential Impacts	Mitigation	Criterion 1 – no measurable adverse impacts on CH	Criterion 2 – no reduction in the population of CR and EN	Monitoring/Comment
		not directly affected by the proposed pipeline routes and permanent infrastructure. Changes in route alignment, timing of works and avoidance of tree felling will reduce risk and impacts Construction work shall be time to avoid the breeding season if specimens of the these birds are found to be using the AoA during the breeding season			
Manis crassicaudata	Direct harm or killing of individuals during construction earthworks, tracking of vehicles and equipment across burrows. Indirect disturbance of individuals through noise and vibration during pipeline construction works. Induced impacts through improved access along pipeline wayleave during and after construction period causing increased opportunity for hunting of species for meat trade.	Before starting any construction activities, conduct survey of species for the EIA process AND prior to construction works, even if not found in initial surveys. If these species are present, the findings should be recorded and reported. No disturbance or works on the site should start/continue until PIU issues clearance to proceed.	Based on full implementation and avoidance of impacts and risks through the proposed mitigation measures it is considered that there will be no measurable effects on this group of Criterion 1 qualifying species	Based on full implementation and avoidance of impacts and risks through the proposed mitigation measures it is considered that there will be no measurable effects on this group of Criterion 1 qualifying species	This is a uncommon species which is difficult to survey and establish with certainty that they are absent from a site. There habit is mainly fossorial and only indirect evidence of activity may be present. During ground excavation works for the pipelines, permanent footprint, all temporary facilities such as access roads, a pre-clearance check and ongoing monitoring

Receptor	Potential Impacts	Mitigation	Criterion 1 – no measurable adverse impacts on CH	Criterion 2 – no reduction in the population of CR and EN	Monitoring/Comment
		PIU should coordinate with the Forestry Department to coordinate the translocation of the affected species.			for the presence of this species must be conducted.

5.3 *Further work*

5.3.1 Preamble

The Screening Assessment has been conducted based on available data. The assessment points to the need for targeted survey work on a small number of bird species. These are the vulture species which may potentially be present and form congregations at feeding locations and are:

- *Gyps bengalensis*
- *Sarcogyps calvus*
- *Gyps indicus*

In addition, survey is recommended for *Sypheotides indicus and Manis crassicaudata*.
The following sections of text provide proposed survey requirements for the above species. The three vulture species are covered in a single survey methodology.

5.3.2 Vultures

Objective

The objective of the survey work for the three identified CR vulture species is to determine their presence or absence in the Area of Analysis, either as breeding species or utilising regular feeding spots at any point within a year.

Outline Methodology

Establishment of Presence or likely Absence – A field survey shall be undertaken by qualified avi-fauna specialists to:

1. Identify potential vulture feeding areas (locations of regular carcass dumping, slaughterhouses, etc.);
2. Engage with local people, land managers etc to determine historical use of the site and surrounding areas by vultures in general and if possible the three target species; and
3. Conduct site survey for vultures using Vantage Point counts for a minimum of 24 hours per vantage point, spread across a calendar year.

For the community engagement it is recommended that good quality images of the three target species and other vultures which may be present, are used to facilitate discussions. In addition, sample images should be left with local people along with the survey team contact details so that records of vulture sightings by the local community can be passed to the survey team.
Vantage point counts are surveys, conducted by two observers, from a Vantage Point from which the AoA (or parts of it) can be viewed. Records of bird species observed (and their behaviours, activity etc),focused on the three target species, shall be conducted. The number of vantage points shall be decided on the ground, based on site topography, visibility etc. The intent will be to ensure that the whole of the area of analysis can be directly observed. It is likely that a minimum of six vantage points will be required to cover the entire AoA. VP observed areas shall not overlap nor be more than 2.5 km apart.
Observations shall be made with suitable binoculars and telescopes and recorded in standard format.

Based on the need for 24 hour recording at each vantage point it is recommended that 2 hourly recording is conducted at each VP per month across 12 months. This will give a total survey effort for VP of 144 hours.

Breeding Vulture Surveys – In addition to the presence/absence survey work, monthly site visits shall be conducted during the first three months of the breeding season (October- December) to record presence of target species which are breeding. If breeding is recorded in the early months of the season, then survey shall continue through to final fledging of young.

All records of activity shall be reported and georeferenced and supported where possible with images. The breeding birds shall not be disturbed by any of the survey activities.

5.3.3 Survey for Sypheotides indicus

The AoA shall be surveyed for suitable habitats for this grassland bird species. This includes grassland and some agricultural cropland, including cotton. The species has an association with the Rattail Grass (*Sehima nervosum*) and the field work shall include survey for stands of this species.

Field work to establish the presence of this species shall be conducted in July-September when displaying males are conspicuous. A minimum of 8 visits shall be undertaken in suitable weather conditions during this period.

5.3.4 Survey for Manis crassicaudata Indian Pangolin

Relatively little is known about the ecology and behaviour of this species which is predominantly fossorial in its habits. Survey techniques should start with discussions with local people regarding sightings of this species and a habitat survey to identify suitable habits for this species.

Previous work in Sri Lanka for this species, suggests that it can be found in a range of habitats, including plantations and semi cultivated areas.

Identified suitable habitat shall be visited and indirect signs of the species searched for. These include feeding areas, faeces and importantly burrows. Research suggests that two forms of burrows are excavated, resting burrows which are more permanent and deeper, and feeding burrows which tend to be shallower.

Field work shall be supported by a camera trapping campaign within suitable habitat areas. A minimum of ten infra-red cameras shall be deployed within the area for a period of 14 days at each suitable habitat location. Experiments with baiting of camera traps for other species of Pangolin have not shown any particular suitable baits to attract the species to the camera traps. Ideally, if ant nests are located within the suitable habitat areas, camera traps should be established in these locations.

Camera traps should be infra-red only and not have flash photography. Still and video images shall be produced through automatic triggering of the camera. Cameras shall be located about 30 cm above ground level.

6 REFERENCES

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Appendix 3: Heritage Impact Assessment Report

(For finalization during detailed design)

A process of identifying, predicting, evaluating and communicating the probable effects of a current or proposed development policy or action on the cultural life, institutions and resources of communities, then integrating the findings and conclusions into the planning and decision-making process, to mitigate adverse impacts and enhance positive outcomes.[32]

Approved by ADB's Board of Directors in July 2009, the Safeguard Policy Statement (SPS) builds upon the three previous safeguard policies on the environment, involuntary resettlement, and indigenous peoples, and brings them into a consolidated policy framework that enhances effectiveness and relevance. The SPS applies to all ADB-supported projects reviewed by ADB's management after 20 January 2010. ADB works with borrowers to put policy principles and requirements into practice through project review and supervision, and capacity development support. The SPS also provides a platform for participation by affected people and other stakeholders in project design and implementation.[33]

The SPS aims to promote sustainability of project outcomes by protecting the environment and people from projects' potential adverse impacts by avoiding adverse impacts of projects on the environment and affected people, where possible; minimizing, mitigating, and/or compensating for adverse project impacts on the environment and affected people when avoidance is not possible; and helping borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

Section 11 defines PCR 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 underwater. Their cultural interest may be at the local, provincial, national, or international level". This section details out the importance of protecting PCRs against any possible impact of infrastructure work undertaken on site. [34]

*9.1. **Executive Summary***

Physical Cultural Resources increasingly face several challenges due to either neglect or new development to their management and conservation process. Heritage Impact Assessment

[32] International Association of Impact Assessment IAIA
[33] https://www.adb.org/site/safeguards/policy-statement
[34] https://www.adb.org/documents/safeguard-policy-statement?ref=site/safeguards/main

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especially focusses on protecting the values and effectively identify the threats posed by some of the developmental challenges. Cultural resources may be private or public and this sets their relation with various stakeholders and create an impact on the place. **It is important, therefore, that informed decisions be made during the process which may impact the cultural resources. It also explains the significance of each baseline component and how proposed development may alter/impact that resource.**

Heritage Impact Assessment (**HIA**) is required to determine the impacts to cultural resources in Khetri in response to the work to be undertaken within the proposed water and sewerage infrastructure. The process includes **identification** of all resources, providing an **evaluation** of the significance and outlining the **impact** and make recommendations through **mitigation** measures that would minimize the impact on the resources. The entire process helps in making informed decisions related to the identified Physical Cultural Resources. **A property doesn't have to be nationally or state-protected to be a subject of Heritage Impact Assessment.** Any resource that exhibits heritage value is subject to an appropriate level of conscientiousness and will be part of the HIA. This would assist developers and consultants and ensure that all the information is complete and comprehensive with regards to the heritage value of the place. **HIA, as a process is important because the PCRs in Khetri, maybe largely unstudied and undocumented holding a significant intangible potential in as a heritage town.**

9.1.1. Introduction to the region

The region has witnessed a momentous history ranging from early civilizations to post Independence. Culturally rich towns and cities of the Shekhawati region, as this is popularly referred to, are a living example of this significant history. Physical Cultural Resources encompass both tangible and intangible assets rooted in the physical, social and economic context of the region. The distinct architectural style and living traditions are a significant attraction and define the essence of the region to the visitor. Archaeological sites, historic landscapes, monumental forts, *chattris*, historic living habitats, residential mansions known as '*haveli'*, step-wells and tanks, known as *bawdis*, temples, and variety of crafts, arts, festivals, dance forms and music, form the Physical Cultural Resource.

The natural environment, represented in 123pecialical and physiographical formations, the habitat of native flora and fauna, water sources and the adaptation of the hydrological cycle for water harvesting and distribution for a part of the unique cultural landscape of this town and are an important part of the PCRs.

Khetri is part of the Shekhawati region of Rajasthan and is geographically located in the Northern part of the State of Rajasthan. The region was established by Shekhawat Rajputs and was ruled

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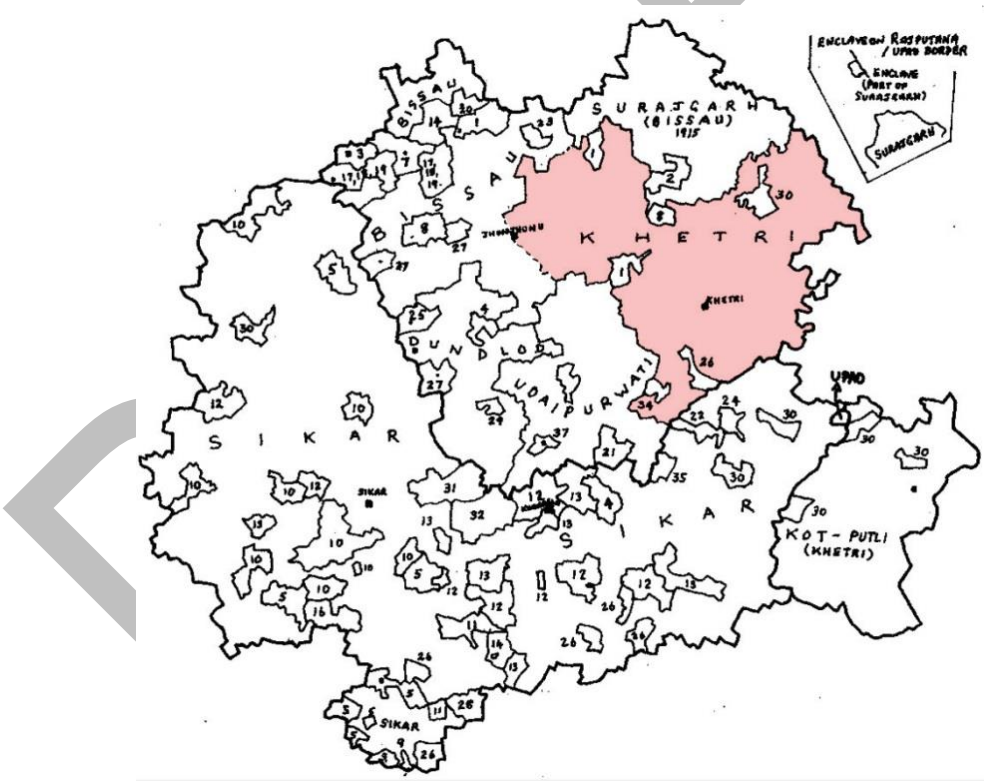
by Songara Rajputs until India got Independence. The Shekhawati Rajputs ruled over the Shekhawati region for over 500 years and were the most prominent among all the sub-clans of the Kachwaha Dynasty of Jaipur and built various forts, *havelis* and other architectural marvels in their respective provinces (*thikana*). They also introduced 'frescoes' in the region through these forts and palaces. The towns in Shekhawati is also known for their grand painted mansions and are recognized as the "Open Art Gallery of Rajasthan" having a significant number of fresco paintings.

The princely States of the Shekhawat region were Shahpura (Head Seat of Shekhawats), Khetri, Dundlod, Nawalgarh, Mukandgarh, Mandawa, Mehansar, Bissau, Alsisar, Malsisar, Mandrella, Chowkari, Heerwa & Sigra, Surajgarh, Udaipurwati, Parsurampura, Taen, Sikar, Kasli, Shyamgarh, Jahota, Khandela-Bara Pana and Chhota Pana, Danta, Khood, Khachariawas, Khatu, Pachar, Mundru, Sainswas, Chirana.[35]

Map 1 showing Shekhawati States



9.1.2. About Khetri

Khetri is located at 27.98 N, 75.8 E and is a small town in the Jhunjhunu district of Rajasthan. Surrounded by hills on all sides this area is renowned for its rich copper mines. The princely state

[35] http://www.indianrajputs.com/history/shekhawat.php

of Khetri *(thikana)* was founded by Thakur Kishan Singh in 1742 and was 125pecialize the second-largest *thikana* of Shekhawat.[36] Initially, it was under the control of Nirban Rajputs but was later usurped by the Shekhawat Rajputs. In 1745, the 2nd Thakur of Khetri, Thakur Bhopal Singh commenced work on the Bhopalgarh Fort which was completed in 1770 and in 177. The 3rd Raja of Khetri, Raja Bagh Singh, was granted the title of Raja by Madhoji Scindia.

The state of Khetri and its amicable ruler were highly respected in the Rajputana region. Despite its limited extents, the state showcased a splendid fort, mansions, palaces, interesting architectural structures and various other natural features adding to its perception of one of the most advanced and progressive states of Rajasthan at the time.[37]

In 1905, Raja Shri Jai Singh Bahadur, dedicated one of the palaces to the Ajit Singh hospital in the name of his father. He bequeathed Rs. 50,000 to charity which enabled the expansion of Jai Singh High School in Khetri.[38] Raja Ajit Singh Bahadur shared a close relationship with the nationally revered spiritual leader, Swami Vivekananda. In honour of this bond, Maharaja Ajit Singh's grandson, Raja Bahadur Sardar Singh subsequently donated this palace to Ramakrishna Mission, a spiritual 125pecialized125 promoting the *Ramakrishna Movement* or the *Vedanta Movement*, named after and inspired by the Indian saint Ramakrishna Paramahamsa and founded by Ramakrishna's chief disciple Swami Vivekananda on 1 May 1897.[39]

The town of Khetri is part of a medieval historic landscape, retaining its authenticity as a heritage town as well as its functionality as a hub of urban life and activity. The residential quarters, streetscapes, water harvesting structures, temples contribute to its unique identity. When studied from the lens of the Historic Urban Landscape (HUL) approach[40] sees the city as a multilayered structure in time and space. This layering addresses topography, geomorphology, hydrology, built environment, infrastructure above and below the ground, open spaces and gardens, their spatial organization and interrelationships.

9.1.3. Demography

As a Municipality in the district of Jhunjhunu, Khetri is divided into 20 wards. It has a population of 18,209 of which 9,451 are males while 8,758 are females as per Census India 2011.

Khetri Municipality administers over 3,149 houses to which it supplies basic amenities like water and sewerage. It is also authorized to build roads within Municipality limits and impose taxes on properties under its jurisdiction.

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[36] http://www.indianrajputs.com/view/khetri
[37] https://www.asianage.com/india/all-india/270819/vivekanandas-special-friendship-with-the-maharaja-of-khetri.html
[38] http://www.indianrajputs.com/view/khetri
[39] https://en.wikipedia.org/wiki/Ramakrishna_Mission
[40] https://whc.unesco.org/en/hul/

Table 4 showing Religious Demography of Khetri as per Census of India 2011

Town	Population	Hindu	Muslim	Christian	Sikh	Buddhist	Jain	Others	Not Stated
Khetri	18209	89.68%	10.09%	0.08%	0.04 %	0.00%	0.08 %	0.01%	0.02%

Out of the total population, 4,966 are engaged in work or business activity. Of this 4,313 are male and 653 female.

Table 5 shows the Demographics of Khetri[41]as per Census of India 2011

Description	**Census 2011 Data**
Town Name	Khetri
Civic Type	Municipality
Tehsil Name	Khetri
District Name	Jhunjhunu
State Name	Rajasthan
Total Population	18209
Total Area	11.31 (Ha)
Total No of House Holds	3149
Total Male Population	9451
Total Female Population	8758
0-6 Age group Total Population	2347
0-6 Age group Male Population	1271
0-6 Age group Female Population	1076
Total Person Literates	12792 (80.65%)
Total Male Literates	7544 (92.22%)
Total Female Literates	5248 (68.32%)
Total Person Illiterates	5417
Total Male Illiterates	1907

[41] https://etrace.in/census/town/khetri-rajasthan-800482/

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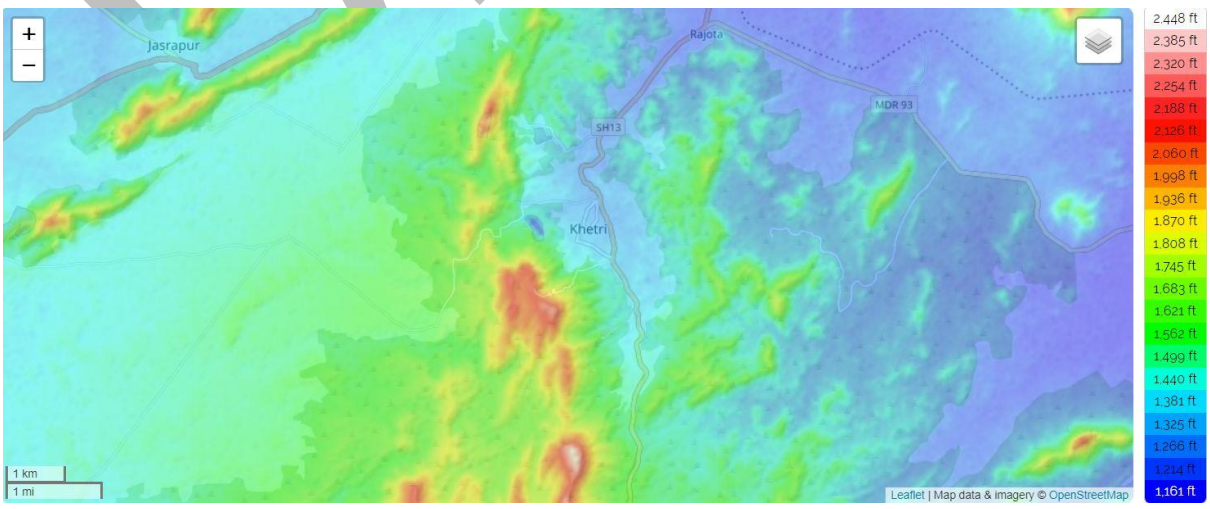
Total Female Illiterates	3510
Scheduled Cast Persons	2765 (15.18%)
Scheduled Cast Males	1413
Scheduled Cast Females	1352
Scheduled Tribe Persons	56 (0.70%)
Scheduled Tribe Males	72
Scheduled Tribe Females	56

9.1.4. Topography

Khetri has an average elevation of 484 metres (1587 feet) above mean sea level. It is surrounded by hills on all four sides and the area is covered mostly by sand and boulders. The sub-surface rocks belong to Ajabgarh and Alwar groups of the Delhi Supergroup with underlying acquifers that form the main source to the groundwater. Explorations in the Gothra (South west of Khetri town and within Khetri tehsil) and Banwas villages (north of Khetri tehsil, within Buhana Tensil) have established the presence of copper in the area. Red sandy clay loam, red sandy loam and loam (alluvial types) soils are available in the North-Eastern part of Rajasthan. Loam (alluvial type) is significant for cultivation and is found in rural settlements such as Neem-ka-thana and Khetri town. The soil cover is very thin and only a few low, medium sized trees can be observed thriving in the landscape. Large areas are covered with thorny scrubs with stunted growth. Brinjal, Bottle gourd, Ladyfinger, Ridged gourd, Daikan, Pepper, Spinach and Guar are locally available in the markets of Khetri. It is also commonly accepted that they may contain high traces of copper and iron ore.

Map 2 showing terrain of Khetri



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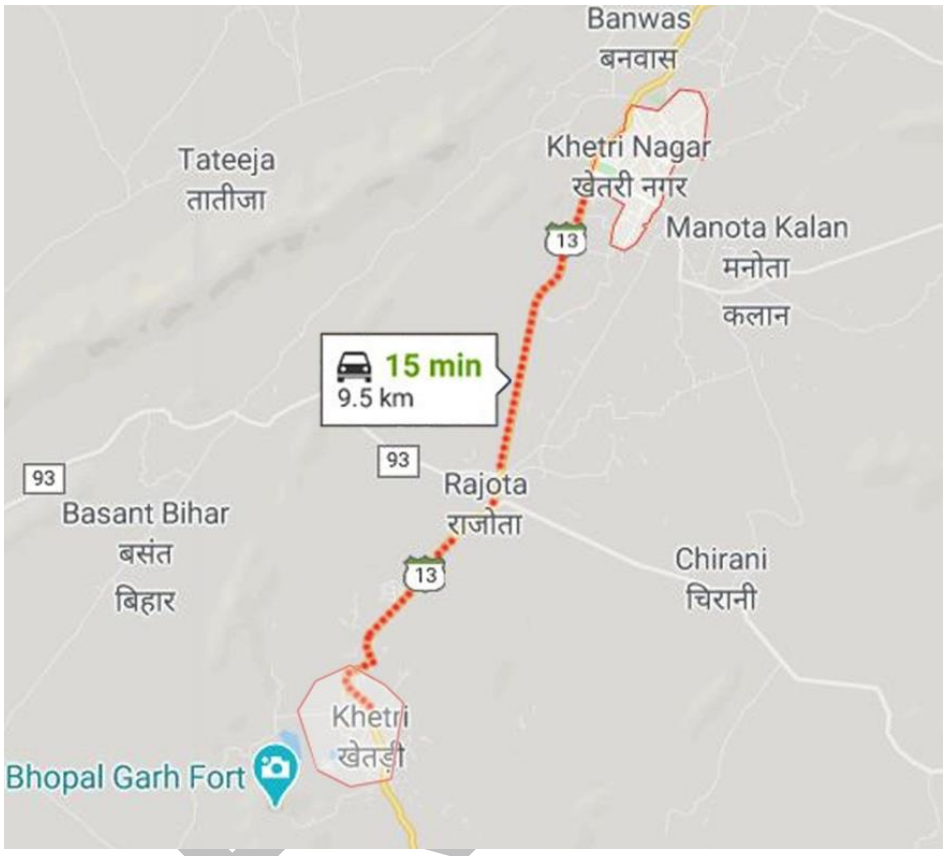
9.1.5. Distance Charts

Two predominant towns located in Khetri are “Khetri Nagar” and the “Khetri Town” which are 10 km apart, connected via National Highway 13.

Map 3 showing distance between Khetri Town and Khetri Nagar



Map 4 showing major roads of Jhunjhunu District

The town of Khetri is connected to 10 railway stations within a 35 km radius, the closest being Maonda 27km away. Nizampur, Jhilo and Narnaul stations are located in the state of Haryana.

Map 5 showing railway stations in a 35km radius

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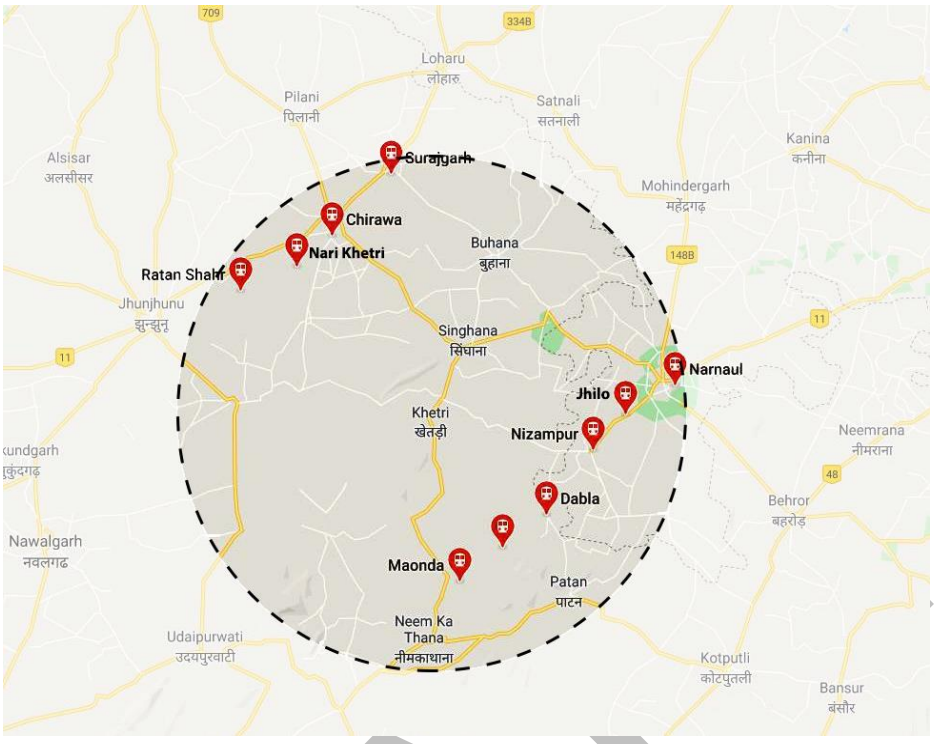
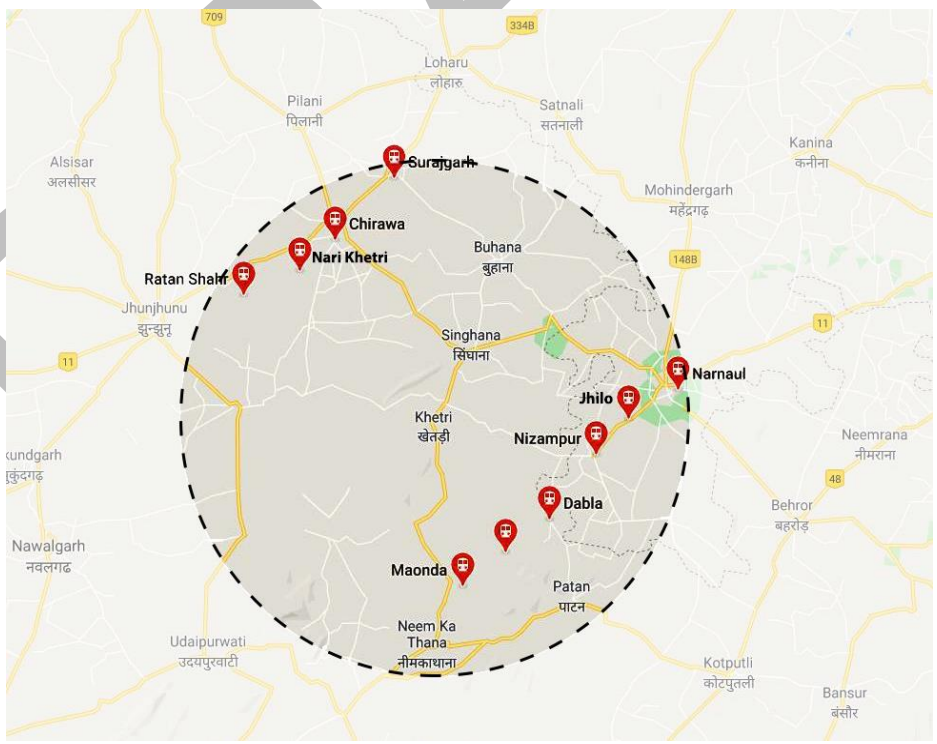


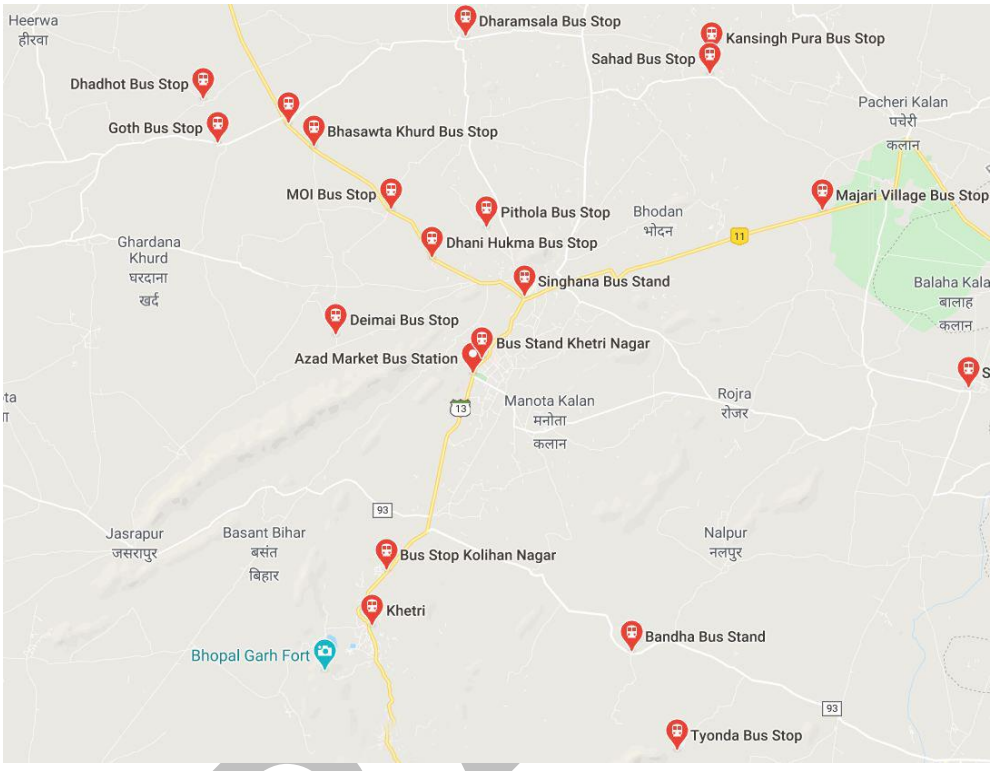
Within a 40 km distance is located the one airport available in Jhunjhunu district. Besides this there are heliports for private air travel.

Map 6 showing airports in a 40 km radius



There are multiple bus stands ensuring good connectivity with the region in and around the Khetri town.

Map 7 showing bus stands in and around Khetri



9.2. ***Project Details and Description***

The aim of the project is to conduct a study related to the impact of the current infrastructure scheme being proposed for the Khetri heritage town and work directly with clients and other consultants, with supervision for critical tasks as an outcome of the Heritage Impact Assessment. This effort is in keeping with the Asian Development Bank Safeguards and the work of the project management unit to manage heritage resources and conservation under the SAUW Division projects. ADB has undertaken to provide loans for the heritage town of Khetri to aid in improved services covering water and sewerage infrastructure with joint efforts from the Government of Rajasthan. Khetri is the first of 14 secondary towns selected for the project. Beyond the HIA study, the project also aims to conduct training for executing agencies, consultants, contractors and other stakeholders to understand heritage management processes in designing, implementing and monitoring projects. Preparing a Terms of Reference to ensure engagement of heritage expertise during all the project 131pecialized131ation to implementation stages by the implementing agency is another outcome of the project.

9.2.1. Physical Cultural Resources

Physical Cultural Resources, as defined by ADB are movable, immovable objects, sites, structures, group 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. As regards Khetri, two site visits were undertaken as a result of which the following PCRs were identified. Seeing the richness of the town with regards to cultural and natural heritage, this list covers some significant structures and includes a representative sample of the lesser known assets of the town's heritage. A detailed list and documentation is recommended to be undertaken through nomination of heritage experts and team by the government agency undertaking work in the area.

(a) Archaeological Sites – Ganeshwar, a small settlement located south of Khetri town within approximately 45-kilometres, in the proximity of Neem ka Thana town, has revealed ancient sites that probably have a 4000 year old history. This site is located at the source of river Kantali, which is known to have earlier joined river Drishadvati, near Soni-Bhadra in the north.[42] Other excavations in the Sikar-Jhunjhunu area of the Khetri copper belt suggest the supply of copper objects to Harappa. Various storage jars, vases, basins, bowls, lids and miniature pots have been discovered near the site.

(b) Mansions (Haveli) – The tangible heritage in the Shekhawati region of Rajasthan are large residential mansions which are owned by business families. The mansions may be deserted and/or in poor condition due to lack of or inappropriate maintenance. These mansions have a potential of serving as open art galleries and can be used for economic generation and protection of local craft while serving as live examples ofsound conservation practice.

(c) **Forts** – Each townscape in the region usually showcases a fort on the high point on the terrain to mark the presence of an erstwhile royal family or its descendants. In some areas, a few of these forts have been converted into hotels or visitor accommodation but most lie deserted usually in a dilapidated state. In Khetri, the Bhopalgarh fort belonged to the royal family of Khetri. Today, this magnificent piece of architecture lies deserted and vandalized.

(d) **Historic core** – The historic core breathes life into towns since residential and religious architecture such as *havelis* and temples are concentrated in the culturally rich core while

[42] https://www.rajras.in/index.php/ganeshwar-archaeological-site-rajasthan/

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it continues to live, breather and operate as a regular town centre operating markets, place of work, schools within its boundaries. However, the historic cores often lack basic infrastructure and services due to various reasons.

(e) **Historic Landscapes–** The region is rich in historic landscapes which can be categorized under royal residential complexes, religious sites, educational cultural institutions and recreational areas and water harvesting and conservation systems within the larger cultural landscape.

(f) **Stepwells (*Baori*), Tanks (*Kund, Johad*) and Lakes and Water Bodies with Stepped Edges (*Ghat*) –** Architectural typology which was historically used in storing water was an inherent part of the water management system of the historic settlement. This traditional system with a high social, associational and cultural value lies defunct and dilapidated while the town looks away from self-sustaining/decentralised traditional water conservation and supply towards a centralised system of government led infrastructure for water supply.

(g) **Religious Sites** – These are strategically located, aesthetically evolved structures linked to the religious beliefs of the local people that strengthen social and religious links within the settlement. Each community group usually takes care of their religious sites and performs activities associated with them.

(h) **Commemorative structures** – These structures evoke a sense of pride, memory, and are symbols of traditional practices that contribute towards the collective memory of the place.

(i) **Traditional markets and streets** – Almost every historic town in the region has a traditional market area, which in most cases offers a vibrant epicentre of daily community life. Intangible heritage within traditional markets is represented through production units of various arts, crafts and culinary delicacies. Making of lac bangles, pickle home industry, sweatmeat shops with traditional sweets such as carrot pak, traditional footwear craft and making of flags or Nishan for the local yatras are some of the activities uniquely seen in the market town of Khetri. These streets are also part of various cultural routes reiterating the sociocultural and religious identity of the local population.

(j) **Festivals and related cultural routes**:

1. **Gangaur Festival –** Gangaur is probably the most celebrated and colourful festival in the region and celebrated with great fervour and devotion especially by womenfolk to worship Goddess *Gauri*, the consort of Lord Shiva. This represents the celebration of

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spring, harvest and marital fidelity.[43] It is especially meant for the women both married and unmarried. The word Gangaur is derived from two words. Gan meaning Shiva and Gauri meaning Parwati. The festival starts day after Holi, the festival of colours (around the month of March) and is celebrated for two weeks.

***Rites and Rituals[44]* -** The Gangaur festival commences with the custom of gathering ashes from the Holi Fire and burying the seeds of 'Barley' in it. The seeds are then watered everyday awaiting the germination. The ceremony takes place with the praiseful songs for Shiva and Gauri. The women decorate their hands with mehndi since it is considered auspicious. They carry painted earthen pots on their heads. They also make images of Gauri and Shiva with clay.

On the seventh evening after Holi, unmarried girls assemble and take out a procession with 'Ghudlia' (an earthen pot with holes around and a lamp inside) on their heads. This practice is repeated for ten days. Celebrated by women this involves fasting for 18 days partaking only one meal a day.

A large number of fairs are organized during this time. Women make images of Isar and Gauri in clay for the festival. In some Rajput families, permanent wooden images are used after painting them every year carried out by traditional painters called *Matherans*. The event culminates with the immersion of the idols in *baoris* or *johads* (wells or water reservoirs), marking farewell to Goddess Gauri.

2. **Khatu Shyam[45] - Celebrated in Rajasthan**, Khatushyam is the name and manifestation of **Barbareek**—according to some texts, the grandson of Bhimsen and Hidimba . Commonly referred to as Shyam Baba, he is considered a popular supernatural power and either referred to by his original Sanskrit name *Barbarīka* or the hindi name *Barbarīk*, or *Barbareek*. According to Hindu mythology, before the battle of Mahabharata began, the prowess of barbarika was said to be unmatched. Bound by his principle to always favour the weaker side in order to remain just, this decision would have resulted in the complete annihilation of both sides, leaving only Barbarika as the sole survivor. It is said that Lord Krishna, to avoid this devastation, asked Barbarika for his head (sheesh daan), to which he readily agreed. Shree Krishna was extremely happy with the devotion shown to him, and by the great sacrifice of Barbarika that he granted him a

[43] https://www.festivalsdatetime.co.in/2016/05/2018-gangaur-hindu-festival-date-time-in-india.html#axzz57fcGnpvP
[44] http://www.dsource.in/resource/gangaur-festival/traditional-attire-rituals
[45] http://www.tourism.rajasthan.gov.in/khatu-shyam-temple.html

boon, according to which Barbarika would be known by Krishna's name, Shyam Ji in *kaliyug* (present times) and would be worshipped in his form.

Nishan Yatra Journey of Khatu Shyam – Nishan Yatra is one of the famous cultural routes in the region. Holding a procession on foot, the believers carry a *kesariya* (saffron coloured) flag referred to as Nishan. After they perform *aarti* of Khatu Shyam, pilgrims proceed towards the local Khatu Shyam Temple. After completing the Nishan[46] yatra journey, an offering is made to commemorate *sheesh ka daani* in context of his head sacrifice.

3. **Varahi Devi Rally –** Goddess Varahi Devi is a Hindu deity representing the feminine aspect of the all-pervading power of creation, believed to be inherent in all animate and inanimate beings. She is one of the *Matrikas*, a group of seven Mother Goddesses who represent 'Shakti', or power. Varahi Devi is the female counterpart of Varaha, the boar form of *Avatar of Lord Vishnu*. The goddess is responsible for maintaining law and order in the universe.[47] Varahi is a night goddess and is worshipped after sunset and before sunrise. A rally is organized in the region by the devotees in the honour of the Goddess. The main market in Khetri has a Varahi devi temple.
4. **Hanuman Jayanti** – Hanuman Jayanti is a Hindu religious festival that celebrates the birth of Lord Sri Hanuman, a significant character popularly referred to as the monkey god in the epic Ramayana. On this auspicious day, devotees of Lord Hanuman seek his protection and blessings. As part of this festival, a grand *Kalash Yatra* heads out from the temple premises.
5. **Ram Navami** – Rama Navami is a spring season Hindu festival that celebrates the birth of Lord Rama. He is particularly important to the Vaishnavism tradition of Hinduism, as the seventh *avatar* of Vishnu. The festival is a part of the spring Navratri, and falls on the ninth day of the bright half (*Shukla Paksha*) according to the Hindu calendar month of *Chaitra*. Some devotees mark the event by taking miniature statues of the infant Rama, bathing and clothing it, then placing it in a cradle. Charitable events and community meals are also organized. The festival is an occasion for moral reflection for many Hindus and thus marked by vrata (fasting).

[46] Nishan - This is holy flag, Kesariya in colour. It has Krishna and Shyam baba Pictures and chants. Coconut and feathers of peacock are also tied to it.
[47] https://poojabell.com/varahi-devi/

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9.2.2. Baseline conditions

Within the above classification of tangible and intangible heritage, the authorities undertaking construction and operational work within Khetri town, need to take cognizance of the wide range of PCRS on site.

Cultural significance is the importance of a property to the history, architecture, archaeology, engineering or culture of a community, region or nation. In selecting a building as a heritage structure, particular attention should be paid to the following:

- Association with events, activities or patterns (like **Ajit-Vivek Museum**)
- Association with important persons or representing the work of a master (**Havelis**)
- Distinctive physical characteristics of architectural style, design, construction or form (like forts & palaces)
- Potential to yield important information, such as illustrating architectural, social or economic history. E.g. Havelis, Royal stables converted to the bus station, town halls, goshala, clubs, markets, waterworks etc.
- Technological innovations in construction or building typologies viz. dams, bridges, etc.
- Town planning features like gateways, squares, streets, avenues. Khetri streetscape continues to showcase facades (complete or in a state of disrepair) of houses, shops, temples and structures that may have retained their original use or adopted another function.
- All structures related to water such as wells, stepwells, baoris or kunds, natural drainage systems, water harvesting systems and any other traditional water collecting, disseminating structure is to be considered as a Physical Cultural resource.
- Art and fresco work which this region is famous for.

Table 6 showing baseline condition of built heritage

Baseline feature no.	**Name**	**Description**	**Location**
1.	The Bhopalgarh Fort Refer to A-2	Khetri Mahal was constructed by Raja Bhopal Singh around 1770. It is primarily known for its fine paintings and murals mainly supporting the Raghunath temple and Bhopalgarh fort. It is also known as Wind Palace of Khetri. Oriented along East-West and facing East,	It is built on the Bhopalgarh mountain and is approachable via a 4 Km long

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	Figure 4 showing ruins of Bhopalgarh Fort	it represents the Shekhawati Architecture style. Built atop a hill it can be accessed on foot via a 4 km trail from th town centre. The palace is connected via a series of ramps with open rooms, colonnaded connected through arched portals. Built using an Indo-Persian structural system the building showcases arcuate construction techniques. The historic structure is made of brick and stone with exposed bricks. The palace is remarkable among buildings of its region because of the flow of wind through its open portals.	trek from the base. 26.6548° N, 73.4916° E
2.	Ajit-Vivek Museum Refer to A-2 Figure 5 showing Ajit-Vivek Museum	A Museum, now known as Ajit-Vivek Museum is related to Raja Ajit Singh and Swami Vivekananda. It was inaugurates on 31st March 2019 in the restored building, the earstwhile Diwan-khana Mahal. The four-storied structure follows the Shekhawati style of architecture with a double storied main hall, an open terrace on the third level with a view of the entire town and hills in the background. The fourth level consists of a meditation room for men and women. The restored structure has a pink paint coating with white paint trimmings on its elevation. This museum houses multiple cultural programs. It is an important commemorative space that interprets the relationship between Raja Ajit Singh and Swami Vivekananda in the context of Khetri's rich history.	Beside State Transport, State Highway 13, Khetri, 28.0053° N, 75.7870° E
3.	Sukh Mahal Refer to A-2 Figure 6 View of Sukh Mahal from Jai Niwas	It was constructed in the 19th century A.D. and used as a guest house for Raja Ajit Singh and Swami Vivekananda's guests. The Mahal is situated near Ram Krishan Mission and 500 m from town Bus Stand. It is a masterpiece of art, culture and architecture with an Indo-Persian structural system and arcuate building techniques.	It is built on a hilltop and can be spotted from a distance. 28.0075° N, 75.7860° E

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4.	Amar Mahal Refer to A-2 Figure 7 showing Amar Mahal	It is a three-story structure right next to the Ajit Vivek Museum. It has eaves holding the balcony on the first level. The building is in a dilapidated condition.	It is located adjacent to the Ajit-Vivek museum 28°00'19.5"N 75°47'14.4"E
5.	Jai Nivas Refer to A-2 Figure 8 showing Jai Niwas	It was constructed in 19th century A.D. and was traditionally used as a residence but is now left only as a tourist attraction. It is a huge palatial building with a lofty staircase. The building stands on high terrain and has a boundary wall in dilapidated condition. It has an arch opening in the exterior which gives an uninterrupted view of the Sukh Mahal. The boundary wall is beautifully designed but is falling apart due to lack of maintenance. The structure has vegetation growing all around it. The poor condition of the building ahs exposed parts of the masonry.	It can be seen clearly from Sukh Mahal. 28°00'23.0"N 75°47'07.7"E
6.	Sanskrit Vidhyalaya Refer to A-2 Figure 9 showing Sanskrit Vidhyalaya	It is a brick masonry structure painted in yellow colour. It is a four-storied structure which can be accessed staircases that open up to the central courtyard where in the middle lies a small temple. It has arched balconies and *chattris* on top of the structure.	Opposite to Ganga Mata Ji Mandir 28°00'05.4"N, 75°47'06.1"E
7.	Shremati Laxmi Shah Hospital Refer to A-2 Figure 10 showing fresco on entry of Shremati Laxmi Shah Hospital	It is a two-storied building with fresco work on the entry gate along with arches. It has *chattris* which have been blackened because of the poor maintenance.	28°00'04.4"N 75°47'07.8"E

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8.	Dewan Brij Lal Singh Ji Shah ka Kund Refer to A-2 Figure 11 showing Dewan Brij Lal Singh Ji Shah ka Kund	It is a brick and stone masonry step-well that has been left unused. It is situated in the same complex as the Laxmi Shah Hospital. It has fresco work on the *chattris* in the corner and on the *chattris* within. There is vegetation growing on the upper story and stagnant and polluted water within the *baori*.	28°00'03.9"N 75°47'10.2"E
9.	Jai Singh High School Refer to A-2 Figure 12 showing panorama of Jai Singh High School	Founded in 1885[48], the masonry structure with an indo Islamic style has *chhatris* on the terrace have a cusped arch opening. The complex has a large open space. The *chhajjas* are supported by stone brackets.	28°00'07.1"N 75°47'10.6"E
10.	Khetri Trust Kariyalay/ Office Refer to A-2 Figure 13 showing condition of Khetri Trust Building Facade	It is a 3 storied structure painted yellow and has vegetation growing on it. The rear elevation has staircases on either side leading to alternate entries. It has a minaret like structure on its edges with arches and *chattris* on top.	28°00'22.6"N 75°47'10.5"E
11.	Bawri Refer to A-2 Figure 14 showing Bowri beside open sewer	The water body is situated on the main axis of the settlement. It has been recently painted which has hidden the authentic fabric of the structure. The chattris are placed on the platform of the *Bawri*. At present, a natural drainage channel that is highly passes along the structure.	

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[48] https://www.icbse.com/schools/g-jai-singh-sr-sec-s-khetri-5e93z

12.	Panna Sagar Talab Refer to A-2 Figure 15 showing panoramic view of Paana Sagar Talab	Panna Sagar Talab is an man made collection tank in the heart of Khetri town designed to collect rainwater. The Talab/tank is situated adjacent to the Nagar Palika Campus approximately a km. from the Bus Stand. It was constructed in the 18th century A.D. [49] and is decorated with remains of exquisite sculptures of Hindu deities. The central pond is approached by a series of the step leading to the water. The rear area of this large structure shows a well worked out water collection and conveyance system which is a usual feature in the dry water parched towns of this part of Rajasthan.	27°59'57.6"N 75°46'52.3"E
13.	Ganga Ji Mandir Refer to A-2 Figure 16 showing Ganga ji Mandir	Built-in the 19th Century, the structure has a multi-foliated arch at the entrance. It is part of the residential unit and is still in use.	
14.	Raghunath Gaushala Refer to A-2 Figure 17 showing Raghunath Gaushala	The Gaushala is situated near Cinema Hall Khetri and is 1 km from Bus Stand Khetri. It was conceived in the 20th century A.D. [50] as a beautiful building adorned with colourful paintings at the entrance. The multi-foliated arch at the entrance has also beautiful Rajasthani frescos possibly with little of the original material. The interior has a courtyard for cattle.	
15.	Mandir Shri Gopal ji Refer to A-2 Figure 18 showing Gopal Ji Mandir	The Temple is situated near Thakur Hari Singh Temple and was built in 18th century A.D.[51] It is an old temple and can be approached by a series of steps. It has turrets on either side of the temple. The top of the temple has chattris. It has a foliated arch at the entrance with the walls adorned with rich Rajasthani frescos. The temple has intricate carving and delicate designs.	

[49] http://ignca.gov.in/asi_reports/rjjjn_1558.pdf
[50] http://ignca.gov.in/asi_reports/rjjjn_1585.pdf
[51] http://ignca.gov.in/asi_reports/rjjjn_1583.pdf

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16.	Bhatiayani Mandir or Saraswati School Refer to A-2 Figure 19 showing Saraswati School	The structure is painted yellow on the outside. It has multi-foliated arches at the entrance gate. It is a three-storied structure with chattris on top of the roof and open classes on the remaining two stories.	
17.	Radha Krishan Refer to A-2 Figure 20 showing Radha Krishan Mandir	The temple has a foliated arch at the entrance with a chhatri on one side of the temple.	
18.	Shree Varahi Devi Temple Refer to A-2 Figure 21 showing Varahi Devi Temple	A beautifully painted exterior the frescos and statues on the entry steps may be recent additions.	
19.	Ganpat Ram ki Haveli Refer to A-2 Figure 22 showing Ganpat Ram ki Haveli	The Haveli is situated near Sabzi Mandi adjacent to the Main Bazaar in Khetri.[52] The haveli has a long arcaded façade faving the main road with intricately carved work on the arches and door lintel. The veranda like projection is embellished with ornamental iron-work.	

Note: This is a sample set of PCRs and more information is to be collected at the stage of DPR preparation. For other projects, this process of documenting PCRs will be undertaken before the design stage. The town, as per locals consists of around 120 temples and it is important to document them so that the infrastructure work respects the spiritual landscape of the heritage town.

[52] http://ignca.gov.in/asi_reports/rjjjn_1553.pdf

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*9.3. **Methodology*** [53]

Development or other physical changes in the environment may have adverse or beneficial impacts on cultural heritage attributes. It is necessary to identify all possible changes/works as well as the range of impacts on each attribute. It is also important to identify the scale or severity of a specific change or impact on a specific attribute – as this combination is what defines the significance of the impact (significance of effect).

Impacts may range from direct or indirect; cumulative, temporary or permanent, reversible or irreversible, visual, physical, social and cultural, and/or economic. Activities undertaken as part of the proposed infrastructure development in Khetri need to be considered for their wide range and possibilities of impact on the heritage fabric and cultural values within the HIA.

Direct impacts are those that arise as a primary consequence of the proposed development or change of use. Direct impacts can result in the physical loss of part or all of an attribute, and/or changes to its setting – the surroundings in which a place is experienced, its local context, embracing the present and past relationships to the adjacent landscape. In the process of identifying direct impacts, care must be taken of regarding gaining/granting approvals to build in mechanisms to avoid direct impact – development needs to address the physical resources in entriiety as well as the impact on each resource, the pattern, ensemble, setting, spirit of place etc. Direct impacts resulting in physical loss are usually permanent and irreversible. These normally occur as a consequence of construction and are usually confined within the development footprint. The scale or magnitude of these impacts will depend on the scale and intensity of activity and proportion of the attribute affected.

Direct impacts that affect the setting of an attribute may occur as a consequence of construction or operation of the development scheme. Assessment of impacts on setting refers to perceptible visual and aural (noise) effects that can be measured at a given time. Such impacts may be temporary or permanent, reversible or irreversible depending on the extent to which the cause of the impact continues. Impacts may also be transient where the occurrence is sporadic or of limited duration, for example, related to hours of operation or the frequency of passage of vehicles.

Indirect impacts occur as a secondary consequence of construction or operation of the development and can result in physical loss or changes to the setting of an asset beyond the development footprint.

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[53] ICOMOS. (2011, January). Guidance on Heritage Impact Assessments for Cultural World Heritage Properties.

Scale or severity of impacts or changes can be judged taking into account their direct and indirect effects and whether they are temporary or permanent, reversible or irreversible. The cumulative effect of separate impacts should also be considered as these may together be be destructive. The scale or severity of the impact can be ranked without regard to the value of the asset, as:

- No change
- Negligible change
- Minor change
- Moderate change
- Major change

The significance of the effect of change – i.e. the overall impact – on an attribute is a function of the importance of the attribute and the scale of change. This can be summarized for each attribute described using the following descriptors. As change or impacts may be adverse or beneficial, there is a nine-point scale with “neutral” as its centre point:

- Major beneficial
- Moderate beneficial
- Minor beneficial
- Negligible beneficial
- Neutral
- Negligible adverse
- Minor adverse
- Moderate adverse
- Major adverse

Table 7 shows the Value of Heritage Asset

VALUE OF HERITAGE ASSET	SCALE & SEVERITY OF CHANGE/IMPACT				
	No Change	Negligible change	Minor change	Moderate change	Major change
	SIGNIFICANCE OF EFFECT OR OVERALL IMPACT (EITHER ADVERSE OR BENEFICIAL)				
Very High	Neutral	Slight	Moderate/ Large	Large/very Large	Very Large
High	Neutral	Slight	Moderate/Slight	Moderate/Large	Large/Very Large

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Medium	Neutral	Neutral/Slight	Moderate/Slight	Moderate	Moderate/Large
Low	Neutral	Neutral/Slight	Neutral Slight	Slight	Slight/Moderate
Negligible	Neutral	Neutral	Neutral/Slight	Neutral/Slight	Slight

All proposals should be tested against existing policy frameworks and the management plan for the property and surrounding area. The compatibility of the scale, pattern, use, etc. should be tested according to the attributes of the property.

9.4. Planning and Legislative Background

9.4.1. Existing Framework

Table 8 shows Acts and Byelaws

Acts and Byelaws	Key Points
Ancient Monuments and Archaeological Sites and Remains Act, 1958 (Central Act No. 24 of 1958	Applies to the monuments and sites deemed to be of national importance.
Antiquities and Art Treasure Act, 1972 (Central Act No. 52 of 1972)	Applies to any antiquities or art treasures which need acquisition or protection.

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The Rajasthan Monuments Archaeological Sites And Antiquities Rules, 1968	As per **Chapter 2, Point No. 8** Prohibition of certain acts within protected monument – No person shall within a protected monument – (a) do any act which causes or is likely to cause damage or injury to say part of the monument; (f) Violate any practice, usage or custom applicable to or observed in the monument; or (g) Bring, for any purpose other than the maintenance of the monument – (i) any animal, or (ii) any vehicle except in the areas reserved for the parking thereof As per the above, the contractors working on-site need to ensure that heritage sites/precincts should not be used for storage of material, parking (temporary or permanent) or be used to undertake any disruptive activity related to the construction of the RUDSICO-EAP projects in keeping with the spirit of the Rules listed above. **As Per Rule No. 10** Conditions for copying other monuments – (1) Any person may copy a protected monument other than such monuments in respect of which an order has been made under rule 9. (2) Nothing in sub-rule (1) shall be construed as authorizing any person other than an Archeological Officer or an officer authorized by him on this behalf while copying any such monuments, (b) erect any scaffolding within such precincts, or (c) use within such precincts any artificial light…., or (d) apply any extraneous matter, such as water, oil, grease or any moulding material on such monument or part thereof, (10) Nothing shall be done to violate the customary rules prevailing at the monument or to use it for any purpose that may be inconsistent with its character. (11) Nothing likely to offend public sentiment shall be done. As per the above sub-rules, heritage is considered as the monument as well as the rules, and local values related to the cultural practices. While we get further information of the controlled area, construction being undertaken in the town should follow the spirit of the historic character of the monuments in its vicinity. Keeping in mind the proximity of the Ajit Vivek museum and Khetri Trust 145pecializ the new AEN structure and office buildings being built should

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	incorporate the following Rules in the structures and office buildings in their final designs: 18. Particulars of buildings, structures and other works controlled under section 19 – Within the controlled area of a protected monument, the position, height, size, design, material, color and screening etc. of the building, structures and other works above the ground shall be regulated by the following conditions:- (a) the new construction or structure shall not be in such a place and of such a height as might obstruct the external view of the protected monument; (b) the size of the new building or structure or works shall not be greater than that of the monument; façade the design of the new construction or structure or works shall not allow any incongruities to be a patchwork in the vicinity when compared with the style used in the monument; (d) the materials used in the new construction shall not be different in quality from those used in the old building, structure or work; façade the color of the new construction, structure or works shall conform with the one used in the monument; (f) the style of screens used, if any, in the new construction or structure or works would confirm to the type used in the monument; (g) the internal appearance of the building, structures and other works above ground within the controlled area of the monument shall fall in line with the external appearance of the protected monument, in the regulated area of which the alteration or extension of any buildings or structures or works take place. 19. Application for permission for construction or excavation etc. in protected areas – Every application for permission for – i. Construction of any building; ii. Carrying out any mining, quarrying, blasting; or iii. excavating for archaeological or historical purposes; or iv. undertaking any other operation of the like nature, under section 22, in any protected area, shall be made in Form II at least three months before the date of commencement of the proposed construction, operation excavation, etc. as aforesaid.

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	The final detail design from the contractor should be cognizant of: i. The location of the trench on the side of the right of way which least interrupts the physical fabric of the monument as well as any related pedestrian or vehicular circulation related to the cultural activities associated with the structure. ii. Excavation/digging depths and methodology so least damage is caused due to the construction activities to the structures in the vicinity. iii. Take care that concrete plaster or other inappropriate building or finishing materials do not come in contact with the buildings or historic boundary walls of the structures. The services of an architect specialising in traditional architectural forms and landscape architect specialing in open space design should be engaged for all new buildings, spaces, interventions being planned in the heritage towns.
Municipalities Act, 2009 amended in 2010	An act to consolidate and amend the laws relating to the State of Rajasthan and to provide for matters connected therewith and incidental thereto (Rajasthan Municipalities Act, 2009). The act describes the conservation of monuments and places of historic importance as core municipal duties along with provision for preparing Master Development Plan, Municipal Action Plan, Execution Plan, keeping in consideration conservation of natural and built heritage assets. Though the detailed analysis for the same shows that provisions for management, financial assistance, land acquisition, urban mobility and outreach are not provided specific to the conservation of heritage assets, it can be seen as a point of initiation formulating a framework for inclusive revitalization in historic towns of Rajasthan.
Shekhawati Heritage Council Rules amended to Rajasthan State Heritage Council Rules[54]	The Government of Rajasthan formulated the Rajasthan State Heritage Council Rules as a statutory document in the exercise of the powers conferred by sub-clause (iii) of clause (g) of Section 46 and Section 337 of the Rajasthan Municipalities Act, 2009. The document applies to all the municipal areas in Rajasthan and proposes the protection of a dense ensemble of unprotected heritage through identification, documentation, conservation and regulation of these assets.

[54] Bank, N. a. (2018). *Inclusive Revitalisation of Historic Towns and Cities : Strategic Framework for Rajasthan State Heritage Programme.* New Delhi: NATIONAL INSTITUTE OF URBAN AFFAIRS, NEW DELHI.

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*9.5. **Assessment and Evaluation of Overall Imp**act*

The process focuses on evaluation and impact assessment as discussed in the methodology on protecting and conserving cultural and natural resources alongside development of essential infrastructure in heritage towns. This is a step towards a long-term vision which mutually benefits local community in maintaining and conserving their heritage while also being served by essential water and sewerage networks.

9.5.1. Key conflicts/issues

- Damage to the **physical fabric** of PCRs to undertake infrastructure work
- Emissions of **noise** resulting from the Project adversely affecting the amenity of residences or sensitive areas.
- Generation of ground-borne **vibrations**, which could adversely affect the PCRs.
- The issues associated post installation during operation and maintenance of pipes are **leakage, cracks, corrosion, poor quality, poor installation** and many others.
- **Access** to the PCRs during the construction process in conflict with the calendar of festivals
- **Loss of visual** integrity and a coherent urban character of townscape
- **Loss/disruption of traditional water harvesting system** that includes tanks, channels, natural waterways and gradient

9.5.2. Impact due to Water Distribution Network

Water distribution and sewerage collection networks are linear interventions undertaken primarily along roads. We need to keep in mind that they do not disrupt the historic landscape as a whole including identified and unidentified Physical Cultural Resources. The pipelines which may not be following existing roads may transverse the historic landscape and archaeological sites and chance find protocols need to be adopted in case of any finds.

The water distribution and sewerage network may impact heritage structures or underground archaeological evidence via noise, vibration and leakages. The water supply and drainage system may have a direct impact on historic structures in the vicinity of the existing road network. The areas where the distribution network does not follow an existing road may also have a bearing on historic landscape fabric and integrity.

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9.5.3. Impact on Physical Cultural Resources

Table 9 shows the impact on Physical Cultural Resources

Baseline Feature No.	Name	Protection Status	Value Assessment					Contributions to values	Scale of Change/ * left to decay, dilapidation, vandalism				
			Historical	Symbolic	Social	Spiritual/Religious	Aesthetic		No change	Negligible	Minor Change	Moderate Change	Major Change
1.	*The Bhopalgarh Fort**	State protected						Medium					
2.	*Ajit-Vivek Museum/ Fateh Vilas Mahal*	State protected						Very High		Studies to be undertaken as to the authenticity of the work			
3.	*Sukh Mahal**	Unprotected						Medium					

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4.	*Amar Mahal* (Within Khetri Trust precinct)*	Unprotected (possibly under litigation)						Medium					
5.	*Jai Nivas**	Unprotected						Low					
6.	*Sanskrit Vidhyalaya (also referred to as Temple of Gopinath ji Ranawat & referred to as Temple of Madan Mohan ji in the State Archaeology list of protected monuments)*	Unprotected						Very High					

Baseline Feature No.	Name	Protection Status	Value Assessment					Contributions to values	Scale of Change				
			Historical	Symbolic	Social	Spiritual/Religious	Aesthetic		No change	Negligible	Minor Change	Moderate Change	Major Change
7.	*Shremati Laxmi Shah Hospital*	Unprotected						Medium					
8.	*Dewan Brij Lal Singh Ji Shah ka Kund**	Unprotected						Medium					
9.	*Jai Singh High School*	Unprotected						High					
	Name		**Value Assessment**						**Scale of Change**				

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Baseline Feature No.		Protection Status	Historical	Symbolic	Social	Spiritual/Religious	Aesthetic	Contributions to values	No change	Negligible	Minor Change	Moderate Change	Major Change
10.	*Bawdi*	Unprotected				To check on site		Medium					
11.	*Khetri Trust Kariyalay/ Office*	Unprotected											
12.	Panna Lal Shah Talab	State protected						Very High				Taking into account its water quality, repair history and status of water harvesting network	
13.	Ganga Ji Mandir	Unprotected											
14.	Raghunath Gowshala	Unprotected						We do not know the historic use					
15.	Mandir Shri Gopal ji	Unprotected						Medium					

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16.	Bhatiayani Mandir or Saraswati School	Unprotected						High						
17.	Radha Krishan	Unprotected						Medium						
18.	Ambe market Shree Varahi Devi Temple	Unprotected						High						
19.	Ganpath Ram ki Haveli*	Unprotected						High						
20.	Temple of Madan Mohan ji	State protected as per list but temple was not identified by experts or locals on site												
21.	Temple of Raghunath ji	State protected												

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Table 10 Shows mitigation measures the type and nature of the impact

Baseline Feature No.	**Name**	**Type of Impact**	**Nature of Impact**
1.	*The Bhopalgarh Fort*	**No impact by current infrastructure scheme** but PCR in condition of extreme dilapidation suffering from neglect and vandalism	Accepted /Beneficial/ Acceptable with mitigation measures/ unacceptable Remarks: No impact. But need for urgent repairs, conservation and maintenance required in the absence of which the PCR will be irreversibly damaged/lost.
2.	*Ajit-Vivek Museum*	Direct/ **Indirect**/ Cumulative/ Residual	Accepted/Beneficial/**Acceptable with mitigation measures/**unacceptable
3.	*Sukh Mahal*	**No impact by current infrastructure scheme** but PCR in condition of extreme dilapidation suffering from neglect and vandalism	Accepted/Beneficial/Acceptable with mitigation measures/unacceptable Remarks: No impact. But need for urgent repairs, conservation and maintenance required in the absence of which the PCR will be irreversibly damaged/lost.
4.	*Amar Mahal*	Direct/ **Indirect**/ Cumulative/ **Residual** PCR in condition of extreme dilapidation suffering from neglect and vandalism	Accepted/Beneficial/**Acceptable with mitigation measures**/unacceptable Remarks: As this is located across from the AEN campus with pipelines running along its façade care will need to be taken that the vibrations and excavations do not harm the building but also that the new buildings set up are visually coherent/in line with the traditional façade and streetscape of the area. Further, need for urgent repairs, conservation and maintenance required in the absence of which the PCR will be irreversibly damaged/lost.
5.	*Jai Nivas*	Direct/ **Indirect**/ Cumulative/ Residual **No direct impact by current infrastructure scheme** but PCR in condition of extreme dilapidation suffering from neglect and vandalism	Accepted/Beneficial/**Acceptable with mitigation measures/**unacceptable Remarks: No direct impact. But need for urgent repairs, conservation and maintenance required in the absence of which the PCR will be irreversibly damaged/lost.

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6.	*Sanskrit Vidhyalaya*	Direct/ Indirect/ Cumulative/ Residual **No direct impact by current infrastructure scheme** but PCR in condition of extreme dilapidation suffering from neglect and vandalism	Accepted/Beneficial/**Acceptable with mitigation measures**/unacceptable Remarks: No direct impact. But need for urgent repairs, conservation and maintenance required in the absence of which the PCR will be irreversibly damaged/lost.
7.	*Shremati Laxmi Shah Hospital*	Direct/ Indirect/ Cumulative/ Residual **No direct impact by current infrastructure scheme** but PCR in condition of extreme dilapidation suffering from neglect and vandalism	Accepted/Beneficial/**Acceptable with mitigation measures**/unacceptable Remarks: No direct impact. But need for repairs, conservation and maintenance required.
8.	*Dewan Brij Lal Singh Ji Shah ka Kund*	Direct/ Indirect/ Cumulative/ Residual No direct impact by current infrastructure scheme but PCR in condition of dilapidation suffering from neglect	Accepted/Beneficial/**Acceptable with mitigation measures**/unacceptable Remarks: No direct impact. But need for urgent repairs, conservation and maintenance required in the absence of which the PCR will be irreversibly damaged/lost.
9.	*Jai Singh High School*	Direct/ Indirect/ Cumulative/ Residual PCR in condition of dilapidation suffering from neglect though in continued use as a school	Accepted/Beneficial/**Acceptable with mitigation measures/**unacceptable Remarks: No direct impact. But need for urgent repairs, conservation and maintenance required in the absence of which the PCR will be irreversibly damaged/lost.
10.	*Khetri Trust Kariyalay Office*	Direct/ **Indirect**/ Cumulative/ Residual	Accepted/Beneficial/**Acceptable with mitigation measures**/unacceptable
11.	*Bawdi*	Direct/ **Indirect**/ Cumulative/ Residual	Accepted/Beneficial/**Acceptable with mitigation measures/**unacceptable
12.	*Panna Sagar Talab/ Panna Lal Shah Talab*	Direct/ Indirect/ **Cumulative**/Residual PCR in moderate condition suffering from poor water quality and misuse	Accepted/Beneficial/Acceptable with mitigation measures/unacceptable Remarks: No direct impact. But need for repairs, conservation and maintenance required.
13.	Ganga Ji Mandir	Direct/**Indirect**/ Cumulative/Residual No direct impact by current infrastructure scheme but PCR in condition incompatible regular use	Accepted/Beneficial/**Acceptable with mitigation measures**/unacceptable Remarks: No direct impact. But need for repairs, conservation and maintenance required.

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14.	Raghunath Gowshala	Direct/ **Indirect**/ Cumulative/ Residual	Accepted/Beneficial/**Acceptable with mitigation measures**/unacceptable
15.	Mandir Shri Gopal ji	Direct/ **Indirect**/ Cumulative/ Residual	Accepted/Beneficial/**Acceptable with mitigation measures**/unacceptable Remarks: No direct impact. But need for repairs, conservation and maintenance required.
16.	Bhatiayani Mandir or Saraswati School	Direct/ **Indirect**/ Cumulative/ Residual PCR in condition of dilapidation suffering from neglect though in continued use as a school	Accepted/Beneficial/**Acceptable with mitigation measures**/unacceptable Remarks: No direct impact. But need for repairs, conservation and maintenance required.
17.	Radha Krishan Temple	Direct/ **Indirect**/ Cumulative/ Residual No direct impact by current infrastructure scheme but PCR in condition incompatible regular use	Accepted/Beneficial/**Acceptable with mitigation measures**/unacceptable Remarks: No direct impact. But need for repairs, conservation and maintenance required.
18.	Ambe market Shree Varahi Devi Temple	Direct/ **Indirect**/ Cumulative/ Residual	Accepted/Beneficial/**Acceptable with mitigation measures**/unacceptable
19.	Ganpath Ram ki Haveli	Direct/ **Indirect**/ Cumulative/ Residual **No direct impact by current infrastructure scheme** but PCR in condition of extreme dilapidation suffering from neglect	Accepted/Beneficial/**Acceptable with mitigation measures**/unacceptable Remarks: No direct impact. But need for urgent repairs, conservation and maintenance required in the absence of which the PCR will be irreversibly damaged/lost.

*9.6. **Mitigation Measures Proposed***

These guidelines will help in the layout of sustainable water supply and drainage systems that are in keeping with the heritage character of the town. The aim is that during conception, design and execution of the projects, the Physical Cultural Resources are protected for their socio cultural significance. Therefore, any new development in a historic context needs to be carefully evaluated for potential adverse effects. The Central and State government legislation guides the kind of work that can or cannot be undertaken in the vicinity of PCRs. However, this document attempts to address specifically the impact of infrastructure work related to water supply and sewerage networks and the measures to minimize and mitigate this impact.

9.6.1. Natural heritage: land, water and vegetation

The development being undertaken should ensure that there is

1. No disruption to traditional water harvesting systems and natural drainage systems of the town and its natural context

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2. Alignment of modern drainage systems with the natural gradient and existing water systems on site
3. No negative impact on rock formations, vegetation patterns in the regional context.

9.6.2. Cultural heritage: Archaeological Sites and intangible heritage

1. The water supply and sanitation pipelines have the possibility to impact archaeological sites, burial grounds in and around town. The chance finds protocol is therefore attached if required. The ideal mitigation for all archaeological sites is preservation in situ. This is not always a practical solution when they are not exposed and a new project has to be carried out. Therefore, a series of recommendations are suggested. [55]

1. Avoidance – The first step is to mark the area which is suspected to have archaeological remains and avoid any kind of construction in that area.
2. Archaeological Test trenching – This would determine the presence or absence of archaeological features, structures, deposits, artefacts within the specified area defined under the project. The trenching is performed as per international standards. In the event of the presence of any indicator, the following actions should be taken immediately:
    - All construction within a radius of at least 20 m should cease. This distance should be increased at the discretion of supervisory staff if heavy machinery could cause further disturbance to the suspected physical heritage resource.
    - This area must be marked using visible means, such as barrier tape, and all personnel should be informed that it is a no-go area.
    - A guard should be appointed to enforce this no-go area. The access should be negotiated in the immediate area.
    - All concerned stakeholders should respect the potentially sensitive and confidential nature of the heritage resources, particularly human remains.

Note: Please refer to Chance find protocol (attached) for further details on handling sensitive cultural sites.

3. Scientific Excavations – This would determine the entire extent and significance of the remains, features, structures, deposits, artefacts to avoid any impact on the resources.

[55] Lee, D. S. (12-13 December 2013). *Eco-Efficient Water Infrastructure: towards Sustianble Urban Development in Asia and the Pacific.* Bangkok.

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4. Re-routing – To avoid damage to places of cultural or archaeological importance, or particular structures, the route of the pipeline has to be designed sensitively to avoid any damage.
5. Temporary relocation – Traditional places such as mela grounds etc. may need to be temporarily relocated as needed with the permission of the concerned authority.

9.6.3. Buildings and Cultural landscape (which include Havelis, Forts, Religious Sites, Commemorative structures, markets and streets)

During the work, heritage conservation/management experts should form part of the PMU Project Management and capacity building consultants. These heritage specialists must ensure that all Physical Cultural Resources are:

1. Identified and demarcated adequately before commencement of construction activities.
2. An inventory of the PCRs to be affected by the route which should include information about each feature including:
    - Distance from the pipeline
    - Nature of predicted impact
    - Predicted impact before mitigation
    - Mitigation measures
    - Extent of impact
3. The PCRs and their importance are brought to the attention of relevant project staff, including construction workers through on-site training workshops.
4. The inspection should be continued monthly even during the process of construction to avoid/minimise any residual effect.
5. Design permanent and temporary works to avoid or minimise impacts on PCRs. The detailed design of these should be discussed and approved before the execution of the project.
6. A vibration and noise impact assessment is essential to understand the impact of heavy machinery and digging of pipelines. It gives a clear understanding of the initial and residual risk. The purpose is to design in a manner that the impact is minimal and risks do not significantly alter the character of the PCRs.
7. The measures devised have to ensure that the impact due to construction and operation works can be managed and mitigated. For operational noise, vibration control systems have to be adopted to control vibration and ground-borne noise emissions from construction work. E.g. Demolition of the old office complex in the vicinity of the Khetri trust-building and Amar Vilas needs to be undertaken with utmost care to ensure minimum

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impact to the foundation and super structure of historic buildings due to noise and vibrations. It is important to ensure listing out appropriate tools and methodologies for this purpose in the construction specifications.

8. The key issues identified with a water supply and sewerage network have to be addressed during the operational phase as this may result in moisture related damage to the PCRs which may be of various degrees. This is the most commonly occurring damage in historic structures.
9. The construction of the water storage facility and new office block needs to minimize any negative impact on the nearby PCRs from the visual perspective as well.
10. The conservation and heritage management plan should incorporate a section on the repair and corrective action to the resources that have been impacted due to moisture. Some of the key recommendations are as follows:
    - Urgent repair of water supply and drainage pipelines and faucets that have been leaking or damaged.
    - Control excessive ground moisture with the use of damp proof treatments.
    - It is critical to monitor areas vulnerable to moisture damage.
    - Moisture management built into a O&M schedule
    - Training local community members to identify and take immediate steps to minimise leakage as soon as it becomes evident
11. Mapping of festival routes and rituals – Construction activity must not create conflict or onsite disturbance during the festival calendars. Each temple, within each ward, will have its *prabandhak* committee and festival calendar and dates. The construction team needs to have a stakeholder meeting with the committee when its construction planning and management plan is being prepared. Construction activity should be cognizant of the traditional as well as tourism calendar to minimize disruption of local life and livelihood.
12. To ensure that areas like the Ajit-Vivek museum with tourist populations have a short construction span to minimize disruption from parking and drop off to the museum.

Specific Recommendations

New developments in historic towns have a direct impact on the visual and physical integrity in the immediate as well as a broader setting. It is important that new development harmoniously integrates with the existing Physical Cultural Resources that include the cultural and natural habitat. Methods and tools should be designed to ensure new development should respect and

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is sympathetic to the local character or appearance of the existing historic landscape. PMU's Project Management and Capacity Building consultants must comprise of a Heritage Expert with the following suggested (not exhaustive) key responsibilities:

(i) Facilitate detailing out and finalization of the Heritage Impact Assessment

(ii) Coordinate between PMU and implementing agencies for implementation of the project

(iii) Facilitate coordination for smooth implementation of project among all stakeholders and executing agencies

(iv) Ensure implementation of different components and Quality assurance and checking and making sure that the work on-site follows drawings and design layouts provided as a part of the Detailed Project Report with regards to protection of PCRs

(v) Coordination with local committees and communities as well as take advice and suggestions

(vi) Ensure timely implementation and review of the progress of projects

During Planni*ng and Designing*

The planning should include research which targets the complex layering of the settlement, to identify values, understand their meaning for the communities. Other academic and research centres should be involved in the process. It is essential to communicate and share the proposal for new development with local stakeholders to get their opinions and incorporate changes if required. The design of any new construction should be such that respects important views as well as the scale of the neighbouring buildings/streetscape.[56]

The PMU should refer to existing acts, policies and rules before undertaking design in a historic environment. Local communities have to be consulted to understand the usage of space, streets where the new construction is proposed. It will help PMU understand and plan the span of construction as well as ensure least delays during construction. Alternate routes have to be designed and approved before the construction phase with local administration in case of conflicts.

The excavations and vibrations due to laying of pipes should not façadempact the historic landscape, strcutures and archaeological remains in the area but as it is not always possible to

[56] Yan, F. G. (2018). Historic Urban Landscape in Beijing The Gulou Project and Its Contested Memories. In M. S. Christina Maags, *Chinese Heritage in the Making* (pp. 93-117). Amsterdam University Press.

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avoid/anticipate, therefore, chance finds protocols are to be designed and adopted prior to the construction phase.

Chance finds protocols process: Planning

The objective of the Chance finds Protocol is to:

(i) Define the processes which must be followed to ensure the management of Physical Cultural Resources and preservation and appropriate treatment of chance finds while also minimizing disruption to the construction schedule.

(ii) Enable compliance with all relevant national laws and regulations and other requirements.

Project Management Unit shall consult all relevant parties including local stakeholders to agree to Chance Finds Protocol. The arrangements have to be made for a suitable laboratory and other necessary facilities. PMU shall develop and issue to Contractor a PCR Training and Awareness manual. The PCR Training and Awareness manual will include basic training in the identification of archaeological materials relevant to the area, including human skeletal remains. Contractor shall deliver the Cultural Heritage Training and Awareness manual to all relevant Contractor personnel before they commence work.

During Construction

The construction of infrastructure and facilities have the potential of disturbing or altering the known and unknown, recorded or unrecorded Physical Cultural Resources. It is recommended that before any intervention the existing conditions in the area should be thoroughly documented with the support of the residents of the town.

Chance finds protocols process: Implementation and Management

The contractor shall monitor ground disturbance works using trained personnel. In case of an event where a site of potentially high significance is discovered, immediately stop works within an approximate distance of five metres of the site and contractor shall demarcate and secure the area. The evaluation will be carried out by trained archaeologists. The management options are listed below:

(i) **Avoidance** – This option minimises the impact to the site through partial or complete project redesign or relocation. This is the preferred option from a physical cultural resource management perspective.

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(ii) **Salvage Excavation** – This data recovery option is site destructive and can delay construction. If required, salvage excavation shall be conducted following national and international standards.

(iii) **In-situ Management** – This option includes the application of site protection measures, such as fencing or barricades, or capping the site area with fill. Appropriate protection measures will be identified and agreed between Contractor, Heritage Management Consultant and PMU.

(iv) **Surface Collection** – If a site is assessed as having limited salvage excavation potential but contains significant surface archaeological items, those surface finds may be individually mapped and collected by the team of Cultural Heritage experts.

1. CHANCE FINDS REPORT FORM[57]

Chance Finds Report Form		
Initial Detail		
Location of Find:	Date of Find:	The person who identified find:
Description of Initial Find:		
Was work stopped near the find?		□ Yes □ No
Was an archaeologist contacted?		□ Yes □ No
Archaeological Detail:		
Date of inspection:		Reporting Archaeologist:
GPS coordinates:		Photo Record:
		□ Yes □ No
Description of Find (fill in applicable information) (use additional pages if required):		
Artefact type:		
Max artefact length (in mm):	Max artefact width (in mm):	
Max artefact thickness (in mm):	Max artefact platform width (in mm):	

[57] PAPUA NEW GUINEA Cultural Heritage Chance Finds Protocol LNG Project

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Approximate number of artefacts at site: □ 1 □ 2 to 10 □ > 10 □ >50 Other:	Approximate size of site: Site area: _____ m2 Site length: _____ m Site height (max) (for rock shelters/caves): _____ m
Brief description of site and vegetation (e.g., surface sediment type, ground surface visibility, distance to nearest freshwater source, attach site sketch if necessary):	
Statement of Significance (scientific, spiritual, historic, aesthetic and emotive and any evidence of stratification):	

The new design and infrastructure should be compatible with the character of the historic town and the unique identity of the town should not get compromised. Each festival route has to be considered so that the construction activity doesn't impact the cultural routes. When it is necessary to build new structures, the existing spatial layout should be respected, especially in terms of scale, size and integrity. Traffic should also be controlled and planned for new infrastructure work.

The natural drainage and traditional water management systems must not be disrupted at any means and the landscape should be protected against disasters and nuisances such as pollution and vibration to safeguard the heritage and for the security and well-being of the residents.

2. MITIGATION STRATEGY

Providing a water supply system should reduce the bore well dependency and allow the groundwater recharge and aid long term aquifer conservation. While the benefits of provision of a sewage system for a town is understood to have long term direct benefits to the people, we also need to highlight the benefits of this to rejuvenating the local water harvesting systems.

Therefore, the priority should be given to laying out the sewage system for areas that are responsible for polluting the surface water and groundwater resources.

The purpose is also to protect Physical Cultural Resources and develop mitigation and management measures. Any construction or development should include these measures and tactical routing to avoid adverse impact on the resources. Infrastructure development in a historic landscape should not conflict with Physical Cultural Resources rather be complementary and be designed in a manner that their long term success is dependent on being linked with each other.

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The **Historic Urban Landscape**[58] approach sees and interprets the historic town as a continuum in time and space. There is a need for balance between preservation and protection of urban heritage, economic development, functionality and livability of a city. Development in a historic town may demand prudence. A **flexible approach**[59] should be built in since individual cases may present specific problems. The infrastructure plan must address all relevant factors including archaeology, history, architecture, techniques, sociology and economics. Mitigation measures are listed as follows:

The mitigation measures are discussed as follow:

7.1. ***Site Recording and Mapping*** – Systematic documentation and mapping of Physical Cultural Resources within the area of laying out the infrastructural works as part of preconstruction surveys. It involves collecting and collating data required for a comprehensive understanding of the current or baseline situation; the typology, number and distribution of Physical Cultural Resources. The list mentioned in the earlier sections is only an indicative legend. during surveys and stakeholder meetings many more structures and intangible systems may become evident. A clear understanding of terrain and PCR should be built into the work schedule to prevent delays when the actual work is undertaken. For this, a Heritage Impact Assessment advisor is to be engaged before the commencement of infrastructure design works[60]. The mapping should include information in this particular form.

(i) HEADING – This section is very important; it contains the all-important ID number and the name of the field worker who collected the data
(ii) LOCATION – Critical data goes here concerning the exact and relative location of the resource
(iii) SITE DESCRIPTION – This provides general information about the type of resource
(iv) LANDSCAPE – General data concerning the setting of the resource
(v) PCR – description on the features
(vi) LOCALHAZARD – This section highlights any major risks facing the cultural resource
(vii) LANGUAGE / ETHNICITY The language(s) spoken and ethnic groups of the community are recorded here, if applicable
(viii) CUSTOMS AND TRADITIONS associated

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[58] Sonkoly, G. (n.d.). The significance of Historic Urban Landscape in the protection of World Heritage Sites. The 1st Heritage Forum of Central Europe.
[59] UNESCO. (2011, November 10). Recommendation on the Historic Urban Landscape. Paris.
[60] ICOMOS. (2011, January). Guidance on Heritage Impact Assessments for Cultural World Heritage Properties.

(ix) NOTE This final section of the form can be used to record additional documentation of the resource and/or other points the field recorder would like to note.

7.2. ***Additional data acquisition*** – This stage is one step further to documentation. It requires archaeological investigations, built heritage surveys (other than PCRs), oral histories of each typology, cultural mapping of skills and intangible assets. Areas where natural water bodies and drains are being used for dumping sewage need to be addressed first. Therefore, an assessment needs to be carried out to see which wards are negatively impacting the natural water systems.

7.3. ***Stakeholder Consultation*** – The consultation will involve local communities regarding the protection of Physical Cultural Resources. The process will consider the opinions and recommendations to involve communities in cultural awareness activities. It is important to reach on consensus on what values to protect for transmission to future generations. *Therefore, a series of stakeholder workshops are advised to be undertaken* both at the city level and also at the neighbourhood levels. The consultant should engage with relevant academicians, experts and practitioners.[61]

Interviewing well and structured meaningful discussions is not always as easy as it seems. The expert must consider issues like gender and other in built societal biases. Many people, especially elders, may have a wealth of historic facts and traditional knowledge that is yet unrecorded. Oral history is recording and sharing interviews with such people about their past memories. It allows people who cannot write to become a part of history.

7.4. ***Protecting the integrity*** and attributes of Physical Cultural Resources by removing and locating the toilet blocks from historic precincts. Limiting the height of new construction to avoid visual impact. Allowing only compatible additions to Physical Cultural Resources. Integrating and harmonizing mass, setback, setting and materials.

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[61] ICOMOS. (1987, October). Charter for the Conservation of Historic Towns and Urban Areas. *Adopted by ICOMOS General Assembly*. Washington DC, USA: ICOMOS.

7.5. ***Rerouting and access plan*** – It focuses on managing the potential impact of new development on existing routes such as festival routes and installation of operational controls. This would include limiting the period of construction in the festival period.

7.6. ***Guidelines for PCRs –***

(i) Historic facades of listed buildings should be retained as far as possible

(ii) Where damage is due to human intervention and weathering has occurred, restoration work should be undertaken to return the façade to its original condition

(iii) Colours, materials and textures should be compatible with original. Where evidence is available, the façade should be returned to its original condition. Where evidence is not available, the Palette should be used to guide the façade upgradation

(iv) Structural changes that are irreversible may be retained, though no further changes to historic structure are permissible

(v) Rooftop material such as water tanks on top of PCRs should be appropriately located to avoid any visual access from the street or public views. If visible, they need to be appropriately camouflaged with a designed wall/ *jaali* etc. that blends in colour and patterns with the existing structure.

(vi) Khetri falls in a unique climatic zone with primarily 4 types of landform: Hilly upland, midland on foothills, undulating long continuous slope and low flood plains. A reference list has to be developed for use of local trees and shrubs that should be retained in this region to ensure ecological balance in its biodiversity.

a. ***Summary and Conclusion***

For undertaking this study and conducting the Heritage Impact Assessment involved site visits to understand PCRs to identify the surveys and documentation that need to be conducted before commencement of such projects. This also includes an in-depth community consultation to evaluate and prepare the value assessment and impact assessment as per international standards for the proposed infrastructure project. This should address all sub-projects as well. A template can be developed to monitor the overlap of schedule of work that is being executed on the ground.

The166peciative is to develop mitigation measures for sustainable management of Physical Cultural Resources to avoid/mitigate any direct or indirect impact on these due to the infrastructure scheme. As part of the process it is aimed that in the long term these studies and

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on-site measures will include efforts for heritage assessment, management and conservation of the heritage towns of Rajasthan.

*b. **Acknowledgements***

This Report was made possible thanks to the support and advice of many individuals and organizations. The team would like to thank everyone who contributed to this endeavor.

The ADB team played a key role in providing guidance and support at all stages of the Report's cycle. We would like to thank each of its members for their time, energy and enthusiasm. Particular thanks go to the Ms. Vivian Castro -Wooldridge, Ms. Ninette R. Pajarillaga, Richard C. De Guzman and Govind Rathore for their guidance and assistance through these six weeks.

Sincere gratitude goes to Ms. Richa Pandey Dwivedii and Mr.Bakshishraj Singh for their hard work and assistance in meeting tight deadlines.

We are also grateful to the team at Beyond Built Private Limited for their help with logistics and for their support in the smooth running of the project.

Special thanks to the local people of Khetri especially Shri Umrao ji Tomar, Chairman Nagar Palika and Mr. Khan for sharing their in-depth knowledge and passion for their town to ensure that the town receives the much needed water supply and sewerage while understanding the need for their heritage and culture to be protected.

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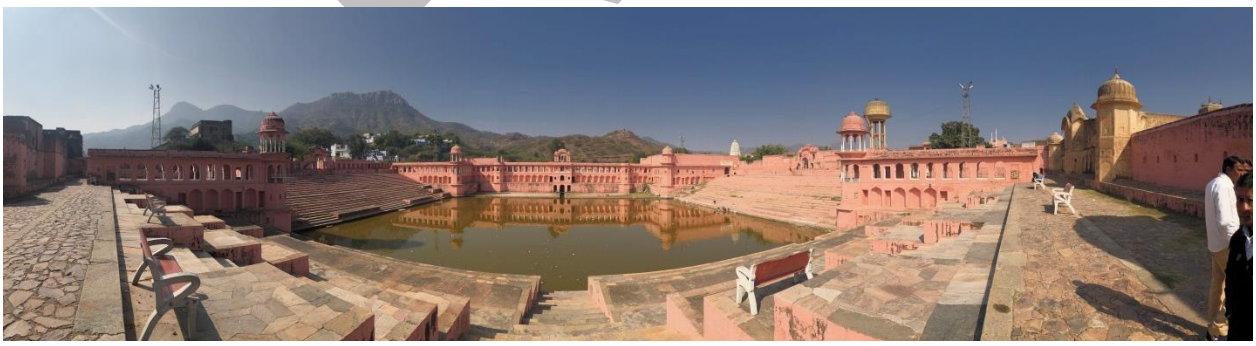
10. **A-2**: IMAGES OF PCRS

Source 1 Author
Figure 23 showing Paana Sagar Talab



Source 2 Author
Figure 24 showing panoramic view of Panna Sagar Talab

Source 3 Author

Figure 25 showing Reservoir at Paana Sagar Talab

Source 4 Author

Figure 26 showing entrance to Mandir Shree Ramchandra ji Chudawat ji

Source 5 Author

Figure 27 showing internal view of Mandir Shree Ramchandra ji Chudawat ji

Source 6 Author

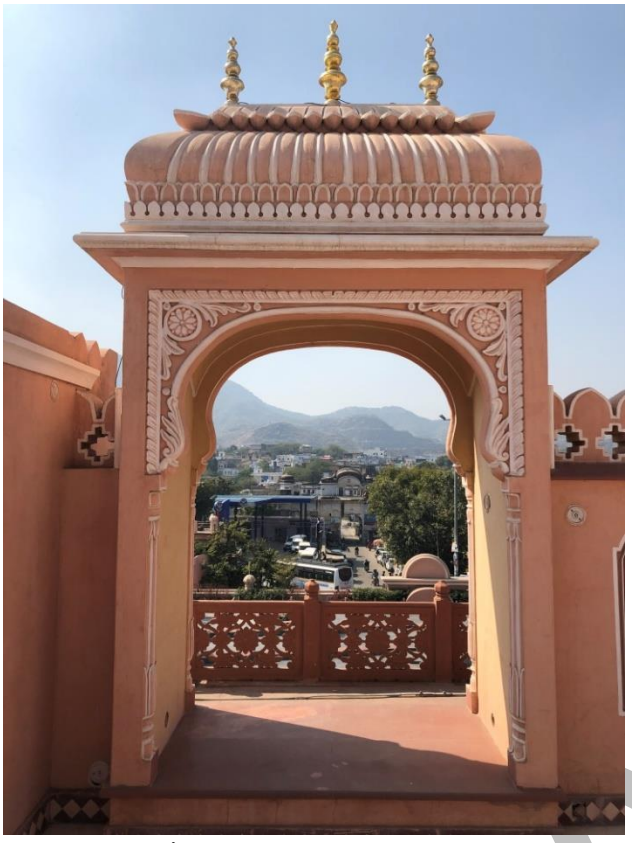
Figure 28 showing Khetri Bus Stand

Source 7 Author
Figure 29 showing Ajit-Vivek Museum

Source 8 Author
Figure 30 showing a side view to Ajit Vivek Museum

Source 9 Author
Figure 31 showing Ajit Vivek Museum

Source 10 Author
Figure 32 showing interior of Ajit Vivek museum



Source 11 Author

Figure 33 showing view of town from Ajit Vivek Museum

Source 12 Author

Figure 34 showing Jai Niwas

AFT

Source 13 Author

Figure 35 showing moisture damage at Jai Niwas

Source 14 Author

Figure 36 showing deteriorating condition of Jai Niwas

Source 15 Author

Figure 37 showing vegetation growth at Jai Niwas

Source 16 Author

Figure 38 View of Sukh Mahal from Jai Niwas

Source 17 Author

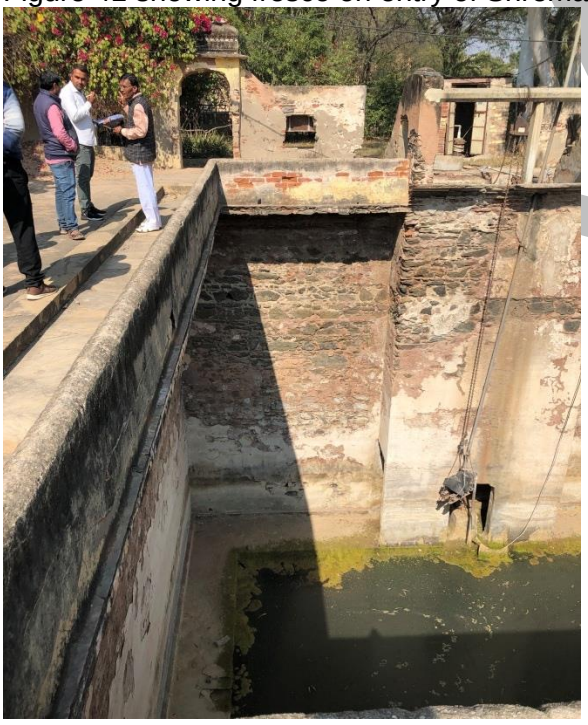
Figure 39 showing Sanskrit Vidhyalaya

Source 18 Author

Figure 40 showing Mandir inside Sanskrit Vidhyalaya

Source 19 Author

Figure 41 showing fresco on entry of Shremati Laxmi Shah Hospital



Source 20 Author

Figure 42 showing Dewan Brij Lal Singh Ji Shah ka Kund

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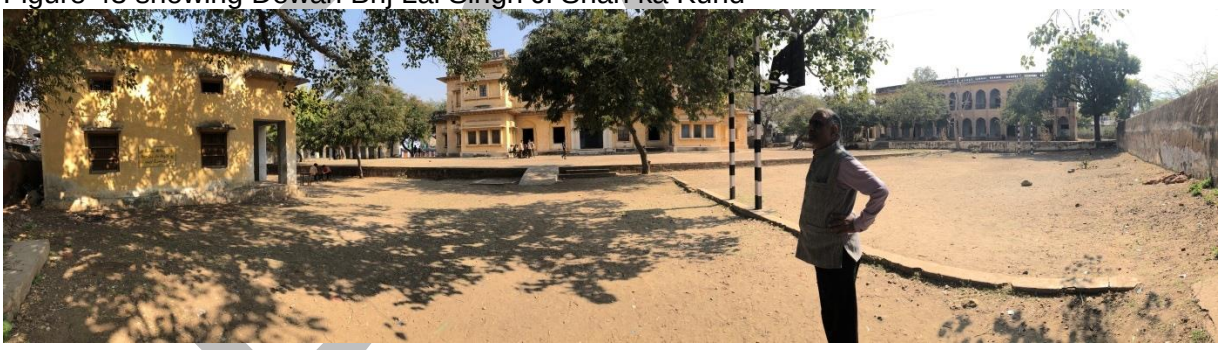
Source 21 Author

Figure 43 showing Dewan Brij Lal Singh Ji Shah ka Kund



Source 22 Author

Figure 44 showing panorama of Jai Singh High School

Source 23 Author

Figure 45 showing Jai Singh High School

Source 24 Author

Figure 46 showing Jai Singh High School complex

Source 25 Author

Figure 47 showing Bawri beside open sewer

Source 26 Author

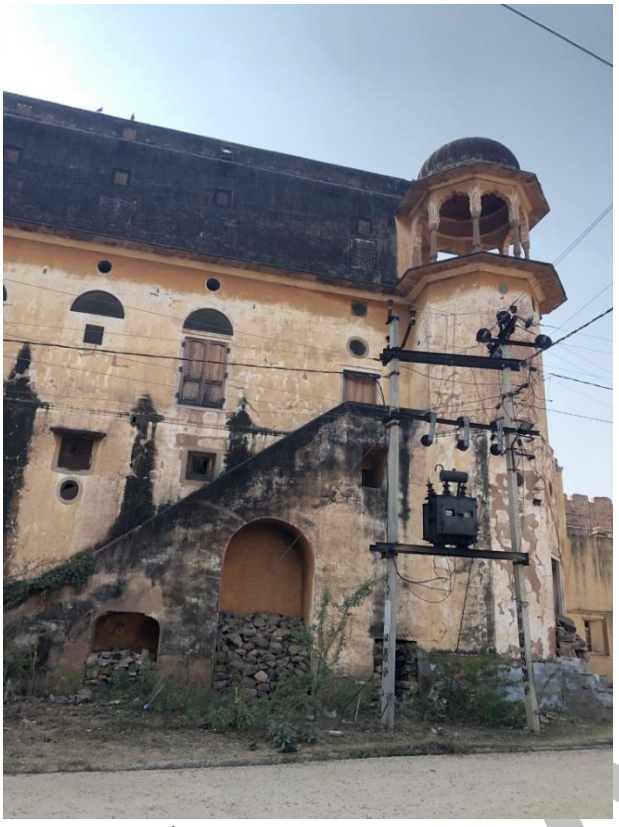
Figure 48 showing existing overhead tank

Source 27 Author

Figure 49 showing rear elevation of building (Amar Mahal) adjacent to Khetri Trust

Source 28 Author

Figure 50 showing rear elevation of building (Amar Mahal) adjacent to Khetri Trust



Source 29 Author

Figure 51 showing rear elevation of building (Amar Mahal) adjacent to Khetri Trust

Source 30 Author

Figure 52 showing entry gate of Sukh Mahal

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Source 31 Author

Figure 53 showing entry to Bhopalgarh Fort

Source 32 Author

Figure 54 showing Entry Gate at Bhopalgarh Fort

Source 33 Author

Figure 55 showing ruins of Bhopalgarh Fort

Source 34 Author

Figure 56 showing ruins at Bhopalgarh Fort

Source 35 Author

Figure 57 showing boundary wall at Bhopalgarh Fort

Source 36 Author

Figure 58 showing view of Khetri Town from Bhopalgarh Fort wall

Source 37 Author

Figure 59 showing condition of the Darbar Hall in Bhopalgarh Fort

Source 38 Author

Figure 60 showing internal courtyard At Bhopalgarh Fort

Source 39 Author

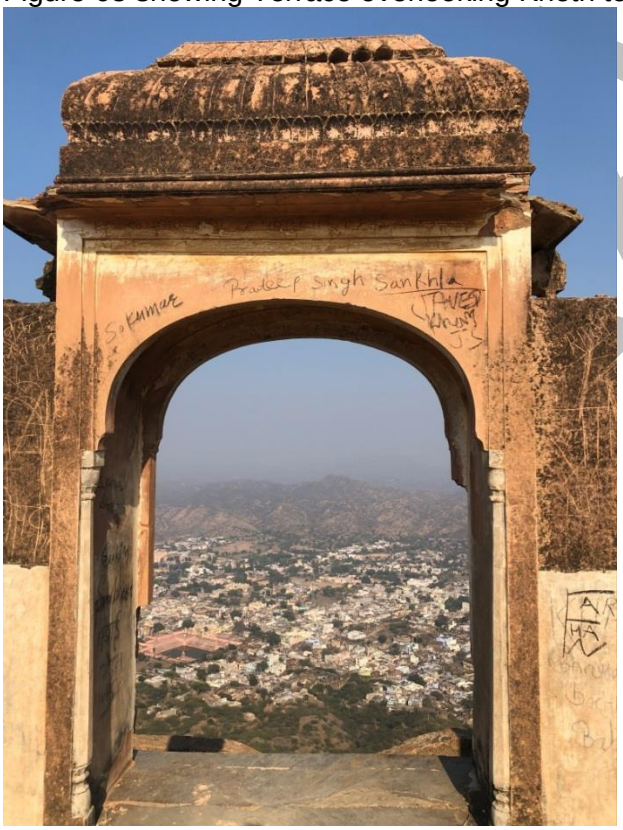
Figure 61 showing a view of the Darbar Hall at Bhopalgarh Fort

Source 40 Author

Figure 62 showing fresco on walls inside Bhopalgarh Fort

Source 41 Author

Figure 63 showing Terrace overlooking Khetri town at Bhopalgarh Fort



Source 42 Author

Figure 64 showing view of Khetri Town from the top of Bhopalgarh Fort

Source 43 Author

Figure 65 showing inside of a Temple at Bhopalgarh Fort

Source 44 Author

Figure 66 showing Bawri at Bhoalgarh Fort

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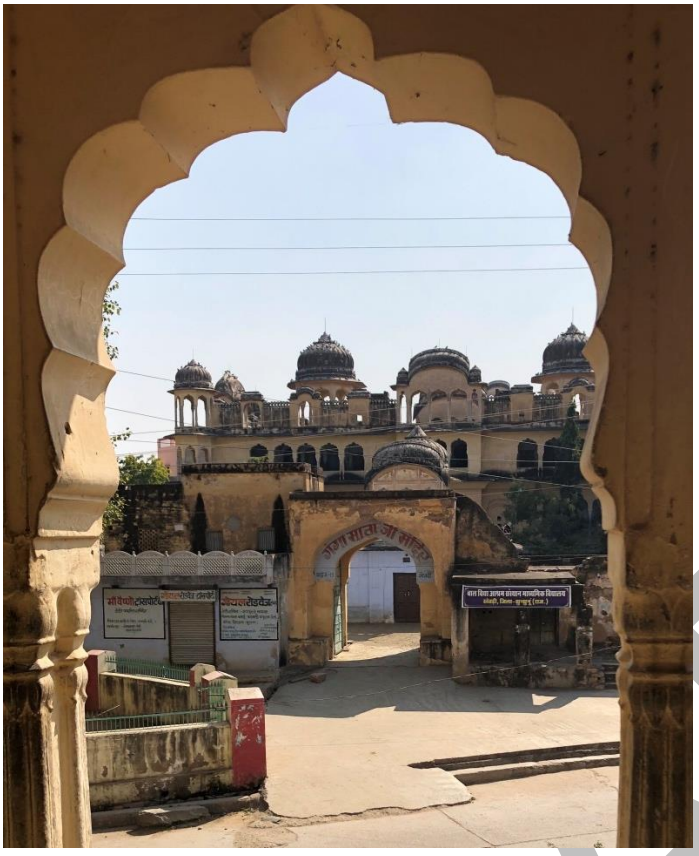
Source 45 Author

Figure 67 showing Raghunath Gaushala

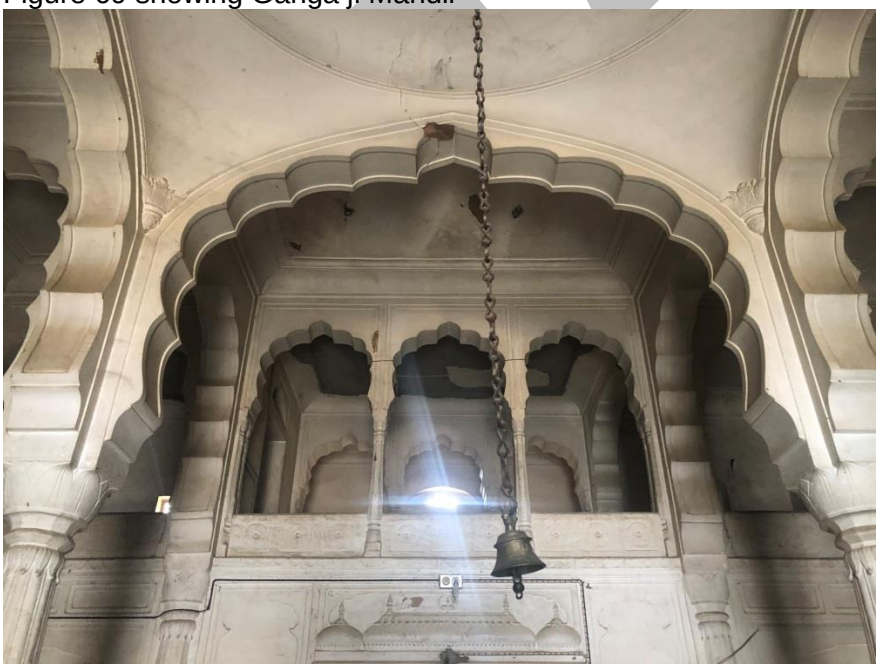
Source 46 Author

Figure 68 showing Gopal Ji Mandir



Source 47 Author

Figure 69 showing Ganga ji Mandir



Source 48 Author

Figure 70 showing interior of Ganga ji Mandir

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Source 49 Author

Figure 71 showing Saraswati School

Source 50 Author

Figure 72 showing Radha Krishan Mandir

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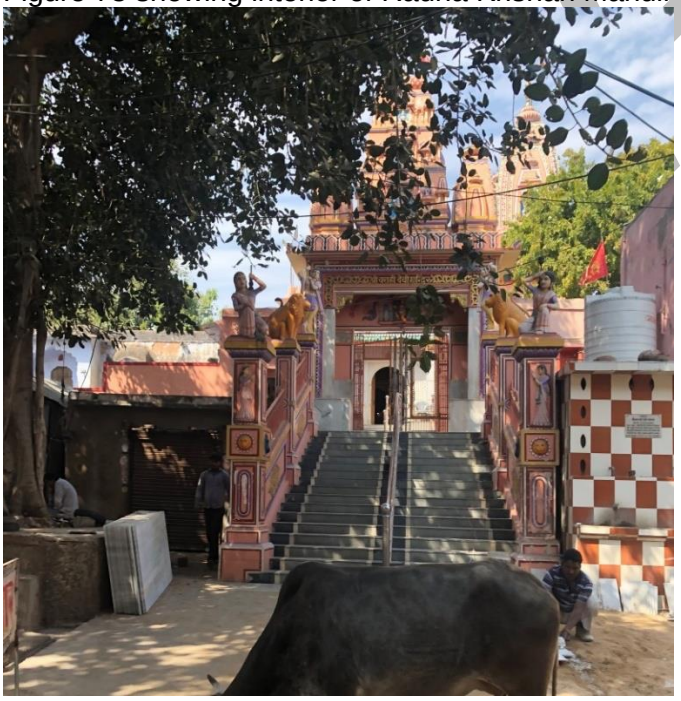
Source 51 Author

Figure 73 showing interior of Radha Krishan Mandir



Source 52 Author

Figure 74 showing Varahi Devi Temple

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Source 53 Author

Figure 75 showing Ganpat Ram ki Haveli

Source 54 Author

Figure 76 showing Ganpath Ram ki Haveli

Source 55 Author
Figure 77 showing Amar Mahal

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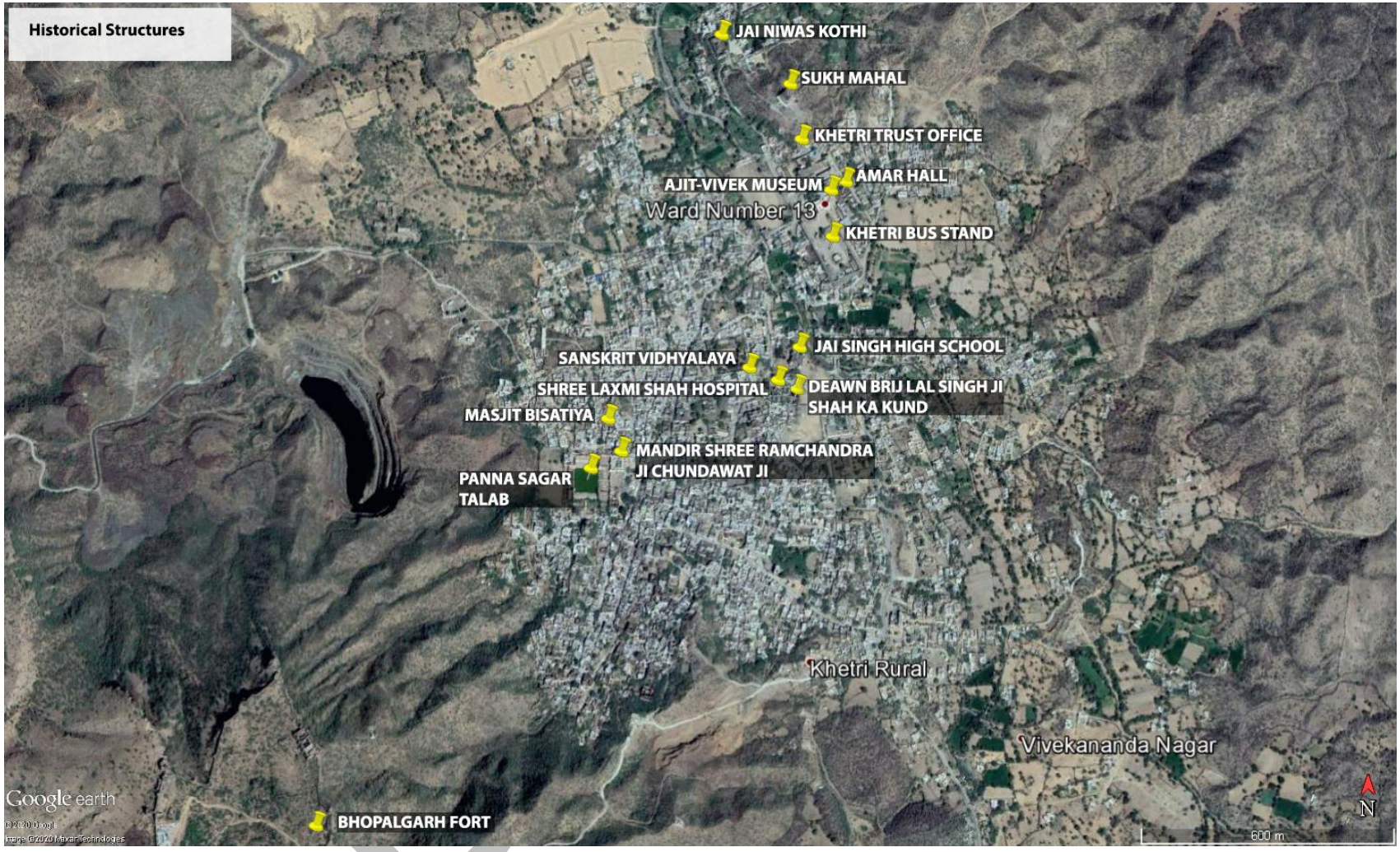
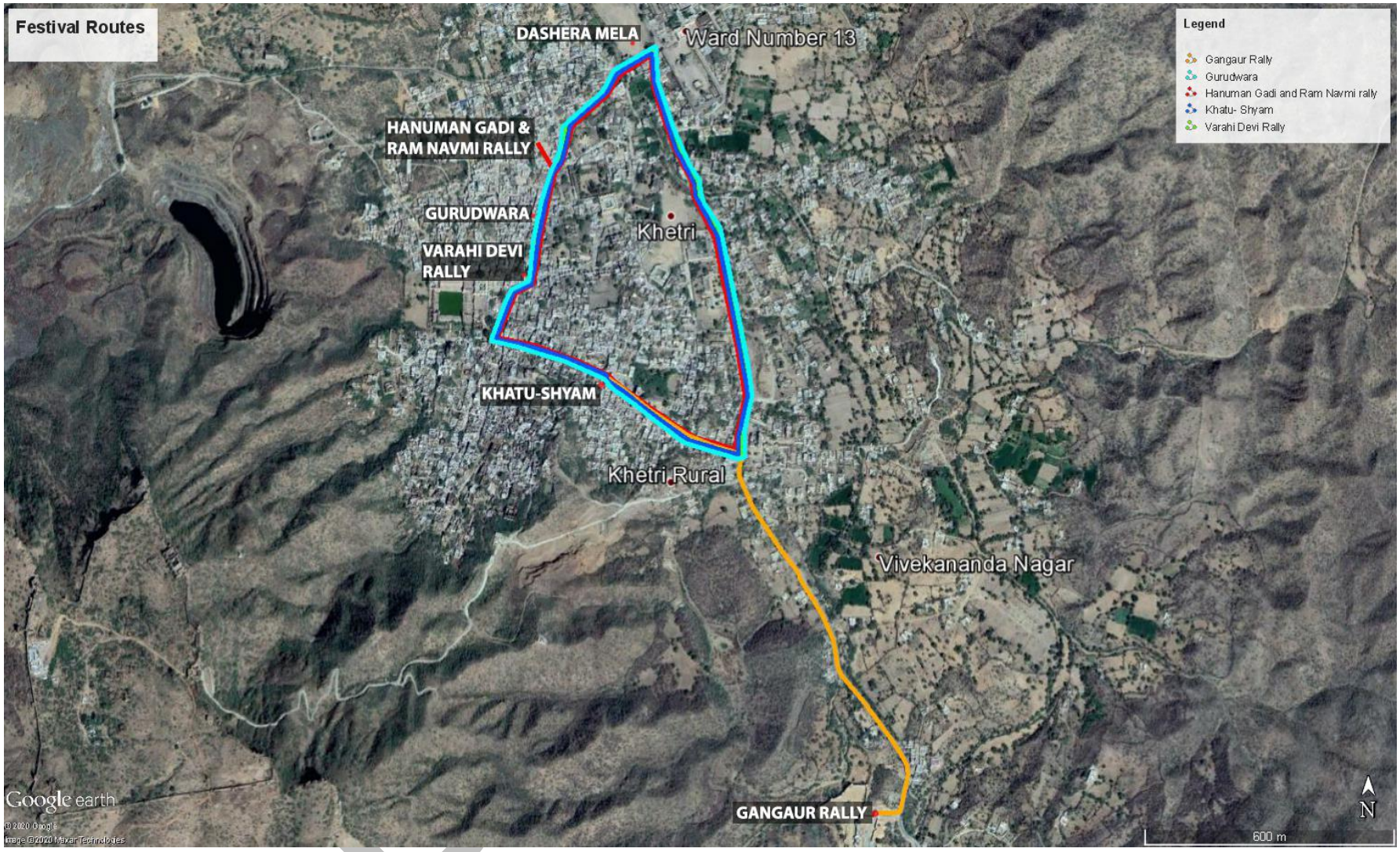
3. MAPS OF KHETRI

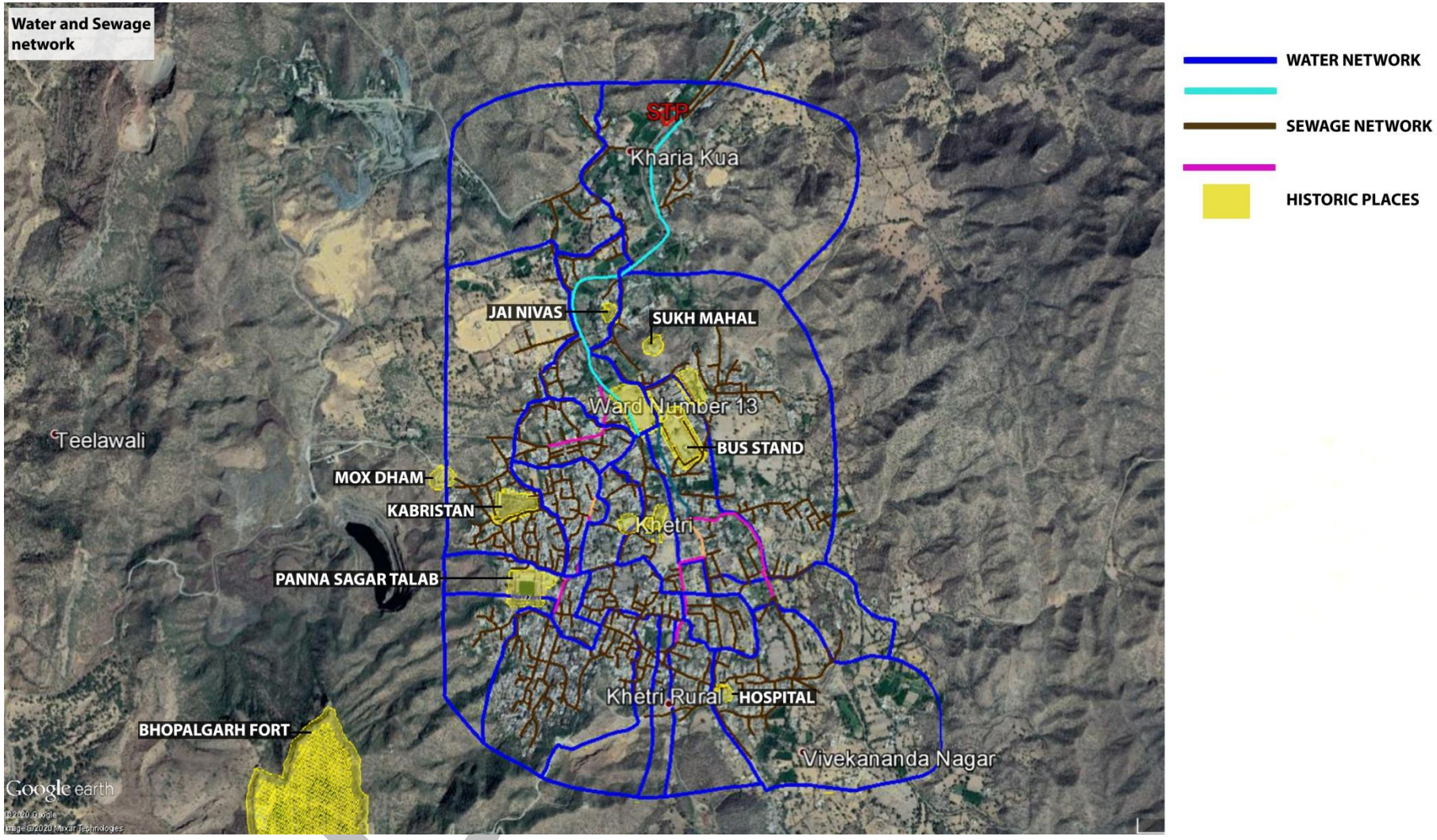


Source 56 Google Earth
Map 8 showing historical buildings in Khetri



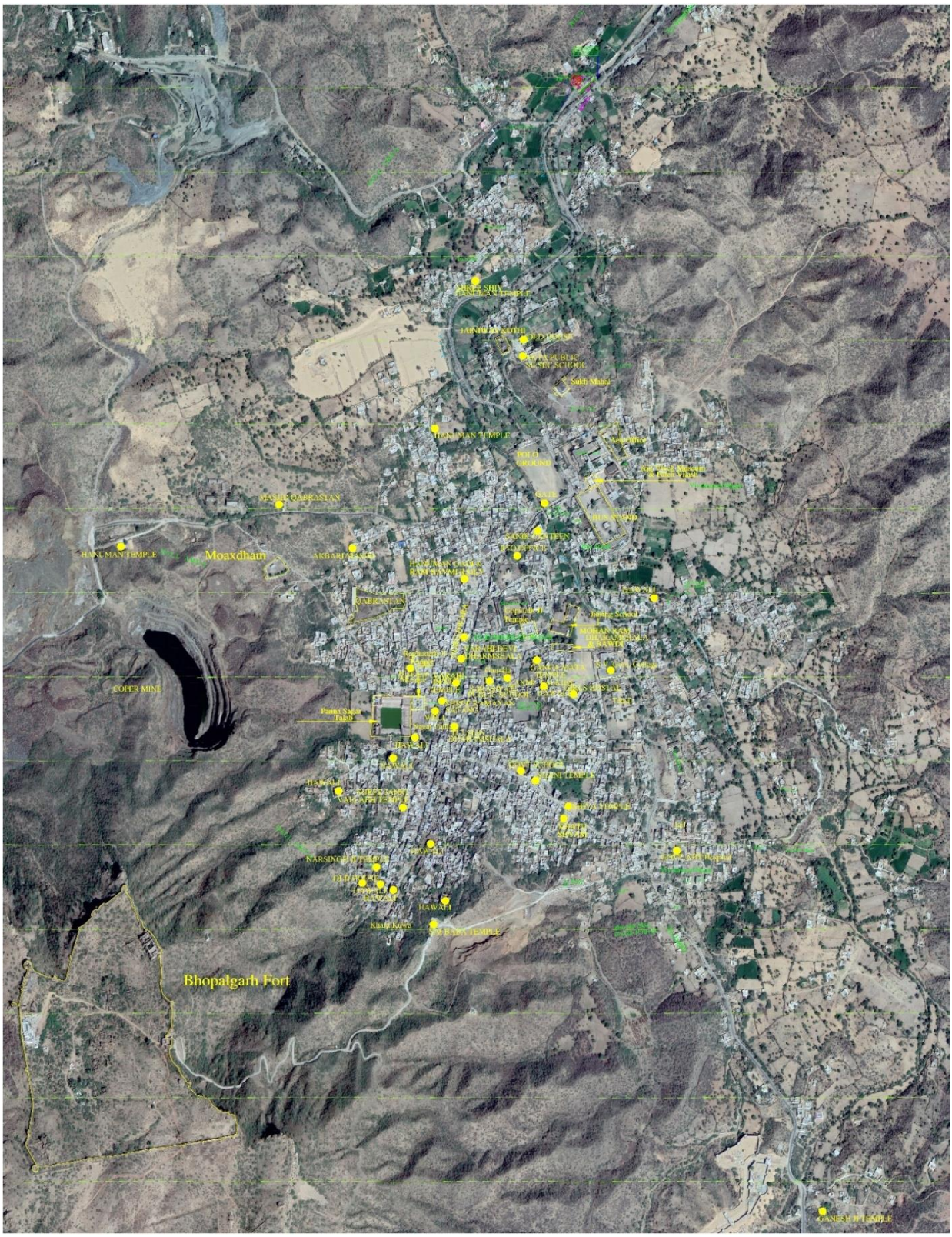
Source 57 Google Earth

Map 9 showing Festival Routes in Khetri



Source 58 Google Earth

Map 10 showing Proposed Water and Sewage network



Source 59 Creative Technocrate Services Pvt. Ltd.

Map 11 showing updated survey map of Khetri

Appendix3B: Sample Heritage Impact Assessment – Bharatpur Heritage and Beautification

Draft Heritage Impact Assessment & Management Plan

Contents

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EXECUTIVE SUMMARY

1. The focus of the subproject is on the following components:

- Conservation & Redevelopment of Town Hall campus and façade improvement of Raj kiya Vishist Purva Uchha Madhyamic Vidyalaya.
- Facade lighting & Illumination of City Gates
- Facade lighting & Illumination of Laxman Mandir, Ganga Mandir & Jama Masjid
- Conservation & Redevelopment of Saligram Kund & campus
- Conservation & Redevelopment of Brijendra Bihari Kund & Campus
- Revitalisation of Nehru Park

2. The major scope of work under the proposed subproject as stated in the Detailed Project Report will include the following aspects:

- Conservation & Adaptive reuse of the heritage resources.
- Creating recreational facilities for tourists & locals
- Development of tourist facilities & services at selected components
- Facade lighting & illumination of important heritage resources for night tourism

3. The objective of the subproject is to improve, conserve and manage physical and environmental image of the historical & heritage sites with planned interventions consistent to its historic status, revitalization of walled city along with sustainable model for citizens and tourists, to educate visitors about the historical structures, culture and the values of city, providing tourist infrastructure facilities along with protecting the heritage value of the property and to enhance tourist attractions with all facilities.[62]

A. Scope of the Subproject

4. Bharatpur is a city in the western Indian state of Rajasthan and is 180 kilometres from New Delhi. Geographically, the district is placed close to the capital of the state, major cities of neighbouring state of Uttar Pradesh and Delhi. Bharatpur touches Gurgaon of Haryana in the north, Mathura in the east, Agra of Uttar Pradesh and Dholpur of Rajasthan in the south and Dausa and Alwar in the west. The city lies the golden triangle, which also includes Delhi, Agra, and Jaipur. The distance between Jaipur and Bharatpur is around 178 km whereas Agra lies 55 km and Mathura is located at 34 km. Tourists from these areas travelling from Agra visit the bird sanctuary and fort in Bharatpur before continuing on to Jaipur. They donot stay overnight in Bharatpur. The proposed subproject components are expected to increase the number of tourist attractions in the city and this is projected to contribute to the economy of Bharatpur.

5. Under the subproject several heritage sites and structures that require conservation and upliftment have been identified with the following objectives:

- Conservation & restoration of existing cultural & natural heritage resources.
- Bringing the rich heritage of the city on the tourist map of Bharatpur.
- Creating awareness amongst locals towards their city heritage .

[62] From the Draft Initial Environmental Examination Report of a Project titled, *"Conservation & Development of Heritage Sites Bharatpur, Rajasthan,"* prepared by Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited- External Aided Project (RUDSICO-EAP), June 2022, p. 2.

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- Providing better infrastructure for tourism in the city.[63]

B. Description of the Setting

6. Subproject components are proposed in the citadel of the historic city of Bharatpur and in its immediate surroundings which were changed to urban use several decades ago. The citizens of the Bharatpur city will be the major beneficiaries of this subproject. Improved ambiance and infrastructure at one of the most visited places in Bharatpur. Implementation of project will attract more recreational facilities in the city and will attract tourist; this will contribute to the overall economy of the city[64].

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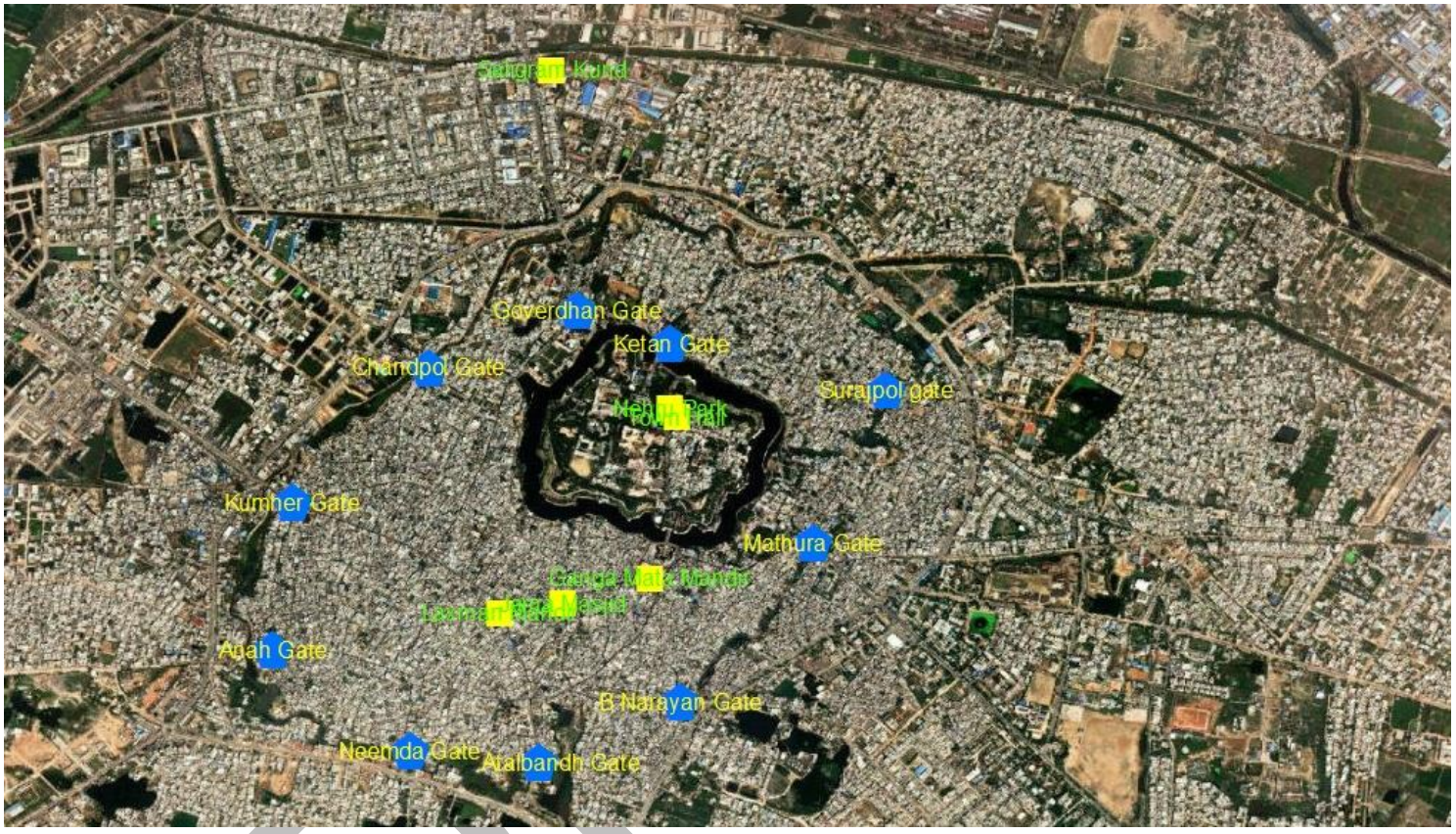
[63] From the Draft Initial Environmental Examination Report of a Project titled, *"Conservation & Development of Heritage Sites Bharatpur, Rajasthan,"* prepared by Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited- External Aided Project (RUDSICO-EAP), June 2022, pp. 2-3.

[64] Ibid

Locations of Proposed Components around Bharatpur



C. Objective of the HIA

- To evaluate the significance of the heritage assets and their condition
- To assess the impact of the proposed interventions under the sub project
- Propose mitigation measures through appropriate design and planning in conservation and adaptive reuse of the cultural heritage sites that ensures that the values of the heritage assets are protected and not compromised with the interventions
- Propose appropriate management systems for project implementation so as to ensure that the conservation works are in compliance with acceptable national and regional standards.
- Establish monitoring indicators for measuring compliance

I.BACKGROUND AND DESCRIPTION

A. Bharatpur: The Eastern Gateway to Rajasthan

7. Bharatpur, lying in the eastern part of the state of Rajasthan, is strategically located along the golden triangle, a touristic route consisting of Delhi, Agra, and Jaipur. It is the administrative headquarters of Bharatpur district, the headquarters of Bharatpur Division of Rajasthan state and is part of the National Capital Region (NCR) of India. It also became a Municipal Corporation with 65 wards in 2014.

8. The city is situated 180 km south of India's capital, New Delhi, 178 km from Rajasthan's capital Jaipur, 55 km west of Agra, Uttar Pradesh and 38 km from Mathura, Uttar Pradesh. A broad-gauge railway line also links it with Jaipur. Geographically, the district is situated between 26° 22' and 27° 83' N and 76° 53' and 78° 17' E and its average height above sea level is around 183 m.

Location of Bharatpur city on the Map of Rajasthan State

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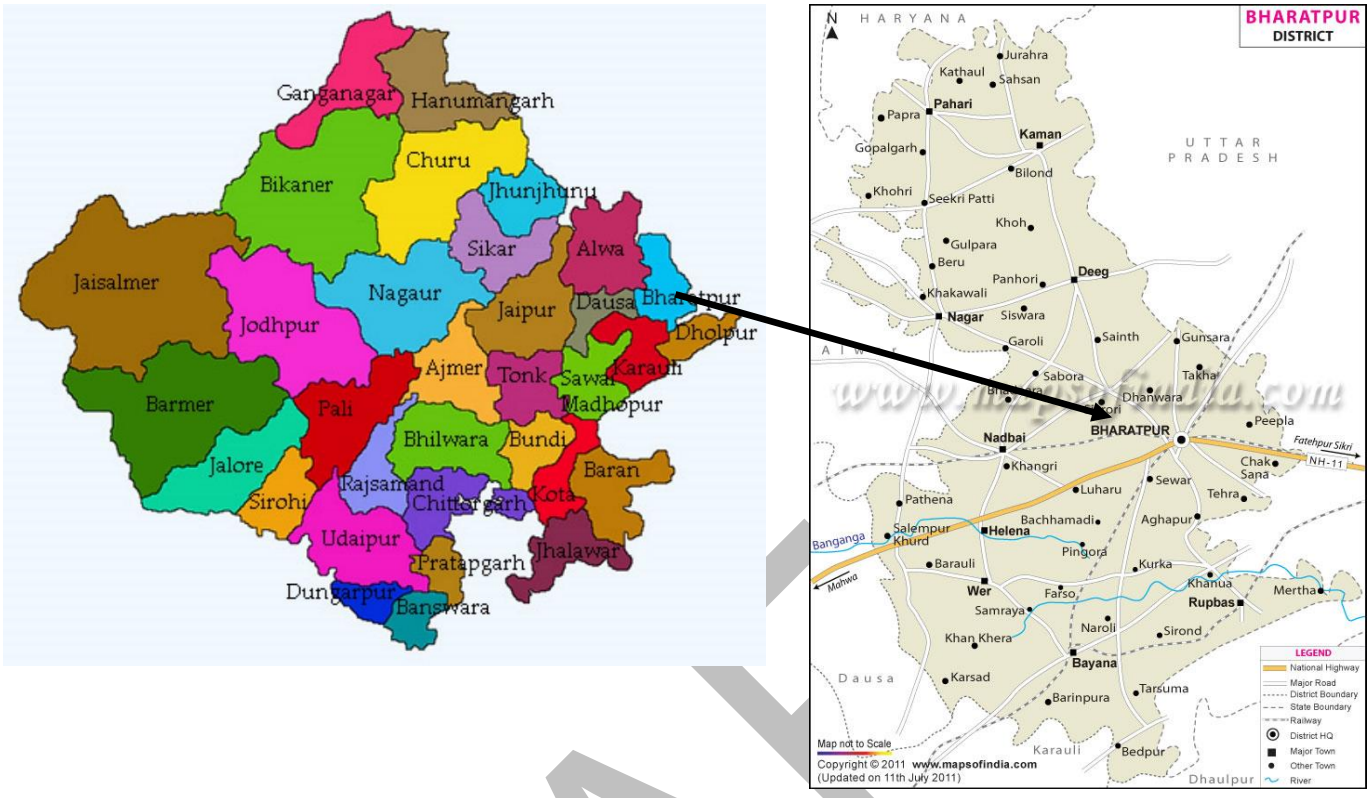

B. Rationale and Tourism Potential of the Project

9. The tourist inflow in Rajasthan is constantly increasing, and being the headquarter of the district, a large number of people visit Bharatpur due to which it sets the record for one of the highest footfalls in the state of Rajasthan. Some of them stay there for work while some go to Agra. Although Bharatpur is connected by road to the state capital and important cities, railway connectivity is via metres gauge line and broad-gauge rail route. The city lacks adequate tourist information counters at important places like railway station and bus stands – currently, Bharatpur has only one Tourist Information Centre.
In the 70s and 80s, Bharatpur used to witness a heavy influx of tourists – 70% of tourists travelling from Agra to Jaipur used to halt or stay here overnight, as per the older residents of the city. Unfortunately, with the passage of time, the tourist infrastructure has degraded, there is a shortage of basic services, utilities, and fundamental resources like water. Due to this, the numbers of tourists have been falling over the last few years. Tourists travelling from Agra visit the Keoladeo National Park and Lohagarh fort on their way to Jaipur. Restoration and improvement of heritage structures in Bharatpur and development of public amenities will also lead to economic development of the city and will significantly contribute to the economy of the state.[65]

10. In recent times, it is claimed that the government has started undertaking several projects to ensure uninterrupted water supply, proper drainage and sewerage in the city. The current 'Bharatpur Tourism Beautification Project Proposal' is envisioned to act as a catalyst to increase tourism footfall in the city.

C. Tourism Assets in and around Bharatpur are listed as :

1. Lohagarh Fort
2. Keoladeo National Park
3. Shri Banke Bihari Temple (inside Lohargh Fort)

[65] From '*Detail Project Report: Conservation & Development of Heritage Sites in Bharatpur*', prepared for Bharatpur Municipal Corporation, Rajasthan Urban Infrastructure Development Program (RUIDP), p. 21.

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4. Gayatri Temple (inside Lohargh Fort)
5. Government Museum
6. Bharatpur Palace and Museum
7. Sewar Fort
8. Purana Mahal
9. Deeg Palace
10. Dak Bungalow
11. Delhi Gate (outside Lohargh Fort)
12. Fateh Burj
13. Jawahar Burj
14. Ashtadhatu Gate
15. Moat surrounding the Fort wall
16. Fort walls including Chowburja gate
17. Approach bridges at the Chowburja and Ashtadhatu gates

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HERITAGE SIGNIFICANCE OF BHARATPUR

11. The heritage value of Bharatpur is closely tied to its mythological significance – the city itself was named after Bharat, Lord Rama's brother, whose other brother, Laxman, is the family deity of the erstwhile royal family of Bharatpur. The name 'Laxman' was engraved on the state's arms, seals, and other emblems. Aside from its association with the Ramayana, there is a belief that the Pandavas, the five brothers central to the epic of Mahabharata, had spent their 13th year of exile in Bharatpur around 3,500 years ago.

A. Historic Value

12. Historically, the city and fort of Bharatpur was founded by Rustam, a Jat chieftain belonging to the Sogariya clan. With the decline of the Mughal Empire, in the early 17th century, the Jats established a state in the Mewat region south of Delhi, with its capital at Deeg. Maharaja Suraj Mal took over from Khemkaran, the son of Rustam, in the 18th century and turned Bharatpur into an impregnable well-fortified city, carved out of the region formerly known as Mewat and established it as the capital of his state. It is also important to note that the cities of Bharatpur, Deeg and Dholpur played an important part in the history of Rajasthan. Several buildings and sites associated with this layer of history exist till date and infact contribute to the rich historic landscape of the urban area.

13. In the early 19th century, the princely state witnessed a siege by the British, and it was also one of the first states in Rajputana to have a treaty with British. During the British rule, it was spread across an area of 5,123 km, and its rulers enjoyed a salute of 17 guns, indicative of a relatively high rank based on their prestige. In 1947, the state acceded to the Indian Union, and in 1948, the Matsya Union or Matsya Sangh, was formed by the merger of four erstwhile princely states – Alwar, Bharatpur, Dholpur, and Karauli – which eventually led to the creation of the present-day state of Rajasthan.66

B. Social and Spiritual Value

14. One of the most important festivals of Bharatpur is the Braj festival lasting 3 days which takes place every year before the festival of Holi, in the month of Phalgun, according to the Hindu calendar. The festival is an embodiment of Indian culture and mythology as it is dedicated to Lord Krishna who is believed to have spent his childhood in the Braj region. The city being close to Mathura, his birthplace, has a great influence on the celebration of the Holi festival at Deeg. Rasleela, an Indian folk dance associated with the traditional story of Krishna as described in Hindu scriptures, is organised on this festival, folk songs are sung, and the whole town is decorated with colours.

15. Gangaur and Teej are also important festivals celebrated in the region. In the memory of the late Maharaja Jaswant Singh of the princely state, an exhibition and cattle fair are organized every year in which different breeds of animals are brought from different places. For pilgrims to the region there are places like the Laxman Mandir, Ganga Mandir, Jama Masjid and Bankey Bihari Temple.

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[66] https://rajbhawan.rajasthan.gov.in/content/rajbhawan/en/aboutus/introduction.html

16. As is evident, the people of Bharatpur hold their native traditions and customs in high regard and endeavour to preserve them.

C. Ecological Value

17. Keoladeo National Park, home to more than 230 different species of birds and a major wintering site for migratory birds from Afghanistan, Turkmenistan, Siberia, etc.,, is one of the main attractions of Bharatpur. Now a UNESCO World Heritage Site, Keoladeo was originally established as a duck-hunting reserve by the Maharajas of Bharatpur and was known as the best duck shooting resort in the British Empire. The site was declared a bird sanctuary in 1956 and later received the status of a National Park.

18. It is famous for ducks, goose, teals, pintails, and the rare Siberian cranes. Local birds in the area mainly are egerls, painted storks, cormorants, sarus cranes, spoonbills and openbill storks and weaver birds. Migratory birds flock here in July-August and breed here till October-November.

BASELINE FEATURES AND CONDITION OF THE SUBPROJECT COMPONENTS

A. Town Hall

19. This building is historic in nature with a distinctive medieval architecture style. It has been built in two phases which is evident from its architecture and use of materials. It comprises a raised pavilion like structure with an extension of a hall evidently built for performances.

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Town Hall- phase I of the building faces the road; the plinth and the roof are in serious state of decay

20. The Town Hall precinct is located adjacent to the Nehru park, along the edge of the moat wall of the citadel. The fortification wall along with the moat of the citadel are notified monuments by the Archaeological Survey of India, hence the Town hall building is located within the 'buffer zone' of the protected monument which requires all proposed works to be undertaken on this building to be approved by the National Monument Authority.

Town Hall in the citadel of Bharatpur; the moat marked in blue, moat walls and the two entrance gateways are protected monuments, notified by ASI

As mentioned in the IEE and Detailed Project Report, the entire building has been unused for several years – a part of the building was used as a government office, another part was used as a storage facility. A large part of the building is currently not in use. The building has been falling into disrepair since several years and hence is in a state of decay evidently due to absence of any maintenance. Architectural details of the structure have been compromised due to poor maintenance and incongruous construction. Graffiti and posters on the walls have defaced the historic fabric of the building along the street as the outer façade of the building is along the road edge.

21. It is evident that some repairs have been made using improper materials and techniques; the original plaster on the walls and roof is disintegrating, while original layers of wall finishing have been masked by inappropriate materials and multiple layers of paint. The parapet is broken, there is vegetation growth across the terrace which is resulting in seepage of moisture and development of cracks. Later interventions have concealed and damaged blind arches, pilasters, and openings on the upper floors.

22. Adjacent to the Town, along the principal access road is the Raj kiya Vishist Purva Uchha Madhyamic Vidyalaya (RVPUMV). This building is of heritage value and was possibly built during the same time as the construction of the Town Hall building. This is evident from its architectural character. The façade of the building appears to have been repaired several times with modern materials like cement-based plaster without any consideration for historic materials and detailing. The eastern façade is reported to be in very poor condition. The school houses students till class 11 soon to be extended to class 12. The existing façade is constructed with masonry wall in lime mortar and further finished with lime plaster.

It is proposed to restore and conserve the road side façade of this heritage school building with traditional conservation method and techniques.

Existing Condition of Town Hall

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B.

Existing Condition of Government RVPUMV School

C. Façade Lighting of City Gates

23. Single-colour warm white lights with theme of micro & diffuse façade is proposed to be used. LED light fixtures like spotlights, strip lights, linear lights, wall washers, up-lighter and down-lighters will be used for illumination. Features to be highlighted on façade are – door frames, motifs, architraves, kangooras or gate chajja, inverted ceilings. Gates proposed for façade lighting are as under:
Showing Continuous façade of Town Hall and RVPUMV (from School side)

	
ATALBANDH GATE	CHANDPOLE GATE

RAF

	
SURAJPOL GATE	KUMHER GATE
	
MATHURA GATE	KETAN GATE
	
NEEMDA GATE	B NARAIN GATE

	
Gobardhan Gate	Anah Gate

D. Laxman Mandir, Ganga Mandir & Jama Masjid

a. Ganga Mandir

24. Ganga Maharani Temple features a unique blend of South Indian, Mughal and Rajputana architectural styles. The temple has two entrance gates, while Lord Krishna is seen holding the mountain of Giri Raj on one side; there are statues of Laxmi Narayan and Shiva Parvati on the other. The walls and pillars of the temple are decorated with beautiful carvings. The temple is located across the moat, opposite the principal gateway of the citadel. The king and queen could have the first sight of Ganga Maharani, and even today, a window in the royal palace opens exactly in the direction of the temple.

25. The building is built of Bansi Paharpur stone and gets its distinctive character from the open arcade which are present on all its sides. A long grand staircase with shallow treads leads to the temple court from the road. The building is in a good state of conservation

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Ganga Mata Mandir, across the moat of citadel.

b. Jama Masjid

26. The Jama Masjid is a monumental building, built of the Bansi Paharpur stone and is in the heart of the market street, and is located between the two temples. The three domes of the mosque tower over the other lesser significant buildings on the market street.

27. The front façade has some shops, while the back façade is marred by incongruous elements such as hoardings, advertisements boards, and improperly hung electrical and cable wires. The lighting on the façade is inadequate as it fails to highlight the Masjid's beautiful architectural elements. The local people explained that the streetlights are inadequate, and they are frequently found in a state of disrepair.

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Jama Masjid, in the heart of the city

c. Laxman Mandir

28. The temple is made of sandstone, Bansi Paharpur. The temple like the previously described buildings are built on a high plinth, with its front façade adorned with a variety of architectural features – the entrance has gokha adjoining tibari structures, flanked by jharokha windows on both sides; and stone chajjas supported by ornamental brackets. The steps inside multifoil arched entrance leads to the temple's Jagmohan Mandapa.

29. Due to later constructions of shops around the periphery of the building, some architectural features and embellishments such as the winged portion of the entrance façade are now hidden. Additionally, hoardings and advertising boards are detracting from the historic façade and hiding its architectural features.

30. In recent years, the floor of the temple court, along its periphery have been provided with stone paving.

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Laxman Mandir- provided with sandstone flooring in recent times

E. Saligram & Brijendra Bihari Kund

a. Saligram Kund

31. Cruciform in shape, the kund has remanent of masonry which define three of its four sides. Built primarily of brick masonry in lime mortar with decorative features in red sandstone. The kund is currently in a poor condition with deteriorating masonry and extensive vegetation growing around it. According to a local resident, the fourth wing comprised a ramp which made it possible for animals to access water in the Kund. Algae has formed on the surface of the water due to long-term water logging, and the water often flows out of the Kund. A temple is located on one of the sides of the kund and a small informal settlement has developed on the other edge.

32. The locals informed that the source of water is a well; however, in the past, it is believed to have been from a canal which continues to exist but no longer supplies water. During the site visit, the canal was observed to have been overgrown with vegetation and filled with debris and garbage. It was also mentioned that the water is contaminated by sewage. Heavy vehicles are parked on the rear side of the temple, along the edge of the road which define one of the edges of the precinct. Due to these developments the kund is not visible from the road. A network of canals in city functioned as flood channels and is said to be one of the sources of water for the kund. Major source of water to the kund is Girraj Canal passing adjacent to the kund in tis Northern direction having a lateral sluice.

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Masonry edges of the kund, remains of the historic fabric

The water of the kund is contaminated with solid waste and surface run off

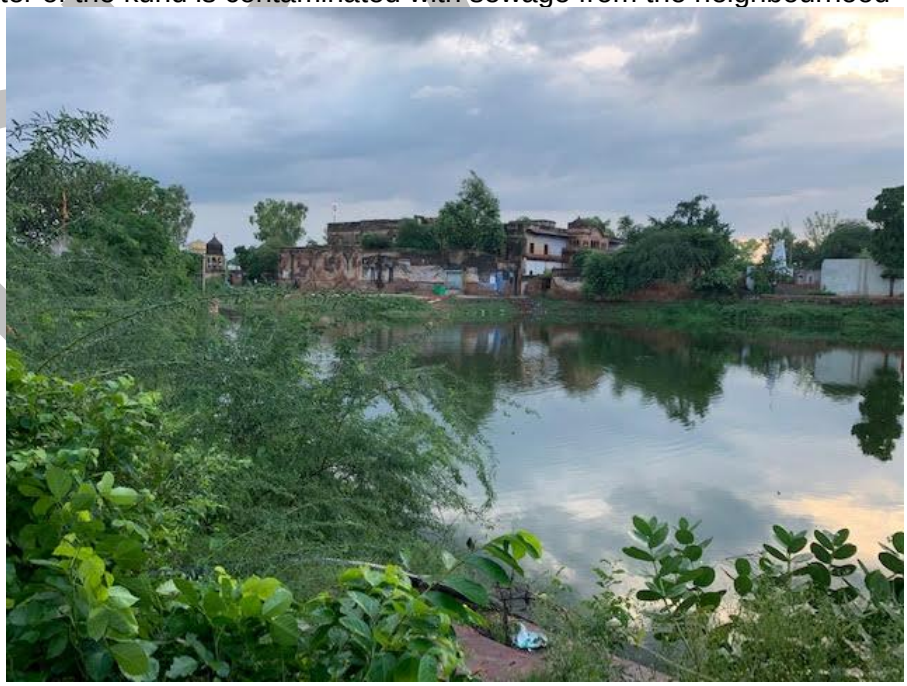
33. The extent of the property (water tank with the open space and temple in the setting) requires to be defined as all the four edges have different conditions, Edge 1 – A temple with informal parking of trucks. A road is present on the outer edge; Edge 2 –Bushy vegetation around the edge of the tank; Edge 3 –B High wall of an adjoining semi-industrial plot; Edge 4 – The overgrown canal. This is necessary for proper protection of the water feature, design appropriate interface between the roads to ensure that the water is not contaminated by storm water runoff from the roads, and to ensure that there is no encroachment in the future. Catchment of Saligram Kund is proposed to be covered under the sewerage network under RUIDP Phase-IV and the Brijbihari Kund under the FSSM scheme under the same scheme

b. Brijendra Bihari Kund

34. The Brijendra Bihari kund is one of the historic water structures in the town located adjacent to an important temple. Water from the Kund was used for rituals in the temple but due to pollutants in the water from sewage, this water is no longer used for ritual purposes. The temple is situated on one of the Kund's edges, recently developed residential neighbourhoods can be found on two of its sides, and a raised mound with a Goddess shrine is on its fourth side along agricultural fields. The extent of the property (water tank with the open space and temple in the setting) requires to be defined. This is necessary for proper protection of the water feature, design appropriate interface between the roads to ensure that the water is not contaminated by storm water runoff from the area around, and to ensure that there is no encroachment in the future.

35. The source of water in the tank is a well which is located on its inner edge, with the principal source possibly being storm water contaminated by untreated sewage from the area around. The water from the tank overflows into a drainage channel which is currently overgrown with vegetation. The Kund was seen filled with sewerage water from nearby habitation. Interception of sewage from this locality is proposed to be covered under Bharatpur Sewerage project, RSTDSP Phase-IV/ Amrut,.

Water of the kund is contaminated with sewage from the neighbourhood



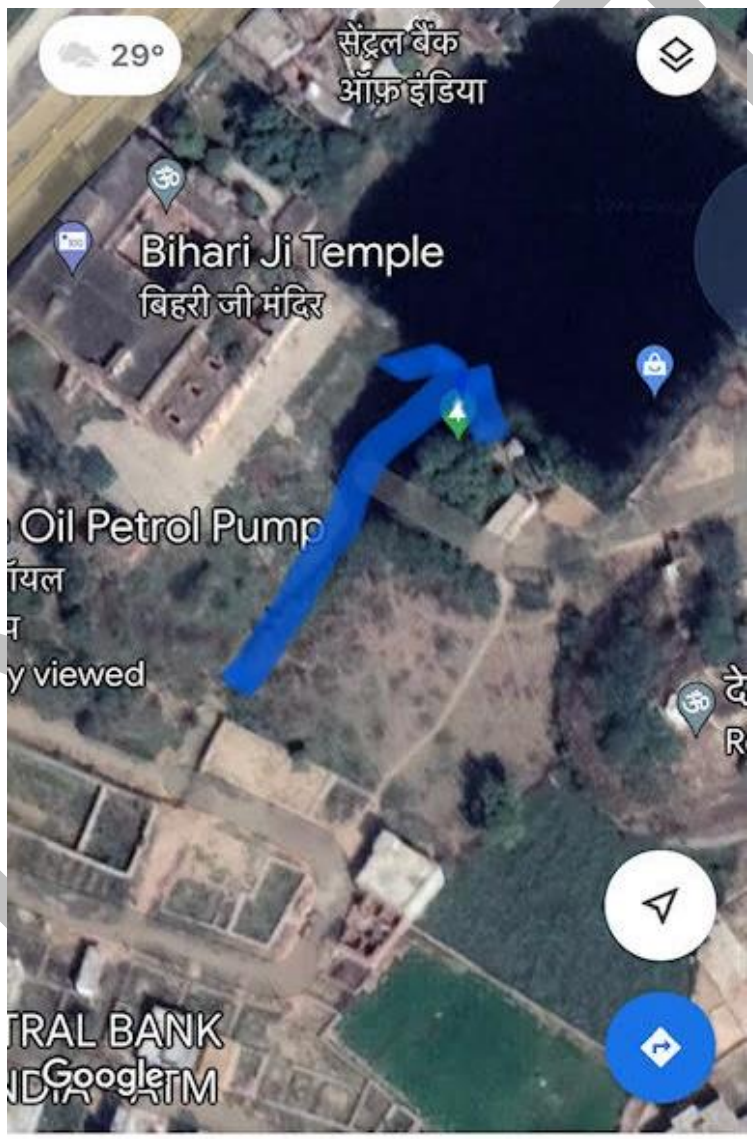
Temple on the bank of the kund

36. Several interventions are underway in the Kund – however, they lack adequate consideration of the historic, architectural or/and socio-cultural contexts and associated

values, because of which the cultural significance of the temple precinct (of which the Kund is a part) is being compromised.

37. The Kund is currently in critical condition – its boundary and steps are broken and need to be conserved and partially rebuilt, and algae has formed on the surface of the water, giving rise to a foul odour. The Kund is surrounded by residential neighbourhoods, and the establishment of shops/ warehouses/ workshops inside the heritage structure has compromised the integrity of the site.

38. Additionally, there are no toilet facilities in the area, parking is haphazard (which makes it difficult to access the Kund and causes congestion), information and direction signage are lacking, and seating facilities are missing.



The setting of the kund with the temple; the
Arrow denotes the flow of storm water from the surrounding area into the tank

F. Nehru Park

39. The Nehru Park is a public park located within the citadel (a protected monument) adjacent to the Town Hall building. The park has provisions of pathways, benches, children's play area all enclosed by a boundary wall. The forecourt has several vendors addressing the needs of the local visitors. The features within the park are in a state of disrepair.

Pathways, sculpture and features such as a clock, all in a state of decay

4.

II.REGULATORY FRAMEWORK

40. Several of buildings of historic significance which are part of the subproject components are recognised and protected by the ASI or the State government.

Monuments of National Importance 222pecialize by the ASI in Rajasthan[67]

41. Following parts of the Lohargarh Fort (the citadel) are recognized as monuments of national importance. Several functions have been assigned to the National Monuments Authority (NMA) for the protection of monuments and sites through appropriate development norms within the prohibited and regulated area around the centrally protected monuments. One amongst these responsibilities NMA is to consider grant of permissions to applicants for construction related activity in the prohibited and regulated area. It should be noted that conduction of any works within 300 m from the boundary of any of the following monuments protected by ASI warrants prior permission from NMA.

1. Delhi Gate outside the Bharatpur Fort
2. Fateh Burj
3. Jawahar Burj
4. Ashtadhatu Gate
5. Chowburja Gate
6. Moat surrounding the Fort wall
7. Fort walls including Chowburja gate and approach bridges at the Chowburja and Ashtadhatu gate.

State Protected Monuments[68]

1. Kishori Mahal complete premises
2. Kamara Khas
3. Kachahari Kala
4. Kothi Khas
5. Hansarani Palace
6. Chaman Bagichi
7. Hammam and adjoining structure area and open land till boundary of the fort including three wells and gates of mudwall
8. Mud bastion near Surajpol gate
9. Mathura gate
10. Atalbandh gate
11. Anah gate
12. Kumher gate
13. Govardhan gate
14. Neemda gate
15. Chandpol gate
16. Surajpol gate
17. B Narain gate

[67] https://asijaipurcircle.nic.in/bharatpur%20district.html.
https://rgplan.com/articles/monuments/Monuments%20of%20Rajasthan.pdf
[68] From the website of ASI. *https://asi.nic.in/protected-monuments-in-rajasthan/.*

PROPOSED SUBPROJECT COMPONENTS AND SCOPE OF WORK

A. Conservation & Redevelopment of Town Hall

a. Description

42. The Town Hall, a two-storeyed structure is located within the walls of Lohargarh Fort. Constructed on a raised plinth, it exhibits a wide variety of architectural styles spread across different time periods with features like round arches, stone columns, pilasters, decorative spandrels, pilasters, stone balustrades, parapets, triangular pediment, piers, round clerestory windows and an arcaded balcony. One of the multifoil arches is designed in a typical haveli temple style where the hallway is Jagmohan mandapa of a temple with garbhagriha at the centre, surrounded by a circumambulation path. Additionally, there is a theatre hall with steps

Citadel, located within a densely populated

leading down towards the stage. It appears to have been built in two phases. This is evident from its architectural style, construction materials and systems that were used. Phase 1 of the building comprises the arcade building with inner pavilion chambers enclosed within a single bay deep rooms and verandas on two sides. Phase 2 is a large hall located towards the rear of the building which is built of relatively modest materials – brick masonry walls and corrugated iron sheets. This hall with sloping roof houses a stage towards its rear, and it is likely to have been a multipurpose hall.

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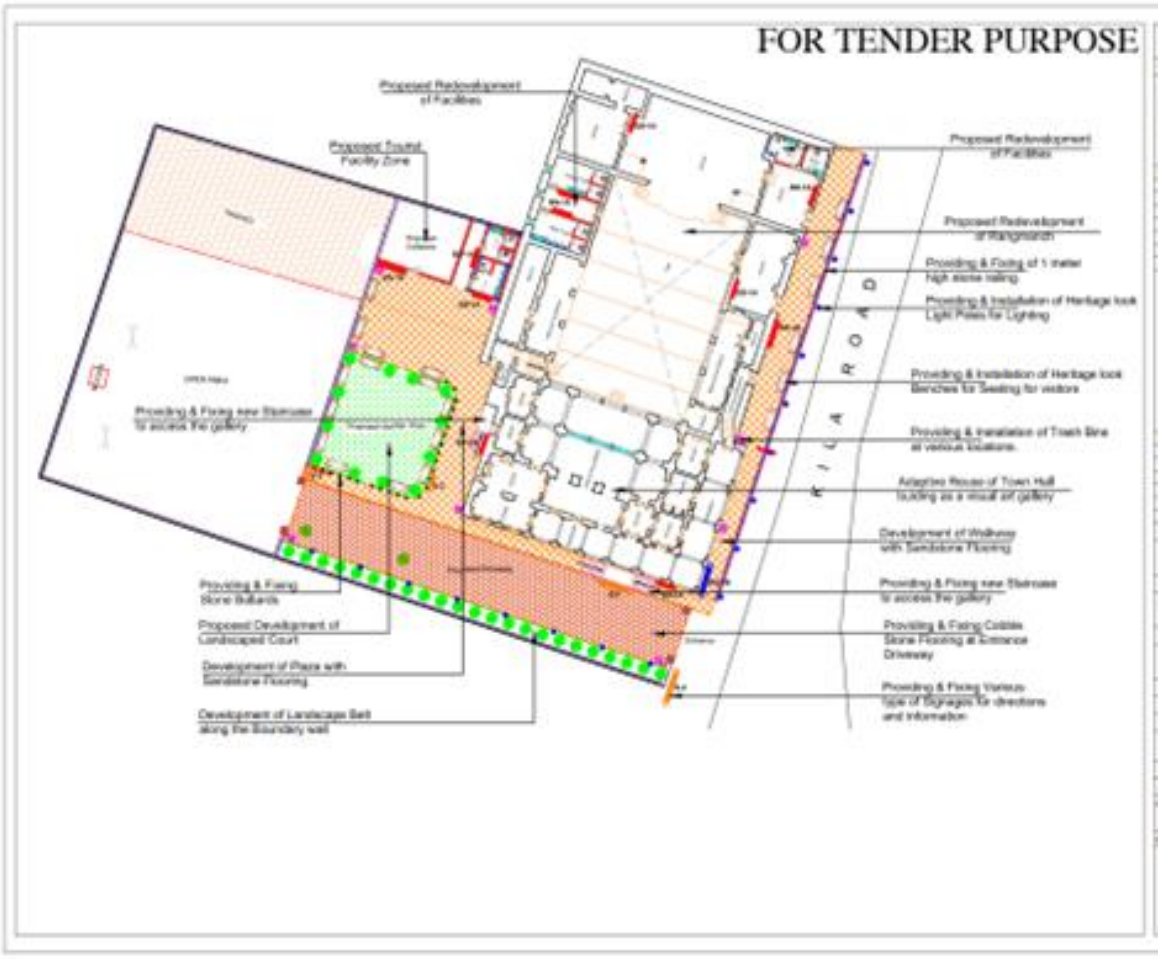
Phase I of the building is the two storied building with the arcade;
Phase II of the building is a plain masonry structure which houses a large hall roofed with trusses and corrugated sheets.

b. Proposed Works

43. It has been proposed to conserve and redevelop the existing Town Hall building by undertaking the following major activities:

i. Adaptive reuse of the heritage building as a cultural activity zone
ii. Redevelopment of Rang Manch area as theatre for visual art performance
iii. Conservation & redevelopment of main building as visual art gallery
iv. Development of viewpoint/ watchtower on terrace
v. Site & outdoor area redevelopment as cafeteria, parking, landscape
vi. Façade illumination for night view



c. Proposed Conservation Activities

i. Façade restoration (Stone Conservation)
ii. Replacement of damaged & missing stone elements
iii. Stone cleaning/ protective coating
iv. Site & building cleaning/ removal of waste & dump materials
v. De-vegetation of built form and surroundings
vi. Removal of encroachments & partitions
vii. Repair & restoration of architectural elements like railing, jaali, parapet, cornice, motifs
viii. Repair & restoration of doors & windows
ix. Repair & restoration of masonry walls
x. Plinth protection of built structure.
xi. Improvement of Façade of Government School adjoining Town Hall

d. Proposed Site Redevelopment Activities

i. Development of walkway/ cobble stone flooring
ii. Development of green spaces
iii. Development of street furniture
iv. Development of activity zone/ craft bazaar/ food outlet
v. Development of parking for visitors
vi. Site surrounding development as heritage precinct

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e. Proposed Building Redevelopment Activities

i. Removal & replacement of existing building shade structure
ii. Redevelopment of stage area, green rooms, washrooms and public amenities
iii. Redevelopment of seating zone with flooring and markings
iv. Updating building services, acoustics
v. Façade and internal lighting

The proposed interventions for façade improvement of the school in the DPR are the following:

i. Cleaning of existing surface, removal of vegetation, re-plastering and Painting
ii. Fixing of broken architectural elements (e.g. Brackets, Chajjas, etc.)
iii. Ornamental work in plaster to enhance the façade
iv. Repair & restoration of masonry wall, doors & windows

These are broadly understood as the following interventions:

1. Removal of the later applied cement-based plaster
2. Removal of the pulverised plaster
3. Repair and restoration of the masonry wall
4. Repair of doors and windows
5. Replastering the masonry with lime plaster
6. Repair of the brackets and chajjas, and other decorative features of the façade.
7. Provision of decorative features in plaster

f. Evaluation of the Proposed interventions:

44. The building is of architectural significance and merits conservation and reuse as a space for performing arts as suggested in the proposed subproject. This is in accordance with the spaces available in the historic building.

45. However, its architectural typology and pavilion-like form with a few walls do not lend itself to be used as a visual art gallery, as also put forth in the proposal (this is in addition to the performing arts space). *In order to achieve spaces and walls for display, extensive interventions would require to be undertaken which would compromise the integrity of the spaces within the historic building.* It is recommended that the building be used as a venue for performing arts only.

g. Conservation Activities

46. Details on conservation to be worked out during the detailed design / prior to implementation (either by contractor or by a consultant). Conservation works must be carried out by a specialised contractor who has prior experience in undertaking such works. Special terms in the contract should be included that the contractor be required to have a conservation architect overlooking the design development process and detailing along with the MEP (Mechanical, Electrical and Plumbing) consultants, in the event that the urban local body may not have the required specialisation. Structural crack has been observed in the

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wall of the school. It is recommended that a structural engineer be part of the team of the consultant or the contractor to provide the structural strengthening details for the walls which should be sensitive to the historic building both in use of material and construction detail. Interventions should be least invasive.

h. Heritage Regulations

47. The Town Hall building is located within 300 metres from the moat surrounding the citadel/ fort, which is a monument of national importance. Since it falls within the buffer zone of this ASI-protected monument, all interventions within this area including conservation and interventions to reuse the Town Hall will require the approval of NMA.

B. Façade Lighting of City Gates

48. Single-colour warm white lights with theme of micro & diffuse façade is proposed to be used. LED light fixtures like spotlights, strip lights, linear lights, wall washers, up-lighter and down-lighters will be used for illumination. Features to be highlighted on façade are – door frames, motifs, architraves, kangooras or gate chajja, inverted ceilings. Following city Gates are proposed for façade lighting, of which 9 gates are state protected monuments and will require prior permission from State Department of Archaeology and Museum, Government of Rajasthan. These gates are, Chandpole Gate, Surajpol Gate, Kumher Gate, Mathura Gate, Ketan Gate, Neemda Gate, B Narain Gate, Gobardhan Gate and Anah Gate

6.1.1 Evaluation of the Proposed interventions

49. Details on illumination to be worked out during the detailed design / prior to implementation by contractor will be done and approval shall be taken from PIU prior to start of work. Implementation of this work must be carried out by a specialised contractor who has prior experience in undertaking lighting on historic buildings. Special terms in the contract should be included that the contractor be required to have a conservation architect overlooking the design development process and detailing along with the Electrical consultants, in the event that the urban local body may not have the required specialisation.

50. The historic Ketan and Mathura Gates are located within 300 m from the moat of Lohagarh Fort which is a monument of National importance protected by ASI. This implies that permission to illuminate the façades of these gates will have to be solicited from NMA.

The illumination of Chandpole Gate, Surajpole Gate, Atalbandh Gate, Kumher Gate, Mathura Gate, Neemda Gate, B Narain Gate, Gobardhan Gate and Anah Gates , which are state protected monuments and will require permissions from the State department of Archaeology and Museum, Government of Rajasthan .

C. Facade Lighting & Illumination of Laxman Mandir, Ganga Mandir & Jama Masjid

a. Historic and Spiritual Significance

i.Ganga Mata Mandir

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51. This is a grand temple dedicated to Goddess Ganga, located right in front of the Lohagarh Fort. A large number of devotees visit this temple every year on religious festivals like Ganga Saptami and Ganga Dussehra. The temple is believed to signify purity and holiness of Maa Ganga.

ii.Jama Masjid

52. The Mosque is located south of the fort, across from the city post office. Jama Masjid serves as a prayer ground and a space for religious meetings of Muslim community. There is also a Madrasa for children within the complex.

53. This is the only Jama Masjid in India built by Hindu Jat rulers and is symbolic of the unity in diversity amongst the people. It is believed that a drought hit Bharatpur a long time ago, animals were dying, no crops were growing, and there was a massive shortage of water. The king asked the religious leaders of all religious groups to pray for rainfall as per their traditions. Soon, there was a heavy rainfall which impressed the king, and he fulfilled the wishes of all the religious leaders – the Hindu leaders asked for the Ganga Mandir, while Muslim leaders asked for the Jama Masjid.

iii.Laxman Mandir

54. This Temple is dedicated to Dasaratha's son, Lakshmana and his wife Urmila, and it also has shrines of Rama, Bharat, Shatrughna as well as Hanuman.

b. Design guidelines as described in the DPR

i. To reduce consumption of power all the proposed lights will be LED
ii. The propose lighting will be done only with single color warm white light
iii. The propose lighting will be done with theme of Micro & Diffuse façade
iv. LED light fixtures like spotlights, strip lights, linear lights, wall washers, up-lighter & down lighters will be used for illumination
v. Areas to be highlighted on façade will be stone architectural elements
vi. No large fixtures will be installed
vii. Wiring of lighting to be hidden

c. Evaluation of the Proposed interventions

55. The three buildings described above have embellished stone exterior surfaces and are of considerable architectural and historic significance. The courtyard/open spaces around or within the complex have stone paving. The proposed subproject component is lighting of the temple façade. The DPR does not contain the details for the intervention, for instance it does not provide details whether the light fittings and related infrastructure would be mounted on poles or on the building itself. However, it would be prudent to accept that no wiring should be mounted on the stone face of the building and no chasing of the stone faces should be permissible to provide the lighting. This is important as damage to the stone face would be an irreversible damage to the historic building facades. This is an important matter for consideration for both the inner and outer facades. Details on illumination to be worked out

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during the detailed design / prior to implementation by contractor and prior approval of PIU will be required for entire lighting arrangement. Implementation of this work must be carried out by a specialised contractor who has prior experience in undertaking lighting on historic buildings. Special terms in the contract should be included that the contractor be required to have a conservation architect overlooking the design development process and detailing along with the Electrical consultants, in the event that the urban local body may not have the required specialisation.

56. Lastly, it should be noted that Ganga Mata Mandir is situated at 150 m from the moat of Lohagarh Fort which is a monument of national importance protected by ASI. Any work within 300 metres of the protected monument, including monument lighting would require permission from NMA.

D. Conservation & Redevelopment of Saligram Kund

a. Historic and Spiritual Significance

57. This kund is located in the Saligram temple precinct which was built by the King of Bharatpur 200-250 years ago to commemorate the birth of his son. It is stated that an idol of Lord Hanuman – which can now be found in the temple – was discovered during excavation work for the Kund, making it sacred, of immense religious significance for the local community. There is an adage about this site – it is believed that when there was a lack of ghee (fat) while making devotional offerings, the water of this Kund was used as ghee in preparation of the same, adding to the spiritual value of this Kund.

Scientific and Ecological Significance

58. The kund is of historic significance that also represents the ancient knowledge of storm water management in the city that informed the historic city planning. It is evident that the catchment of the kund is such that it prevented the flooding of the adjacent areas.

6.1.2 Scope of work

6.1.3 Conservation of the Kund

i. Conservation of the masonry walls
ii. Provision of Lime plaster & *kada*
iii. Restoration & replacement of damage/ missing stone elements
iv. Restoration of Ghats/ flooring
v. Plinth edge protection
vi. Reconstruction of damage/ missing wall
vii. Dredging of the polluted water
viii. De-vegetation of existing structure
ix. Façade restoration of surrounding heritage structures
x. Façade lighting

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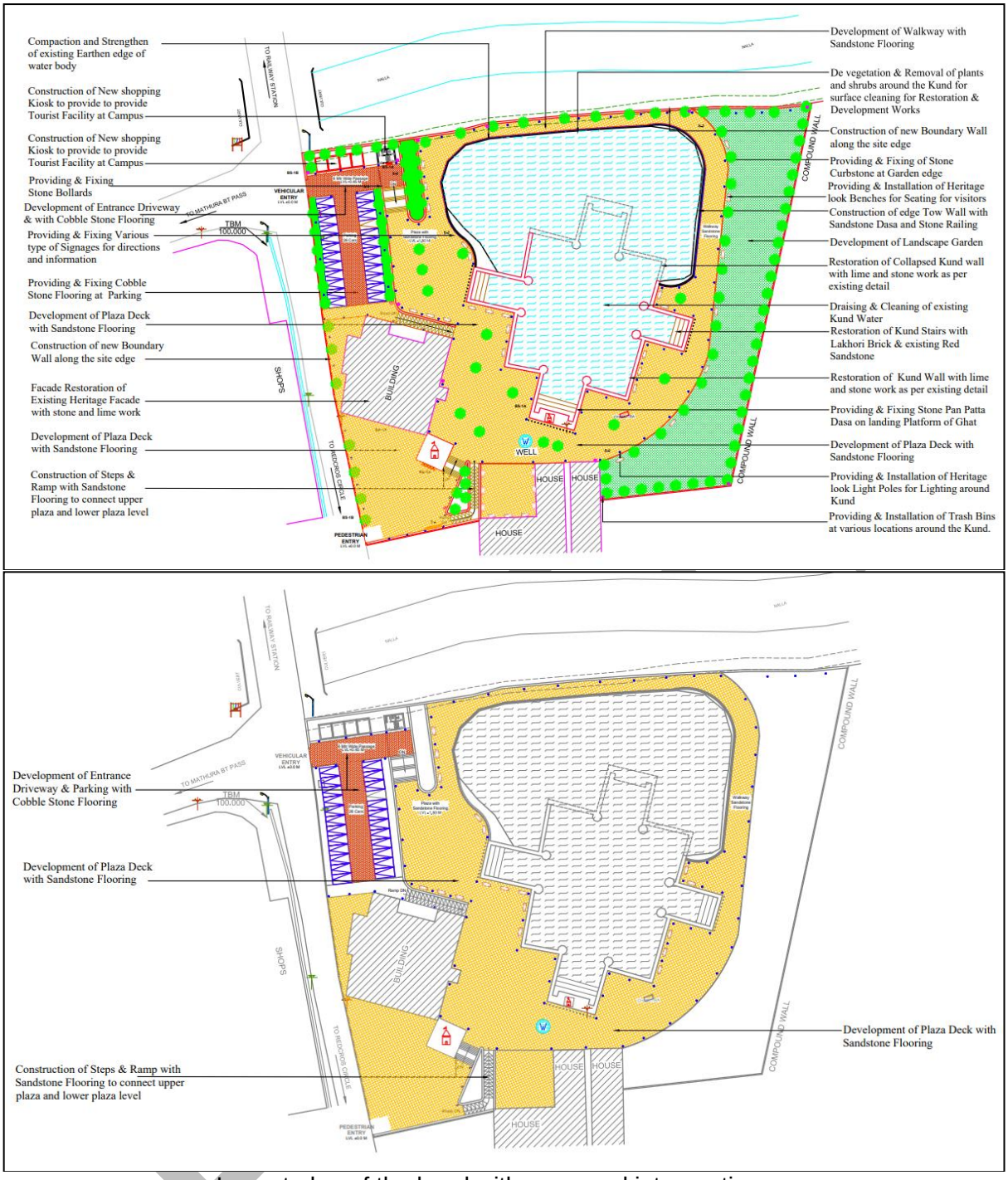

Layout plan of the kund with proposed interventions

b. Redevelopment of the area

i. Construction of boundary wall/ site demarcation
ii. Area development around the kund – flooring/ plantation/ street furniture/ lighting/ signage
iii. Development of visitor facility area like toilets
iv. Development of kiosk
v. Development of parking

c. Evaluation of the Proposed interventions

59. The historic town of Bharatpur has a unique system of water bodies and water channels comprising a complex system of flood management, and irrigation canals and drains. The moat of the Lohargarh Fort is part of this complex system which was found to be filled to its brim in the month of August 2022 (at the time of site visit). Other than these, water tanks of historic and cultural significance were also observed.

60. Although the scope of the project is conservation of historic fabric of tank and landscape interventions, the nature of interventions is primarily for beautification of the area around the kund.

61. The conservation and plan for reconstruction of the missing areas of the tank requires to be based on investigation which is only possible after the water and sludge has been dredged. It is therefore recommended that the conservation plan be prepared during the project implementation by a team of conservation architect, structural engineer and Environmental Engineer (as the source of water needs to be comprehensively analysed to revive the water system, if possible; design for protection of water source and propose interventions to prevent contamination through design interventions). A holistic plan which addresses aspects related to water harvesting is recommended to ensure that the intervention of conservation of the heritage structure enhances the integrity of the water structure. It is further recommended that paving with red sandstone along the perimeter of the kund be not provided as it compromises the authenticity and integrity of the historic structures. The paving should be a combination of hard and soft surfaces where hard surface is provided only in pathways. The pathways could be a combination of the brick and rough stone surfaces with anti-skid properties.

62. The extent of the property (water tank with the open space and temple in the setting) requires to be defined. This is necessary for proper protection of the water feature, design appropriate interface between the roads to ensure that the water is not contaminated by storm water runoff from the area around, and to ensure that there is no encroachment in the future.

63. Operation and maintenance of heritage structure is recommended to be considered while developing the design components as several of features such as the electrification with decorative lights etc need to be regularly maintained.

d. Heritage Regulations

64. The ASI protected fort wall is located at 2300 metres from the kund, thus, no permission for the proposed works is needed.

E. Conservation & Redevelopment of Brijendra Bihari Kund

a. Historic Significance

65. This temple was founded in 1918 by Maharaja Kisanji to commemorate the birth of his son, Maharaj Brijendra Singh Ji, who donated it to Shri Vallabh Acharya Ji. The adjoining kund was built in 1918 to meet the temple's water needs, and it included 6 ghats and 1 well. Later, this kund was used to provide drinking water for the elephants in the Sewar fort.

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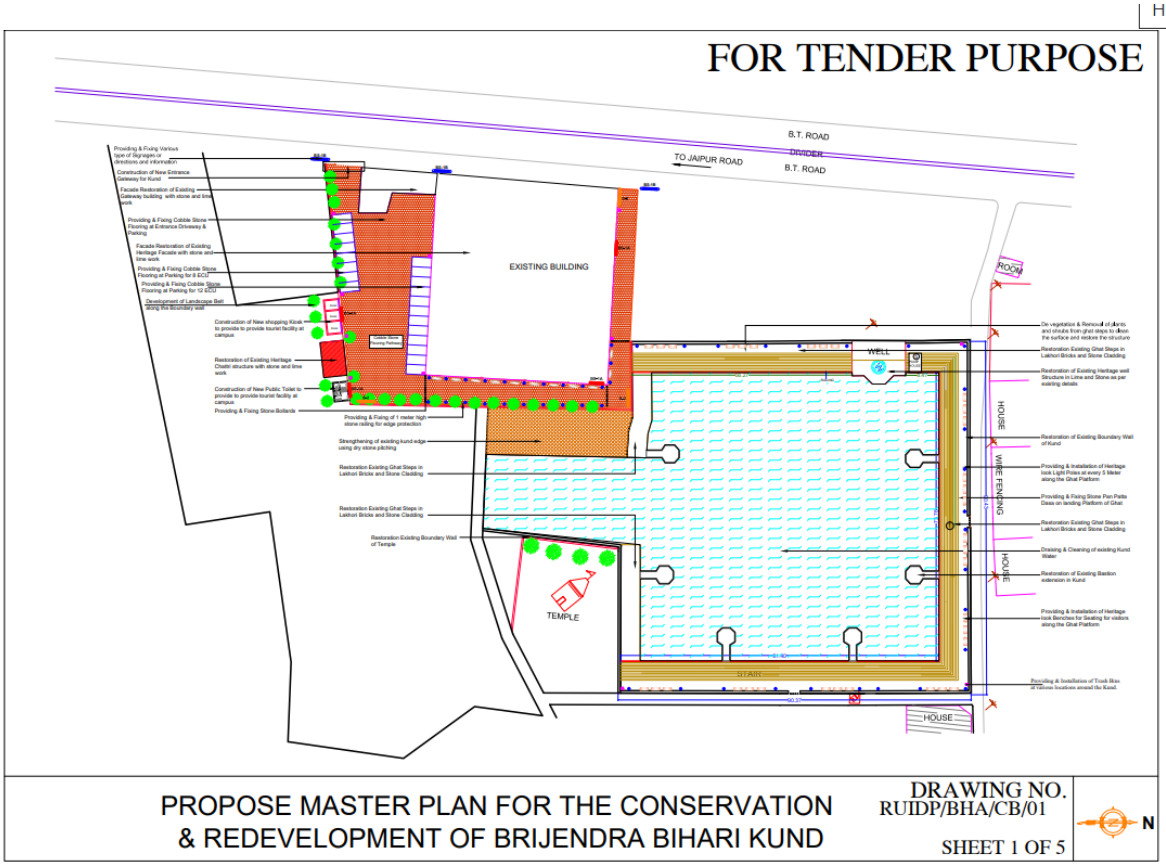
b. Scope of work

Conservation of Kund

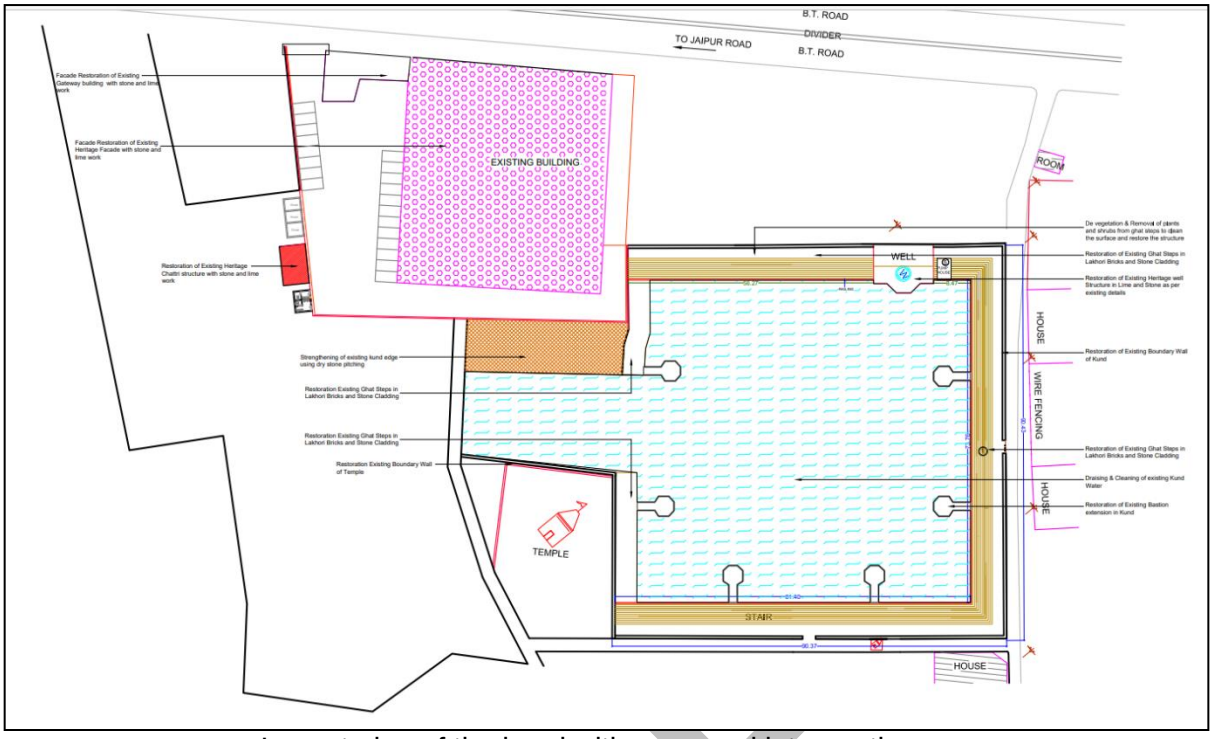
i. Restoration of historic ghats
ii. Façade Restoration of surrounding heritage structures
iii. Restoration of water channel
iv. Retaining wall construction around catchment area
v. Restoration of architectural elements on façade
vi. Façade lighting



Layout plan of the kund with proposed interventions

Redevelopment

i. Redevelopment of compound area/ compound wall
ii. Flooring & pavement around kund
iii. Installation of street furniture- stone benches, signage's, light poles, bollards, dustbins, railings
iv. Landscape development in surroundings
v. Kiosk & public amenities development



Layout plan of the kund with proposed interventions

The temple is regularly visited by the local community, more specifically by women

c. Evaluation of the Proposed interventions

66. The historic town of Bharatpur has a unique system of water bodies and water channels comprising a complex system of flood management, and irrigation canals and drains. The moat of the Lohagarh Fort is part of this complex system which was found to be filled to its brim in the month of August 2022. Other than these, water tanks of historic and cultural significance were also observed.

67. This tank is located near the Jaipur-Bharatpur highway, adjacent to an important historic temple endowed by the royal family to a trust. The temple was seen to be frequented by local people, more specifically, women, for various rituals throughout the day.

68. The extent of the property (water tank with the open space and temple in the setting) requires to be defined. This is necessary for proper protection of the water feature, design appropriate interface between the roads to ensure that the water is not contaminated by storm water runoff from the area around, and to ensure that there is no encroachment in the future.

69. It is recommended that detailed conservation plan be prepared during the project implementation by a team of conservation architect, structural engineer and Environmental Engineer (as the source of water needs to be comprehensively analysed to revive the water system, if possible; design for protection of water source and propose interventions to prevent contamination through design interventions). RUIDP project under RSTDSP, Phase-IV includes provision of sewage management (FSSM) in this area as this area falls in fringe of city and have sparse population. It is recommended that the source of contamination of the water tank be addressed as part of this scheme.

70. It is also advised that the contractor will be required to provide detailed design as part of their scope of work.

71. To avoid contamination of kund water with sewage, the catchment area of 2 Kunds are proposed to be covered to be covered under the Bharatpur Sewerage project under RSTDSP, Phase-IV.

d. Heritage Regulations

72. The ASI protected fort wall is 5.4 km far from proposed site, thus, no permission for the proposed works is needed.

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The edge of the kund, a road with historic brick masonry wall

The well structure of the kund, important feature for conservation

Community consultation at the site of the kund.

F. *Revitalisation of Nehru Park*

73. The Park is located close to the Town Hall within the premises of Lohargarh Fort.

a. Work Proposed

i. Redevelopment of pathway in local sandstone
ii. Restoration of Clock built in the landscape in the park.
iii. Provision of benches
iv. Facilities of children play area, wave slider, multi-seater see-saw, four-seated arch swing and others.
v. Umbrella shaped 4 fountains; to include wall fountain on the sloping wall beside the steps.
vi. Selfie Point is proposed inside the park made up of red sandstone.
vii. Repair of Boundary Wall.
viii. Circular Gazebo of size 6.4 m diameter.
ix.

b. Evaluation of the Proposed interventions

74. Nehru Park is located within the citadel / Lohargarh fort, adjacent to the fortification wall which forms the inner edge of the moat. The Nehru park shares a boundary with the Town Hall. The subproject components are for the repair of clock, provision of street furniture, pathways, children's play area enhancement, and boundary wall repair. It is however recommended that the park be considered for integration with the Town Hall by providing interlinking passage guarded by Gate(s), the proposed use of the Town Hall as a Centre for Performing Arts will also merit some open space – possibly as an outdoor venue for performing arts – and there is very little open space within the Town Hall complex currently.

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Need for improvement for surface parking along the edge of the Town Hall & Nehru Park

75. Parking areas are available at a distance of 70m from the town hall, which include small parking at museum. Town Hall is conserved and reused as a Centre for Performing Arts (Rangshaala) and other events which match best with the architecture ambiance of Town Hall. It is recommended that the landscape plan for Nehru Park be reorganised responding to the integrated plan for the Town Hall and the Park. This will facilitate improved operation and maintenance of the facilities too.

76. The Nehru Park is located 190 m away from the Moat surrounding the Fort Wall and its 2 Gates which are monuments of national importance, protected by the ASI. These project subcomponents fall within the buffer zone of these ASI-protected monuments, work to be undertaken in the Nehru Park will solicit the approval of NMA.

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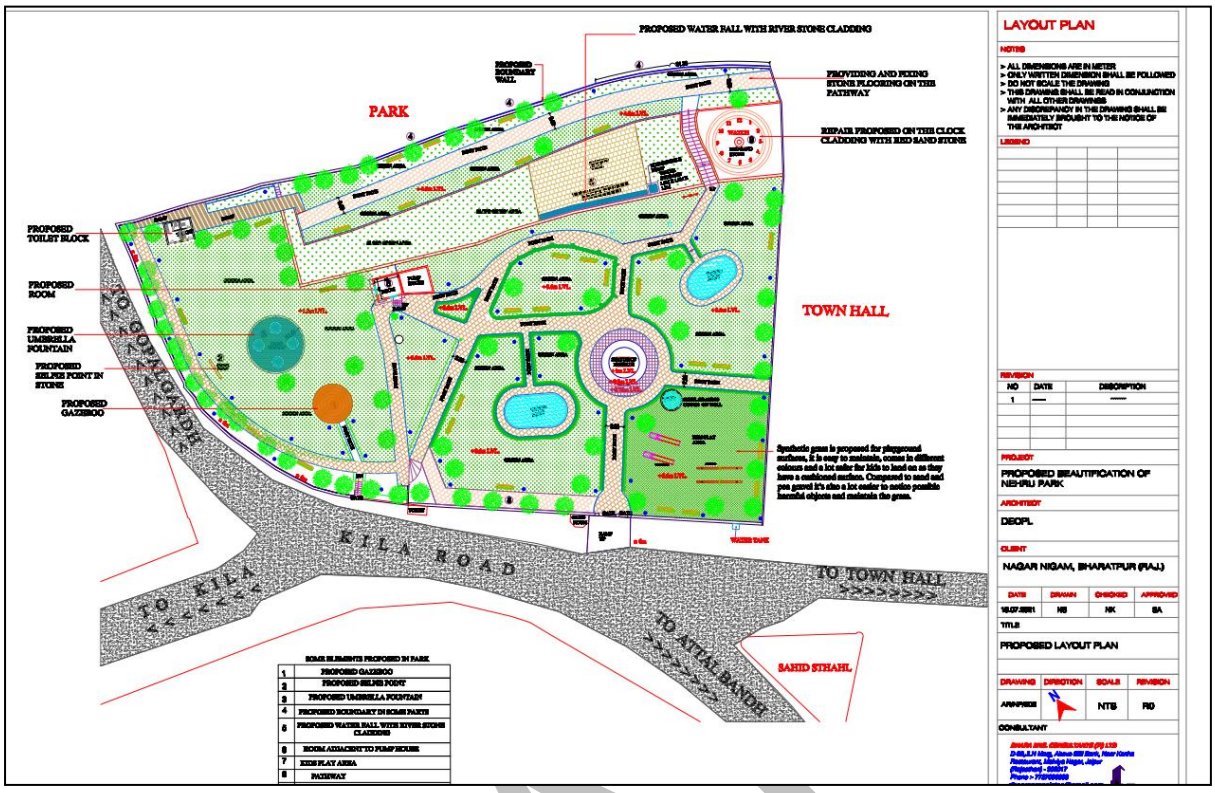
Landscape plan for the Nehru Park- A beautification project



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FRAMEWORK OF HIA TO DETERMINE THE MITIGATION PLAN

77. The objective of the Heritage Impact Assessment report is to evaluate the significance of the heritage assets and their condition from the documents shared by RUIDP. A field visit was undertaken in the month of August 2022. The previous sections of the report has the information from the DPR primarily along with information from the field visit. A framework has been developed to assess the impact of the proposed interventions under the sub project. Mitigation measures have been recommended for implementation. These are through appropriate design and planning in conservation and adaptive reuse of the cultural heritage sites that ensures that the values of the heritage assets are protected and not compromised with the interventions or through appropriate management systems for project implementation so as to ensure that the conservation works are in compliance with acceptable national and regional standards. RUIDP is advised to establish monitoring indicators for measuring compliance that ensure that the heritage attributes are protected and conserved anchored in the principles of sustainability in material, social, legal and ecological aspects.

78. The framework is provided in a table with the following sections:

- Subproject components
- Existing Management framework
- Attributes of value
- Proposed Interventions
- Vulnerability
- Impact
- Recommendation for Mitigation

A. Archaeological / Chance Finds

79. Considering the long history of the town, it is possible that archaeological remains may be uncovered during the excavations. Contractors therefore should follow the below measures when undertaking and construction 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 Archaeological Department / Museum office if a find is suspected and take any action, they require to ensure its removal or protection in situ; and
- Prepare a chance find protocol

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HERITAGE IMPACT ASSESSMENT FRAMEWORK AND RECOMMENDATIONS FOR MITIGATION- A SUMMARY

80. The Subproject components are:
1. Conservation & Redevelopment of Town Hall campus
2. Revitalisation of Nehru Park
3. Façade lighting & Illumination of City Gates (Chandpole Gate, Surajpol Gate, Kumher Gate, Mathura Gate, Ketan Gate, Atalbandh Gate, Neemda Gate, B Narain Gate, Gobardhan Gate and Anah Gate)
4. Façade lighting& Illumination of Laxman Mandir, Ganga Mandir & Jama Masjid
5. Conservation & Redevelopment of Saligram Kund& campus
6. Conservation & Redevelopment of Bijendra Bihari Kund& Campus

81. The major scope of work are- conservation and adaptive reuse of the heritage resources, creating recreational facilities for tourists & locals, development of tourist facilities & services at selected components, façade lighting & illumination of important heritage resources for night tourism.

82. Under this subproject the Town Hall is proposed to be used as a Centre for Performing Arts. From the architecture of this historic building it is evident that the building has been built in two phases. Phase 1 of the building comprises a building comprising an arcade around an inner pavilion chambers enclosed within a single bay deep rooms and verandas on two sides. This is a two-storeyed building built over a raised plinth. The second part or phase of the building is a large hall towards the rear of the building which is built of relatively modest materials – brick masonry walls and corrugated iron sheets. This hall with sloping roof houses a stage towards the rear, it is evident that the hall was used as a multipurpose hall. The building is currently used as a storage facility by the urban local body and is in a poor state of conservation.

83. The building is of architectural significance and merits its conservation and reuse as a space for performing arts as recommended in the proposed project. This is in accordance with the available spaces in the historic building. The hall shall be used considering the architectural typology, its features of pavilion-like form with embellished few walls.

84. Details on conservation to be worked out prior to implementation by contractor. Conservation works must be carried out by a specialised contractor who has prior experience in undertaking such works. Special terms in the contract should be included that the contractor be required to have a conservation architect overlooking the design development process and detailing along with the MEP (Mechanical, Electrical and Plumbing) consultants, in the event that the PIU/PMU may not have the required specialisation.

85. The building is within the 300 metres buffer zone of the ASI protected monument of the citadel gate and moat and therefore the conservation and reuse plan would require to be approved by the National Monument Authority.

86. Nehru Park is in the Citadel adjacent to the fortification wall which forms the inner edge of the moat. The moat and the two gates of the Citadel are protected monuments by Archaeological Survey of India and hence development within 100 metres and 200 m are prohibited and regulated areas. Any work to be undertaken in the Nehru Park would solicit NOC/approval by National Monuments Authority. The project components are for the repair of clock built in the landscape, provision of street furniture, pathways, enhancement of

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children's play area, and boundary wall repair. As Nehru Park and Town Hall share a boundary, it is recommended that the park be considered for interlinking through gates with the Town Hall through landscape design– as Town Hall as a Centre for Performing Arts would merit some open space – possibly as an outdoor space for performing arts. In the current condition there is very little open space within the Town Hall complex. The landscape plan for Nehru Park could be reorganised responding to the need. Further, the edge of Nehru Park and Town Hall is recommended to be reorganised to include a proper parking facility as the building of Town Hall borders the road and use as the Performing Arts (Rangshaala) would generate traffic. Proper management of the edge would facilitate efficient and safe vehicular and pedestrian movement.

87. Façade lighting & Illumination of City Gates (Chandpole Gate, Surajpol Gate, Kumher Gate, Mathura Gate, Ketan Gate, Neemda Gate, Atalbandh Gate, B Narain Gate, Gobardhan Gate And Anah Gate)-The city gates are proposed to be illuminated under subproject. The Gates proposed for façade lighting are state protected monuments. Details on illumination to be worked out prior to implementation by contractor. Implementation of this work must be carried out by a specialised contractor who has prior experience in undertaking lighting on historic buildings. Special terms in the contract should be included that the contractor be required to have a conservation architect overlooking the design development process and detailing along with the Electrical consultants.

88. Works on the city gates would need permission from the state department of archaeology and Museum.

89. Façade lighting& Illumination of Laxman Mandir, Ganga Mandir & Jama Masjid; The buildings are of considerable architectural and historic significance. These are built of stone exterior surfaces. The courtyard/open spaces around a central/building have stone paving. Details on illumination to be worked out during the detailed design / prior to implementation by contractor. Implementation of this work must be carried out by a specialised contractor who has prior experience in undertaking lighting on historic buildings. Special terms in the contract should be included that the contractor be required to have a conservation architect overlooking the design development process and detailing along with the Electrical consultants.

90. Conservation & Redevelopment of Saligram Kund & campus and Conservation & Redevelopment of Bijendra Bihari Kund & Campus; The historic town of Bharatpur has a unique system of water channels, and water bodies. The water channels include a complex system of flood management and irrigation canals and drains. The moat of the Citadel is part of this complex system which was found to be filled to its brim in the month of August 2022. Other than these there are water tanks which were of historic and cultural significance.

91. **Saligram temple Kund:** Evidently cruciform in plan, built of brick masonry set in lime mortar of which only three wings are visible. The fourth wing was explained by the local resident to comprise of a ramp which provided for animals to access water. The source of water was explained by a local resident to be from a well, in the past it was apparently from a canal which continues to exist but does not supply any water now. The canal was found to be overgrown with vegetation and with debris and garbage. The water is contaminated by sewage water and the extent of property of this historic tank is not clear and all the four edges have different edge conditions. Edge 1 – a temple, open four court of temple with informal parking of trucks. A road is present on the outer edge; Edge 2 – Bushy vegetation at the edge

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of the tank; Edge 3 – high wall of an adjoining semi-industrial plot; Edge 4 – The overgrown canal. The extent of the property (water tank with the open space and temple in the setting) requires to be defined. This is necessary for proper protection of the water feature, design appropriate interface between the roads to ensure that the water is not contaminated by storm water runoff from the area around, and to ensure that there is no encroachment in the future.

92. The scope of the project is conservation of historic fabric of tank and landscape interventions. The extent of the property (water tank with the open space and temple in the setting) requires to be defined. This is necessary for proper protection of the water feature, design appropriate interface between the roads to ensure that the water is not contaminated by storm water runoff from the area around, and to ensure that there is no encroachment in the future. It is further recommended that a hydrologist and environmental engineer be part of the team for detailed planning for proper protection of the water feature, design appropriate interface between the roads to ensure that the water is not contaminated by storm water runoff from the area around, and to ensure that there is no encroachment in the future. Also, that the planning addresses appropriate ecologically responsive techniques for both the quantity and quality of the water in the Kund. It is recommended that the contractor be required to provide conservation and detailed landscape design as part of his scope of work.

93. Bijendra Bihari Kund: this tank is located adjacent to the Jaipur Bharatpur highway and in close proximity to an important historic temple. The temple is frequented by local people more specifically women for various rituals throughout the day. In the past water from the tank was used for rituals in the temple but due to pollutants in the water from sewage, this water is not used for ritual purposes. Several interventions are being done in the setting of the tank without adequate consideration of historic, architectural or/and association in value of the various cultural and social components because of which the cultural significance of the temple precinct (of which the tank forms a part) is being compromised. The tank has the temple on one of its edges, residential neighbourhoods (recently developed) on two of its side, a raised mound with a Goddess shrine on one side along agricultural fields. The source of water in the tank is a well which is located on the inner edge of the tank. Principal source possibly being storm water (contaminated with untreated sewage from the area around). The overflow from the tank is into the drainage channel which is currently overgrown which vegetation and floors along the agricultural field and under the highway to across the road.

94. As in the case of the Saligram kund, the scope of the project is conservation of historic fabric of tank and landscape interventions. The extent of the property (water tank with the open space and temple in the setting) requires to be defined. This is necessary for proper protection of the water feature, design appropriate interface between the roads to ensure that the water is not contaminated by storm water runoff from the area around, and to ensure that there is no encroachment in the future.

95. It is further recommended that an environmental engineer be part of the team for detailed planning for proper protection of the water feature, design appropriate interface between the roads to ensure that the water is not contaminated by storm water runoff from the area around, and to ensure that there is no encroachment in the future. Also, that the planning addresses appropriate ecologically responsive techniques for both the quantity and quality of the water in the Kund. It is recommended that the contractor be required to provide conservation and detailed landscape prior to start of restoration activities.

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96. Catchment of Kund area is proposed to be covered under Bharatpur Sewerage project under RSTDSP, Phase-IV. It is recommended that the source of contamination of the water tank be addressed as part of this scheme.

97. It is advisable that the PMU/ ULB ensures that catchment area of 2 Kunds is covered by proposed sewerage schemes under RUIDP phase – IV/ Amrut.

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HERITAGE IMPACT ASSESSMENT AND MITIGATION MEASURES PLAN

Proposed interventions	Details of works / components, materials, design, etc.	Observations & Assessment	Mitigation measures	Responsibility to implement mitigation measures/guidelines
• Conservation & Redevelopment of Town Hall campus and façade improvement of the Raj kiya Vishist Purva Uchha Madhyamic Vidyalaya Adaptive Reuse of the Heritage Building as a Cultural Activity Zone • Redevelopment of Rang Manch Area as Theatre for visual art performance • Conservation & Redevelopment of Main Building as visual art gallery • Development of View point/ Watchtower on Terrace • Site & Outdoor area redevelopment as cafeteria, parking, landscape • Façade Illumination for night views. Façade conservation of the Rajakiya Vishist Purva Uchha Madhyamic Vidyalaya All selected works should conserve the historic built fabric and structural strengthening. Retrofitting of selected monuments may be undertaken. No new material or change in	Adaptive Reuse as a Centre of Performing Arts and façade improvement/ conservation of Raj kiya Vishist Purva Uchha Madhyamic Vidyalaya – intervention of civil works and mechanical, electrical and plumbing services Conservation of the built fabric and structural retrofitting	Reuse of spaces and parts of the building to ensure appropriate interventions to protect the integrity of the monument. Provision of services can cause distress in the historic building as chases are made to provide electrical cables etc. Use of modern materials for conservation and repair can be incompatible with historic materials and lead to loss of authenticity in the historic building	Prepare detailed conservation plan based on detailed documentation of materials, condition, and conservation planning. Detailed design of adaptive reuse with detailed design of engineering services including electrical, plumbing, and mechanical. Conservation to be carried out by 244pecialized contractor who has prior experience in such works. The special terms in the contract are recommended to include that contractor is required to have in his team, a conservation architect for design development and detailing along with the MEP consultants. Structural engineer to be part of the project team to provide details for structural repair and retrofitting. All design to be reviewed by a conservation architect. Avoid any additional structure within the town hall	Contractor/PIU

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Proposed interventions	Details of works / components, materials, design, etc.	Observations & Assessment	Mitigation measures	Responsibility to implement mitigation measures/guidelines
design is proposed in the subproject.				
Revitalisation of Nehru Park • PATHWAY: Redevelopment of pathway in local sandstone. • CLOCK: Restoration of stone clock in the park. • SEATING ARRANGEMENTS: Few more benches have been proposed in the garden. • CHILDREN PLAY AREA: Facilities of children Play Area, Four Seater MGR, Wave Slider, Mult Seater See-Saw, Four seat Arch Swing are proposed. • FOUNTAIN: Umbrella shaped 4 fountains, Wall fountain is proposed on the sloping wall besides the steps. • SELFIE POINT: Selfie point is proposed inside the park made up of Red sand stone. • BOUNDARY: Restoration of boundary wall. • GAZEBO: One circular gazebo of size 6.4 m Dia.	Landscape improvements with interventions of pathways, enhancement of children's play area, boundary wall repair etc.	The park is within a historic citadel and in close proximity to ASI protected monuments; the fortification wall of the citadel defines one of the edges of the park, bold and over decorative interventions can compromise the spirit of the place and loss of authenticity of the historic setting	Low impact interventions which do not overpower the historic attributes of the setting. Use of local/ historic / natural materials which are similar in colour, texture with the historic materials and techniques used in the historic buildings (for instance random rubble stone masonry in walling, rough sandstone etc.)	Contractor/PIU
Façade lighting & Illumination of City Gates (Chandpole Gate, Surajpol Gate, Kumher Gate, Mathura Gate, Ketan Gate, Neemda Gate, B Narain Gate, Gobardhan Gate and Anah Gate) • The propose lighting will be	Monument lighting During site visit recently installed lighting was noted.	Cables and fittings mounted on the surface of the monument are invasive and will cause irreversible damage to the historic surfaces	Following Illumination fittings guidelines may be used in detail designing • provided on independent floor mounted or pole mounted structures. • No fixtures should be visible on surface	Contractor/PIU

Proposed interventions	Details of works / components, materials, design, etc.	Observations & Assessment	Mitigation measures	Responsibility to implement mitigation measures/guidelines
done only with single color warm white lights • The propose lighting will be done with theme of Micro & Diffuse façade • LED light fixtures like Spot lights, Strip lights, linear lights, wall washers, Up-lighter & down lighters will be used for illumination • Areas to be highlight on façade will be – Door frames, motifs, architraves, Kangooras or gate chajja, Inverted ceilings			• No wiring to be visible on surface • Prior applicable permissions from ASI/Department of Archaeology and Museum, Government of Rajasthan	
Façade lighting& Illumination of Laxman Mandir, Ganga Mandir & Jama Masjid To reduce consumption of power all the proposed lights will be LED. • The propose lighting will be done only with single color warm white lights • The propose lighting will be done with theme of Micro & Diffuse façade • LED light fixtures like Spot lights, Strip lights, linear lights, wall washers, Up-lighter & down lighters will be used for illumination • Areas to be highlight on façade will be stone architectural elements	Monument lighting During site visit recently installed lighting was noted.	Cables and fittings mounted on the surface of the monument are invasive and will cause irreversible damage to the historic surfaces	Following Illumination fittings guidelines may be used in detail designing • provided on independent floor mounted or pole mounted structures. • No fixtures should be visible on surface • No wiring to be visible on surface • project team may re-consider the proposal for number of proposed lightning. • Prior applicable permissions from ASI and state archaeology and museum department	Contractor/PIU

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Proposed interventions	Details of works / components, materials, design, etc.	Observations & Assessment	Mitigation measures	Responsibility to implement mitigation measures/guidelines
• No large fixtures to be installed • Wiring of lighting to be hidden				
Conservation & Redevelopment of Saligram Kund& campus Conservation Scope of Work • Conservation of Kund structure • Masonry walls conservation & restoration • Lime plaster & Kada • Restoration & replacement of damage/ missing stone elements • Restoration of Ghats/ flooring • Plinth Edge protection • Reconstruction of damage/ missing wall • Dirty water raising • De-vegetation of existing structure • Façade Restoration of surrounding heritage structures • Façade lighting Redevelopment Scope of Work • Construction of boundary wall/ site demarcation • Surrounding development of Kund- Flooring/ plantation/ Street furniture/ Lighting/ Signage • Development of visitor facility area like Toilets • Development of Kiosk • Development of Parking	Conservation of the historic Kund; dredging of the sludge and polluted water inside the water body, de-vegetation of the Kund – from inside and from the masonry structure Landscape improvements in the setting of the tank with paved surfaces; street furniture etc.	Conservation and repair with modern materials and structural details will cause loss of authenticity of the historic structure. 'Beautification' needs to be based on understanding of the historic attributes of the water body and i's setting, more specifically the relationship with the temple absence of which will lead to loss of authenticity and integrity of the structures and its setting	The contractor be required to provide detailed conservation and landscape design as part of his scope of work The scope of the project is conservation of historic fabric of tank and landscape interventions. The extent of the property (water tank with the open space and temple in the setting) requires to be defined. This is necessary for proper protection of the water feature, design appropriate interface between the roads to ensure that the water is not contaminated by storm water runoff from the area around, and to ensure that there is no encroachment in the future. It is further recommended that an environmental engineer be part of the team for detailed planning for proper protection of the water feature, design appropriate interface between the roads to ensure that the water is not contaminated by storm water runoff from the area around,	Contractor/PIU

Proposed interventions	Details of works / components, materials, design, etc.	Observations & Assessment	Mitigation measures	Responsibility to implement mitigation measures/guidelines
• Plinth Edge protection • Reconstruction of damage/ missing wall • Dirty water raising • De-vegetation of existing structure • Façade Restoration of surrounding heritage structures • Façade lighting			and to ensure that there is no encroachment in the future. Also, that the planning addresses appropriate ecologically responsive techniques for both the quantity and quality of the water in the Kund. It is recommended that the contractor be required to provide conservation and detailed landscape design as part of his scope of work.	
Conservation & Redevelopment of Bijendra Bihari Kund& Campus Conservation Scope of Work • Restoration of historic Ghat structure • Façade Restoration of surrounding heritage structures • Restoration of water channel • Retaining wall construction around catchment area • Restoration of architectural elements on façade • Façade lighting Redevelopment Scope of Work • Redevelopment of compound area/ compound wall • Flooring & pavement around Kund • Installation of street furniture- stone benches, signage's, light	Conservation of the historic kund; dredging of the sludge and polluted water inside the water body, devegetation of the Kund – from inside and from the masonry structure Landscape improvements in the setting of the tank	Use of modern materials and techniques for all the conservation and repair works; 'Beautification' needs to be based on understanding of the historic attributes of the water body and its setting, more specifically the relationship with the temple absence of which will lead to loss of authenticity and integrity of the structures and its setting	The extent of the property (water tank with the open space and temple in the setting) requires to be defined. This is necessary for proper protection of the water feature, design appropriate interface between the roads to ensure that the water is not contaminated by storm water runoff from the area around, and to ensure that there is no encroachment in the future. It is further recommended that an environmental engineer be part of the team for detailed planning for proper protection of the water feature, design appropriate interface between	Contractor/PIU

DRAFT

Proposed interventions	Details of works / components, materials, design, etc.	Observations & Assessment	Mitigation measures	Responsibility to implement mitigation measures/guidelines
poles, bollards, dustbins, railings • Landscape development in surroundings • Kiosk & public amenities development			the roads to ensure that the water is not contaminated by storm water runoff from the area around, and to ensure that there is no encroachment in the future. Also, that the planning addresses appropriate ecologically responsive techniques for both the quantity and quality of the water in the Kund. It is recommended that the contractor be required to provide conservation and detailed landscape design as part of his scope of work.	

Appendix 4: Guidelines for compensatory tree plantation in RUIDP works

RUIDP
Office of RUDSICO, External Aided Project (RUIDP)
Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Ltd (RUDSICO)
{Erstwhile Rajasthan Urban Infrastructure Finance and Development Corporation Ltd}
Head Quarter Address:- Old Working Women Hostel, Behind Nehru Palace, Tonk Road Jaipur
Branch Address: - AVS Building, Jawahar Circle, JLN Marg, Jaipur - 302017
Ph. – 141 2721966 Fax No. 141 2721919,
E-mail:- mailruidp@gmail.com, mail.ruidp@rajasthan.gov.in **Website: -** www.ruidp.rajasthan.gov.in

No. F3 (201)(57)/RUIDP/PMU/Ph-III/CMS/ 586

Date: 13.04.2018

Sub: Construction Management System: Circular – 10
Ref: Guidelines for Compensatory Tree Plantation in RUIDP works.

RUIDP being a responsible organization in the sector of Urban Infrastructure understands the need & responsibility towards protection and conservation of Environment. It is mandatory in all RUIDP projects to avoid tree cutting during construction activities, however, in some unavoidable cases tree cutting may be allowed subjected to following conditions : -

1. Submission of detailed proposal by contractor indicating number of trees required to be cut with justification and details of efforts made to avoid/minimize tree cutting.
2. Tree cutting should be allowed by PIU/Employer Representative only after permission from concerned authorities (Administration/ Tahsildar/ Forest Department as the case may be).
3. Compensatory plantations should be ensured/ done by contractor in sufficient number of trees so that final survived trees should meet criteria of 1:3 (three trees should be planted for every one tree cut). This ratio is a minimum requirement; additional plantation by contractor should be encouraged. The ratio shall also be got approved by concerned permitting authority.
4. Compensatory plantations can be done in any of project sites (if space available) or any other place in the town after due permission from land owner/concerned department and PIU.
5. Tree species selected for compensatory plantations should be native (local) species and list of such species should be obtained/ verified from Forest Department of concerned town prior to submission of proposal for tree cutting.
6. Trees proposed to be planted should be at least of 3 mtrs height and in healthy condition.
7. It shall be responsibility of contractor to ensure the survival of planted trees upto 5/10 years i.e. for entire O&M period.
8. After completion of Contract period and before handing over project for O&M, all the trees should be counted by PIU through consultants and handed over to Municipality/asset owner/concerned department through PIU.

9. Compensatory plantation is an additional obligation (deemed to be accepted by all parties) and should not be considered as replacement/substitution of any pre-existing contractual obligation/ conditions. Compensatory plantation obligations will be additional to Pre defended mandatory plantations for sites in contract.
10. Payments for this Compensatory plantation shall be done from provisional sum of contract and rates shall be taken from RUIDP SOR for the available items and market rate analysis for other items.

This circular shall be strictly abided by all the members of PIU, PMDSC, PSC & Contractor.

(Dr. Preetam B Yashvant)
Project Director

No. F3 (201)(57)/RUIDP/PMU/Ph-III/CMS/ 597-91 Date: 13.04.2018

Copy to following for information and necessary action:

1. PA to PD/Addl. PD/ FA/ CE/ ACE/SE-I/SE-II/SE-III/ POs/APOs, PMU, RUIDP, Jaipur
2. SE, PIU, Pali/Tonk/Sriganaganagar/Jhunjhunu/Bhilwara/Hanumangarh/Kota
3. EE, PIU, Sawai Madhopur/ Bikaner/ Udaipur/ Jhalawar/ Mt. Abu/Banswara
4. Team Leader/ Project Coordinator/CM/ Dy. CM/ACM, PMDSC/ PSC, Jaipur, Pali/ Tonk/ Sriganaganagar/ Jhunjhunu/ Bhilwara/ Hanumangarh/ Kota/ Sawai Madhopur/ Bikaner/ Udaipur/ Jhalawar/ Mt. Abu/Banswara
5. ACP, RUIDP, Jaipur to send by e-mail and put up the Guidelines on the website.

Addl. Chief Engineer

Appendix 5: Sample Asbestos containing material (ACM) Management Plan

BACKGROUND OF ASBESTOS

1. 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.

2. 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. The most abundant asbestos used in the world is chrysotile. The use of ACM propagated due to its economic viability.

3. The purpose of this 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.. 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 sector and defined safety instructions and standard operating procedures identifying roles and responsibilities.

REGULATORY FRAMEWORK, STANDARDS AND PROTOCOL

Table.1

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.

Further, there are several legislations that regulate the use and handling of asbestos as applicable, namely:

a. The Supreme Court of India – Banned ACM use in January 21 2011.
b. 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."
c. Environmental (Protection) Act (1986)-Environmental monitoring.

RISK ASSESMENT:

4. The process of evaluation of risk at all the working sites was evaluated with the inventorization of the unscientific storage pipes-in case of worst scenario. The site identified and evaluated was Sardarshar. Site visit was conducted to evaluate the risk associated with the ACM handling and re- handling. 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 in and around the work sites. The condition of existing underground AC pipes are not known, however, as these are old certain pipes will be in deteriorated conditions. So the Conditions were presumed if it is in friable form or in a condition in which it can release fibers before it is subjected any disturbance or removal, all safeguard measures needs to be adopted. There were certain areas where the AC pipes were subjected to shear and are powered, and AC Pipe ends were damaged these were the high risk zones in the campus. The probability of the air borne asbestos fibers in the areas cannot be over ruled.

5. Thus it is necessitated to draft standard operating procedure for disposal of ACM. The purpose of this standard operating procedure (SOP) is to ensure the safe handling of AMC including protection from hazards associated with uncontrolled distribution, encounter and removal of Asbestos Cement (AC) Pipes and pipe fittings. The scope of this SOP encompasses all aspects of safe AC pipe handling including identification of site, re-handling and encountering of ACM, site selection and proper identification for storage, inventorization, monitoring, final disposal, training and maintenance of records.

6. The fatal health hazard with inhalation of air borne asbestos fibers and its adverse health impact are known and needs a proper attention and planning with defined roles and responsibilities to ensure the work zone is at minimal risk and safe for the workers. It is also necessary to mandate the standard operating procedures with implementation of all requisite safety gears.

7. The assessment of the ACM disposal will be vested with the DOB Operator. The undamaged pipe-where the pipe ends are intact that there is no damaged on the entire length of pipe-to be stored in isolated storage with secured pipe ends either by wrapping the ends with permissible plastic bags. The damaged/broken pipes/powered pipes will be disposed off, by bagging the same in permissible plastic bags. All the records pertaining to the inventorization has to be kept by the DBO Contractor. The same shall be cross verified by RUIDP.

EMERGENCY RESPONSE PLAN & CHANCE FIND PROTOCOL

8. 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-DOB 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, eg asbestos cuttings, powered asbestos that may release the asbestos fibers, to be done by authorized person

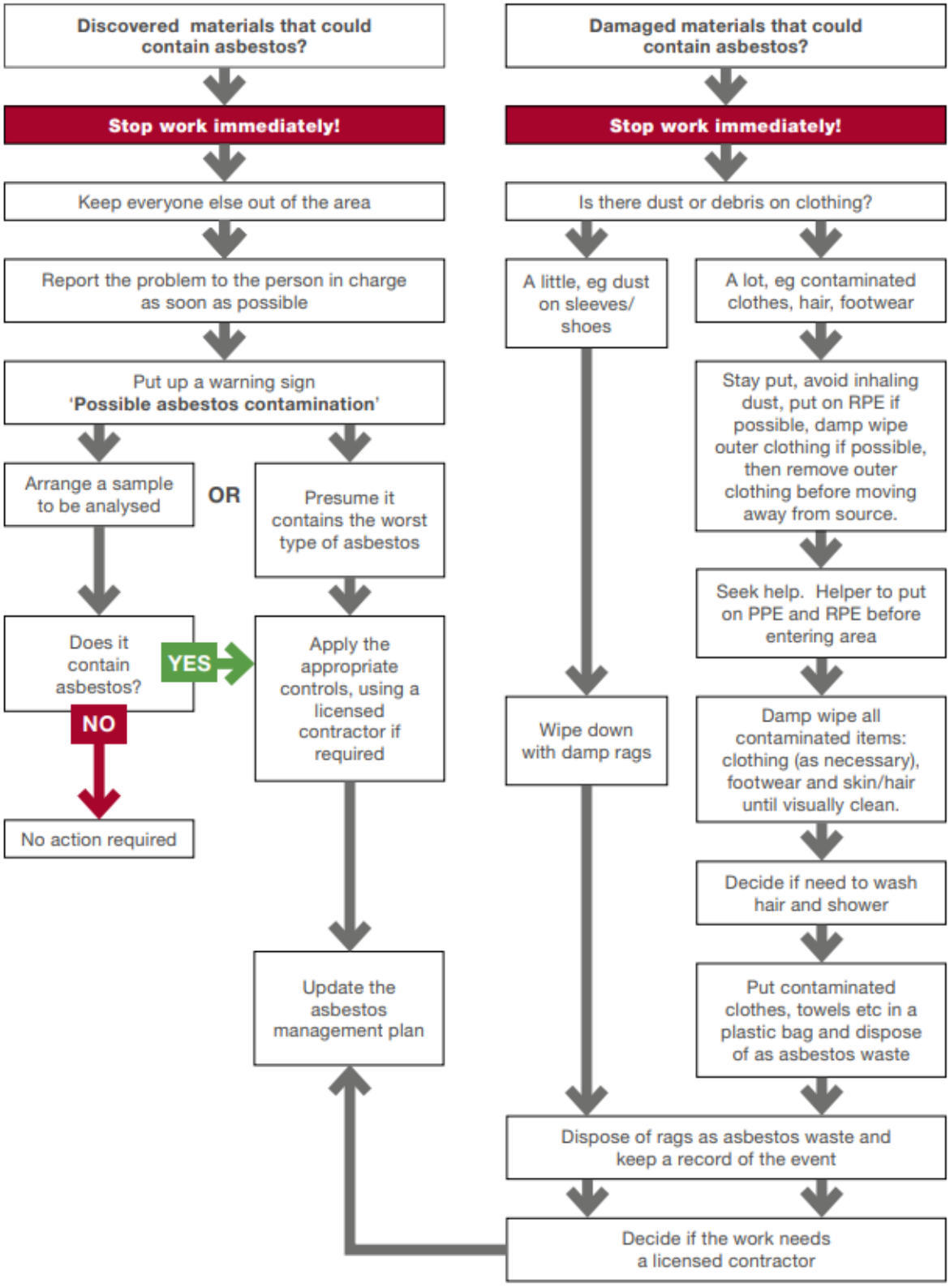


Fig.No.1-Showing Flow chart of ERP

Table.no.2-Roles and Responsibilities

PRE-CONSTRUCTION				
Activities	**Responsibilities**	**Associated Documents**	**Estimated Cost**	**Remark**
Design to encounter minimal ACM, and then Identification & Inventorization ACM - AC pipes & fittings	**RUIDP & DBO CONTRACTOR**	Form-I	Rs.100/km	The onus of the minimal encounter of ACM is vested upon the RUIDP and inventory will be with the DOB Operator and has to be annually verified by RUIDP.
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	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.
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	Rs.40,000/sample	The sampling zone should be 500 m from the storage site and personal sampling has to be as per SOP-2
Reporting in SEMR	**RUIDP/ DBO CONTRACTOR**	None	Nil	As per ADB Format
Collection of Health records in compliance to the local laws	**DBO CONTRACTOR/RUIDP/PHED/LSG**	Form-IV	Nil	For regular evaluation & identification of any aboronmality.

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	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	Nil	90 days from the start of work
To facilitated a restricted confined storage space with access control with proper inventorization.		Form-II	Nil	Site Specific
In-situ storage of ACM.	**DBO CONTRACTOR**	Form-VI		The storage of existing and encountered ACM pipes (more than 4.0 ft) 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	Nil	The copies of inventory generated and collected will have to be shared with Land Custodian (LC), RUIDP and DOB 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	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 HAZARDOUR 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	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

Permissible Levels

9. 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.

ACM REMOVAL

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 gears are to be adopted:

- 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

Fig.No.2 Asbestos warning signage

- 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 4.0 ft 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.

Safe Practices in Handling ACM

10. Proper handling and PPE:

a. Cover up and wear PPE (Personal Protection Equipment). including respirator or dust mask
b. Make sure the mask has two straps to hold it firmly in place. Don’t use masks that only have one
c. Also wear a Hard hat, gloves, disposable coveralls with a hood, and safety glasses or goggles to protect eyes
d. 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.
e. Do not use power tools Asbestos fibers can be released if power tools are used for anything other than the removal of screws.
f. 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 DOB Operator
g. 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.
h. Avoid drilling and cutting into asbestos products.
i. Do not drill holes through and never cut Instead remove the entire product and replace it with a non-asbestos product
j. Don’t drop fiber pipes remove them carefully, Lower them to the ground, don’t drop them, to minimize breakage.
k. Lay plastic sheeting under the work area to prevent any dust contaminating the ground. Use 200 micron thick plastic sheeting or bags or as permissble these must not be made from recycled materials or re-used for any other purpose.
l. The work area has to be barricaded and there should be no un-authorised person allowed. Only Trained ACM expert should be allowed to handle the ACM along with EHS Expert.
m. Close windows and doors and seal vents to stop dust getting into the house; ask neighbors' to do the same.
n. Seal off other places where dust can get in.
o. Remove soft furnishings like rugs, clothes, jute bags from the work area, and seal anything with plastics if it cannot be moved.

p. All the AC broken pipes have to collected and stacked properly with 200micron plastic wrapping with winning signage.

q. Do not leave plastic sheet lying about where they may be further broken or crushed by people or traffic.

r. Remove all ACM by the trained handler.

s. 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.

t. Mark and add signage.

11. Due care has to be taken to collect the dampened waste in a permissible standard bags with proper warning signage's.

12. The wastages packed have to be disposed off to Treatment, Storage or Disposal Facility (TSDF).The plastic bags must have legible note:

d. Waste Type:

e. Date of packing:

f. Qty/Numbers:

g. Packed by:

h. Warning Signage:

i. Disposal

Fig.No.3- ACM: In-situ storage warning

13. The AMP procedures-**Standard Operating Procedure-01-** are as follows and are summarized as above

j. Objectives – to keep the work zone safe and secured.

k. Requirements – identify all the requirements needed for handling AC in the specific site and project

l. Conduct and ensure awareness and vocational training to ACM handlers

m. Conduct a comprehensive identification and risk assessment of ACMs

n. Apply restriction / re-handling of ACM on ground-use of PPE. Ensure that workers handling ACM have the right PPEs as follows:

i. Hard helmet

ii. Overall suit

iii. Gloves

iv. Mask to be strapped tight
v. Safety goggles
vi. Safety shoes
vii. Ear plugs

o. Avoid underground encountering of ACM
   i. Ensure that an authorized person (HSE) are supervising the work
   ii. Barricade the area with signage
   iii. Damp ACM
   iv. Use safety gears
   v. Dismantle ACM to be labeled, kept on plastic grounding and packed in permissible bags
   vi. Label the bags properly
   vii. Ensure shipping to proper disposal sites
p. 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:
   i. Away from habitation
   ii. Avoid low lying areas
   iii. Away from water storage
   iv. To be enveloped with minimum of 8-feet height enclosure
   v. Avoid high vertical stacks
   vi. Access controlled
   vii. Proper signage enclosure
q. Proper re-handling of AMC, labeling and packing
r. Control access and ensure proper monitoring of records, specifically:
   i. Environment
   ii. Health
   iii. Reporting to regulators

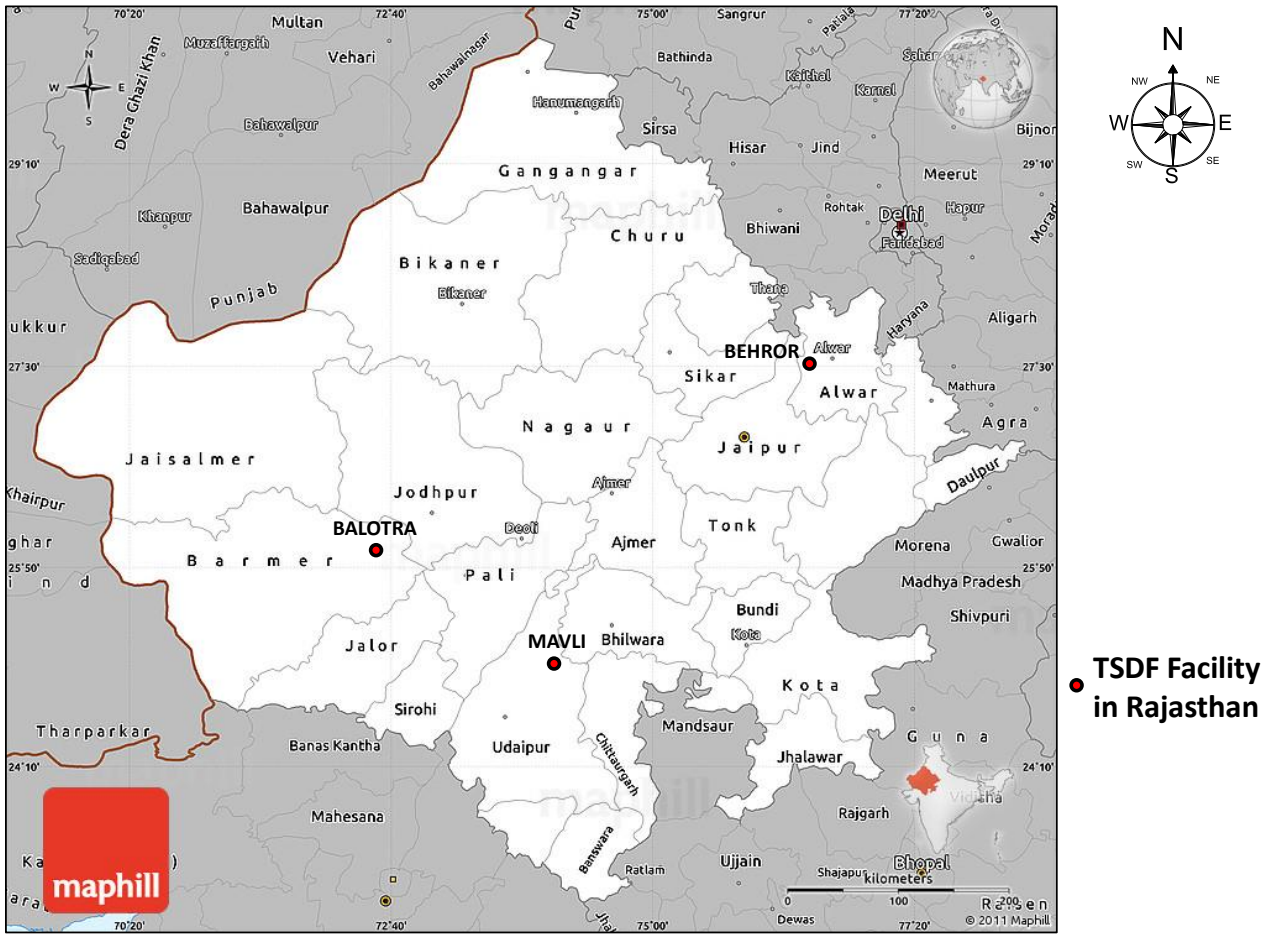
Dispose the ACM through qualified DOB Operators up to the Total Sanitary Disposal Facility (TSDF)

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	Bheror, Distt- Alwar	Only for Incineration

Label/display for TSDF disposal bags has to have clear display of the content in both English and local language as displayed under:



The above map clearly depicts the location of approved TSDF in Rajasthan.

IN-SITU STORAGE ACM PIPES AREA

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.

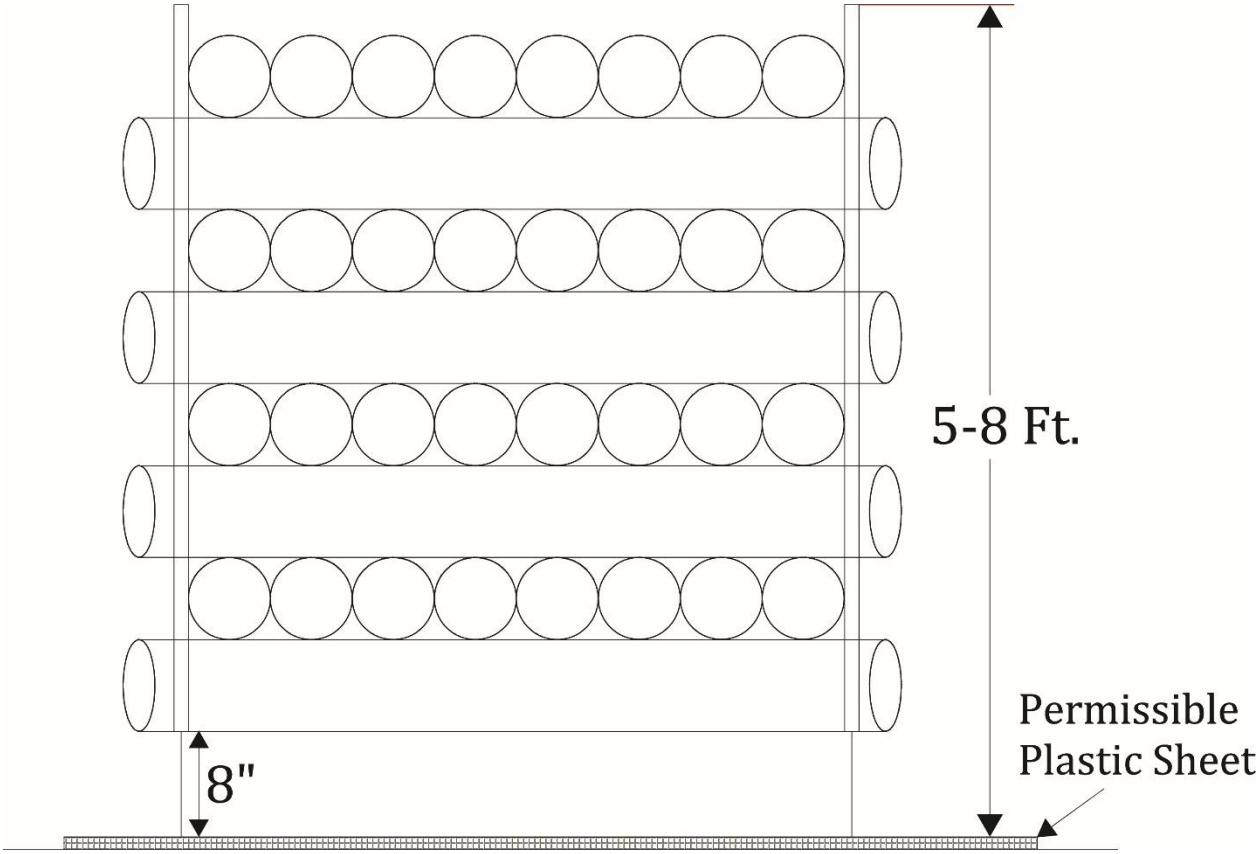


Fig.No.5: Schematic diagram showing ACM Pipes stacking

The ACM stack has to be enveloped with proper fencing showing internal movement of person with 4.0ft 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.

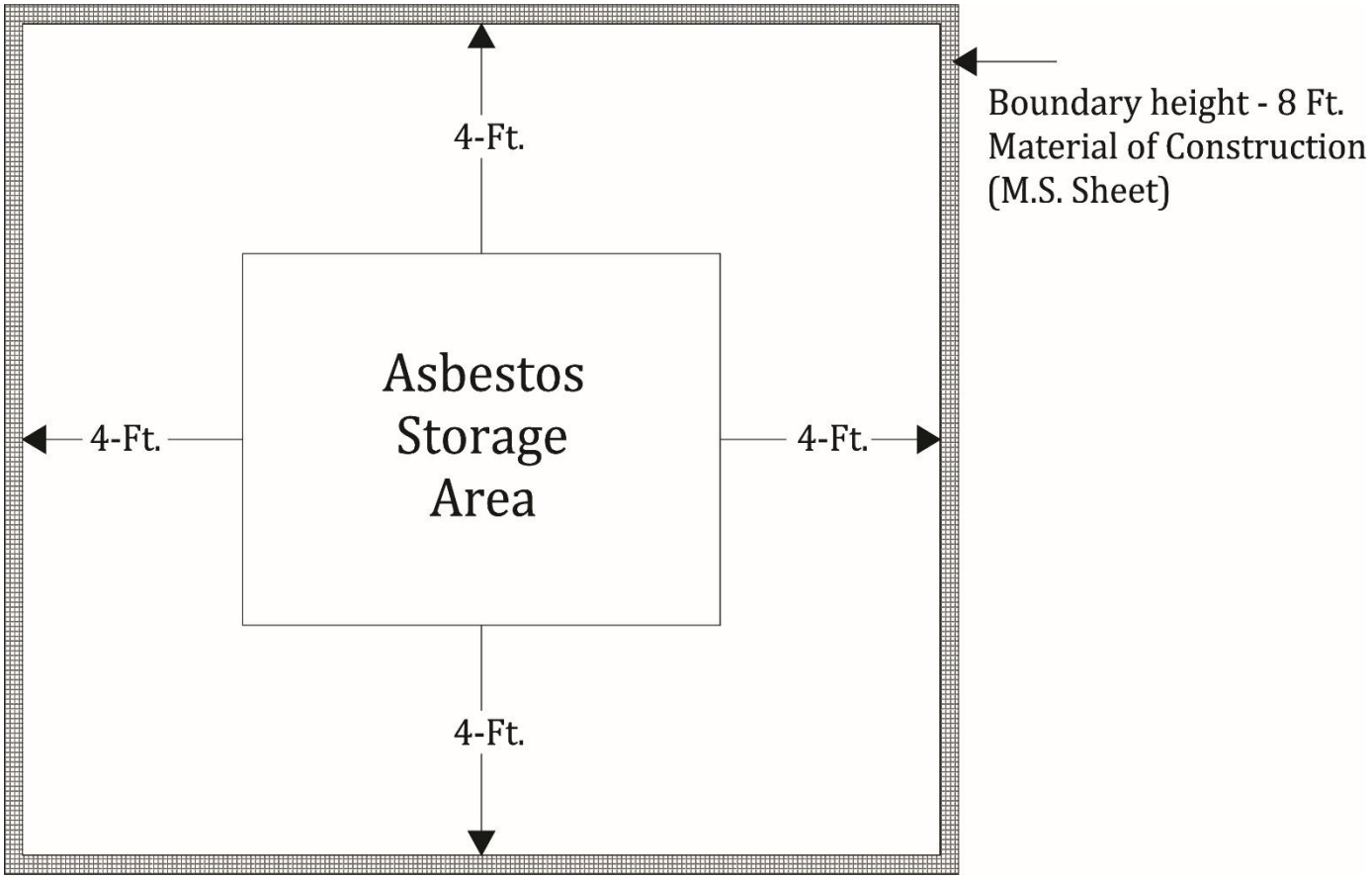


Fig.No.6: Schematic diagram showing ACM Pipes storage area

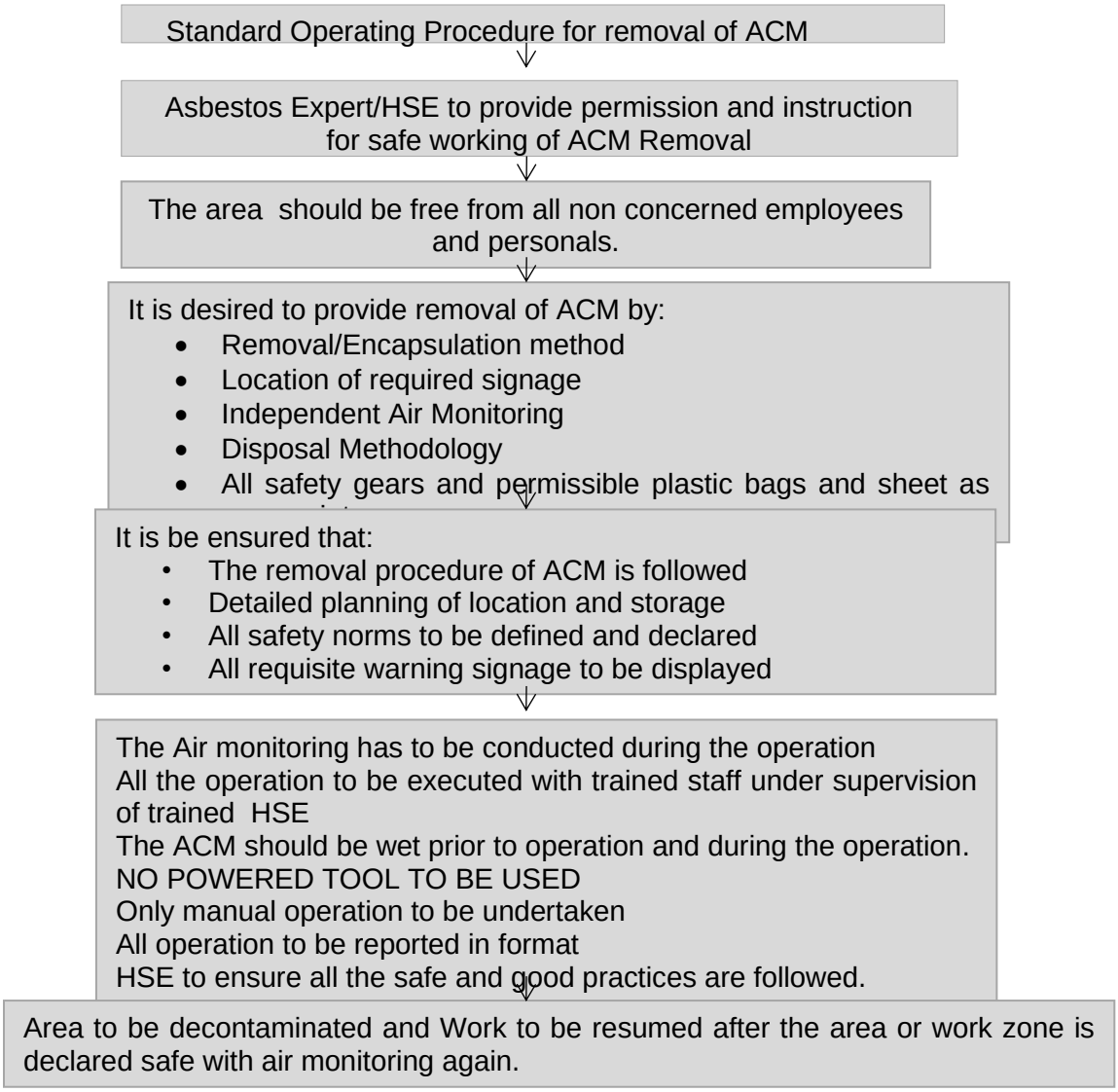


Fig.no.2-Standard Operating Procedure Flow Sheet

14. 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.

15. 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.

16. Based on the outcome of the workshop it was essential to enumerate the standard operating procedure & define the roles and responsibilities (already discussed as above) and the re-handling cost of the ACM as stated below:

Table.03- Suggestive Protective measures & Estimation of the cost of Re-Handling of ACM

1	Re-Handling			
	Re-handling of AC Pipes scattered/used in the premises.	• Re-Handling of the old AC Pipes in the premises needs to be quantified and a proper inventorization has to be prepared. • The isolated enveloped storage sites should be away from the habituation, the pipes used for fencing, tree guard needs to be re-handled & stored in the nearest isolated storage site and the damaged pipes/broken pipes have to be disposed off to the TSDF with all pre-cautionary measures. **NOTE:** Only powered/ grounded ACM will have to be disposed off to TSDF.	Manpower engaged: Trained labor, Supervisor, HSE Experts/Asbestos Expert	The re-handling cost will be part of the laying program. The disposal cost is Rs.1500/MT plus freight as per actual
	Removal of encountered AC Pipes	• The damaged / broken AC Pipes have to be cautiously handled with prior moistening and packed in plastic bags (permissible plastic bags) and sent for re-use in road making or to TSDF with all signage and precautionary measures as suggested above.	Manpower engaged: Trained labor, Supervisor, HSE Experts/Asbestos Expert	As stated above
	Storage	• The existing storage stacks have to be shielded with 8.0 ft height and above ground (min1.0 ft) The Pipes shall be stored in stacks with stoppers provided at the bottom layer to keep the pipe stack stable. The stack, particularly of smaller diameter pipes, shall be in pyramid shape. Pipes shall not be stacked more than 1.5 m high. Each stack shall have pipes of the same type and size only. Removal of pipes shall start from the top layer and by pulling from one end, if required, with all safety precautions. A pipe shall not be stored inside another pipe. The pipes may also be placed alternately length and crosswise. They shall be stored on horizontal racks supported throughout their lengths on a reasonably flat surface free from stones and sharp projections.	Manpower engaged: Trained labor, Supervisor, HSE Experts/Asbestos Expert	As on daily wages

		They should not be stacked in large piles, especially under warm conditions. Open ends of pipes to be sealed with permissible polythene.		
	Transportation	• Full length pipes • Damaged/Broken Pipes	Authorised agency	As per actual.
	Disposal			
	Isolated storage	The storage area should be twice the area required for storage of ACM	Manpower engaged: Trained labor, Supervisor, HSE Experts/Asbestos Expert. Authorised vendor. Boundary, signage, safety aspects etc	As stated in Table1.1.
	Sent to TSDF	The damaged/broken pipes will be packed in permissible Poly bags and has to be stored in defined location within the isolated storage. The records pertaining to the disposal (within 90 days of generation) have to be made systematic. Possibilities of using the broken pipes in wet conditions in road making in order to bind the asbestos fibers can be explored.	Authorised agency	Freight as per actual.
Estimation of suggestive protective and preventive measures				
	Air Quality sampling & Analysis- Asbestos fiber count	Personal sampler, phase contrast microscope, In case of asbestos dust, the same shall not exceed 2 mg/Nm3. Per the OSHA standards for asbestos, exposure monitoring and medical surveillance of workers is required when the Workers are or will be exposed to airborne concentrations of fibers of asbestos at or above OSHA's exposure limits for a combined total of 30 or more days per year; Workers perform work that disturbs asbestos-containing material (ACM) or presumed asbestos-containing material (PACM) for a combined total of 30 or more days per year. Minimum 3 locations (@120deg from each location) at min 500 m from the isolated storage of ACM and one sampling near the encountered site. The frequency of monitoring should be bi-annually.	Approved/accredited laboratory	As stated above.
	PPE's	Hard helmet, double strapped mask, safety tapes, boots(non laced), gloves, safety suits, goggles, ear plugs,	Standard make, minimum-4 sets at each site	As stated Above

	Education & Training	Awareness, New induction training and inspections	Asbestos expert/HSE Experts	As stated Above
	Medical Check up	As per norms or in consultation with Medical Practitioner.	Medical Doctor	As stated Above

Note:

Efforts should be made to minimize the existing AC water pipes. In areas where ACM are stored, it is required to have induction training of AMP, complete the formats and maintain the records.

Removals of used AC Pipes for fencing, boundary wall etc have to be carefully removed from use and stored in isolated storage.

At certain locations, it was observed that the discarded pipes was used as tree guard, when the sapling was planted as on date the tree is fully grown, in that case the removal of ACM has to be done with all precautions and use of total safety gears. Hand tools or slow-running tools producing coarse dust or chips shouldbe used where practicable rather than high-speed machines or those which cut by abrading the material after wetting. Alternatively, the same can also be bounded properly by bitumen paint.

The coarse dust and pieces in wet conditions will have to be collected in permissible plastic bags with use of all safety gears.

The collected wastes are to be labeled as stated above and disposed off to TSDF. The records of the same will have to be kept on daily basis and summarized to monthly basis.

FORM I – ASBETOS INVENTORY, INSPECTION AND ACTION FORM **Format: RUIDP/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: RUIDP/INSP.MATRIX/LOCATION/NAME OF DBO CONTRECTOR/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 DOB 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 transparence to retrieve, trace and track the records as necessary. The records maintained by the DOB 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: RUIDP/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: RUIDP/MH/ LOCATION/NAME OF DBO CONTRACTOR/HSE 004/YEAR							
Employee code:							
Employer Details:							
PPE Used:							
Insurance/ESI							
S.No	**Name**	**Age/Sex/DOB**	**Address/ Contact details:**	**Period of Employment/ Job Title**	**Pre-History**	**Doctor's comments**	**HSE Remarks**
					Height **Weight/BMI** **Blood group** **X-Ray** **CT Scan** **others** **Smoker:** **Tobacco:** **Alcohol Consumption:** **Family History:** **Medication if any:** **Eye sight:** **Hearing:** **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 authorisation 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 Authorisation No.		
10.	Waste description	•	
11.	Total quantity No. ofContainers	•	……..m^3 or MT ……..Nos.
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 habituation. • 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 Authorised 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

Standard Operating Procedure-02
Asbestos Fiber Monitoring, Analysis and Identification

Principle

1. 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 workplace 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.

Monitoring of Asbestos Fiber in Air

2. 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.

3. Two types of samples are to be taken, one within the workers breathing zone that is 300 mm 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.

Mounting Procedure

4. 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 15-25 mm. 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 mm^2
a= graticule counting area in mm^2,
r= flow rate of air through filter in cm^3/min., and
t= single sample duration in minutes

5. 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 1000-500 m 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.

6. 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 Convention,[69] asbestos or asbestos waste in the form of dust and fibers is classified as hazardous waste. The applicable legislation under the present scenario are:

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

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 ❑ Peritoneial mesotherlioma ❑ 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 /RUIDP	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 4.0 ft 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 ❑ Peritoneial mesotherlioma ❑ 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/RUIDP	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 ❑ Peritoneial mesotherlioma ❑ 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/RUIDP	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/RUIDP	To be kept intact for easy tracking and reference in legible format. The same can be kept in soft format as well.

Details of in-situ, existing AC pipelines in RSTDSP towns (preliminary)

S.No	Town	Existing AC pipe in-situ (in km)
1	Abu Road	52.00
2	Khetri	22.23
3	Kuchaman	48.00
4	Laxmangarh	100.0
5	Sardarshahar	5.00

Appendix 6: Environmental Standards for Air, Surface, Water, Groundwater, Emissions, Noise, Vehicular Exhaust and Disposal to Land/Agricultural Use of Sludge and Bio-solids

Ambient Air Quality Standards

Parameter	Location[a]	NAAQS ($\mu g/m^3$)[b]	WHO Air Quality Guidelines ($\mu g/m^3$)		Applicable Per ADB SPS[e] ($\mu g/m^3$)
			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)

Parameter	Location[a]	NAAQS (µg/m^3)[b]	WHO Air Quality Guidelines (µg/m^3)		Applicable Per ADB SPS[e] (µg/m^3)
			Global Update[c] 2005	Second Edition 2000	
Lead (Pb)	Industrial, Residential, Rural and Other Areas	0.5 (Annual) 1.0 (24-hr)		0.5 (Annual)	0.5 (Annual) 1.0 (24-hr)
	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.

Ambient Noise Level Standards

Receptor/ Source	**India National Noise Level Standards** [a] (dBA)		**WHO Guidelines Value For Noise Levels Measured Out of Doors**[b] (One Hour LA_q 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 DG Set

NOISE LIMIT FOR GENERATOR SETS RUN WITH DIESEL

(Noise Limit for Generator Sets run with Diesel were notified by Environment (Protection) second Amendment Rules vide GSR 371(E), dated 17th May 2002 at serial no.94 and its amendments vide GSR No 520(E) dated 1st July 2003; GSR 448(E), dated 12th July 2004; GSR 315(E) dated 16th May 2005; GSR 464(E) dated 7th August 2006; GSR 566(E) dated 29th August 2007 and GSR 752(E) dated 24th October 2008; G.S.R. 215 (E), dated 15th March, 2011 under the Environment (Protection) Act, 1986)

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.

Surface Water Quality Classification Criteria

Designated-Best-Use	Class of Water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	• Total Coliforms Organism MPN/100ml shall be 50 or less • pH between 6.5 and 8.5 • Dissolved Oxygen 6 mg/L or more • Biochemical Oxygen Demand 5 days 20°C 2mg/L or less
Outdoor bathing (Organized)	B	• Total Coliforms Organism MPN/100ml shall be 500 or less pH between 6.5 and 8.5 Dissolved Oxygen 5mg/L or more • Biochemical Oxygen Demand 5 days 20°C 3mg/L or less
Drinking water source after conventional treatment and disinfection	C	• Total Coliforms Organism MPN/100ml shall be 5000 or less pH between 6 to 9 Dissolved Oxygen 4 mg/L or more • Biochemical Oxygen Demand 5 days 20°C 3 mg/L or less
Propagation of Wild life and Fisheries	D	• pH between 6.5 to 8.5 Dissolved Oxygen 4 mg/L or more • Free Ammonia (as N) 1.2 mg/L or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	• pH between 6.0 to 8.5 • Electrical Conductivity at 25°C micro mhos/cm Max. 2250 • Sodium absorption Ratio Max. 26 • Boron Max. 2 mg/L

Source: Central Pollution Control Board
mg/L = milligram per liter, ml = milliliter, MPN = Most Probable Number

Vehicle Exhaust Emission Norms

1. Passenger Cars

Norms	CO (g/km)	HC+ NOx (g/km)
1991Norms	14.3-27.1	2.0(Only HC)
1996 Norms	8.68-12.40	3.00-4.36
1998Norms	4.34-6.20	1.50-2.18
India stage 2000 norms	2.72	0.97
Bharat stage-II	2.2	0.5
Bharat Stage-III	2.3	0.35(combined)
Bharat Stage-IV	1.0	0.18(combined)
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)
1991Norms	14	3.5	18	-
1996 Norms	11.2	2.4	14.4	-
India stage 2000 norms	4.5	1.1	8.0	0.36
Bharat stage-II	4.0	1.1	7.0	0.15
Bharat Stage-III	2.1	1.6	5.0	0.10
Bharat Stage-IV	1.5	0.96	3.5	0.02
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

Appendix 7: Discharge Standards to be achieved as per NGT order dtd. 30.04.2019

Sl. No.	Parameters	Parameters Limit
1		5.5-9.0
2	BOD (mg/l)	Not more than 10 mg/l
3		
4	TSS (mg/l)	
5	P-Total (mg/l)- for discharge into ponds/lakes	Not more than 1.0 mg/l
6		
7	Fecal Coliform (MPN/100ml)	Desirable- Less than 100 MPN/100ml Permissible- 230 MPN/100ml

Appendix 8: Pages from Rajasthan State Sewerage and Wastewater Policy for reuse of treated effluent and sludge

viii. Design and performance specifications of wastewater treatment plants shall be as per guidelines given in the manual on sewerage treatment systems published by CPHEEO. Sufficient room in tendering for the construction of new plants shall be provided for competition to take place in both technologies and costs.

5.4. On Reuse of Treated Effluent and Sludge

1. Treated wastewater effluent is considered a water resource and is added to the water stock for reuse.
2. Priority shall be given to agricultural reuse of treated effluent for unrestricted irrigation. Blending of treated wastewater with fresh water shall be made to improve quality where possible. Crops to be irrigated by the treated effluent or blend thereof with freshwater resources shall be selected to suit the irrigation water, soil type and chemistry, and the economics of the reuse operations.
3. Crop nutrient requirements shall be determined taking into consideration the prevailing effluent quality. Overuse of nutrients shall be avoided.
4. Accumulation of heavy metals and salinity shall be monitored, managed and mitigated. Leaching of soils shall be advocated by the irrigation authorities.
5. Farmers shall be encouraged to determine the rate of water application needed for different crops, taking into consideration the value of nutrients in the treated water and other parameters.
6. Farmers shall be encouraged to use modern and efficient irrigation technologies. Protection of on-farm workers and of crops against pollution with wastewater shall be ensured.
7. Treated effluent quality should be monitored and users alerted to any emergency causing deterioration of the quality so that they will not use such water unless corrective measures are taken.
8. Studies should be conducted and projects designed and implemented to store the excess treated wastewater in surface reservoirs but artificial recharge is not permitted . Due attention shall be given to the quality of treated and groundwater and the characteristics of the strata.
9. Plans and studies for power generation from sludge, if proven technically, economically and financially feasible, shall be made with due attention to environment impacts.
10. Sludge produced from the treatment process would be processed so it may be used as fertilizer and soil conditioner. Care shall be taken to conform to the regulations of public health and environment protection norms.

11. **Industry:** Industrial reuse of reclaimed wastewater represents major reuse next only to irrigation in both developed and developing countries. Reclaimed wastewater is ideal for many industrial purposes,. Where effluent is to be used in the industrial processes, it should be the responsibility of the industry to treat it to the quality standards required. Pilot scale feasibility studies carried out in Australia have concluded that it is possible to economically treat the domestic wastewater to achieve adequate quality for reuse as cooling water. Based on the conclusions of the feasibility study, a full-scale treatment plant employing cross-flow membrane microfiltration system may be installed. The membrane filtration system can remove all suspended solids, fecal coliforms, and giardia cysts. It could also significantly reduce human enteric viruses such as *reovirus*and *enterovirus*. The water reclamation plant at Eraring Power Station demonstrates the potential for reuse of wastewater in power generation and other industrial manufacturing facilities.

Industrial uses for reclaimed water include:

(i) Evaporative cooling water:-

  (a) Once-through cooling system.

  (b) Re-circulating cooling system.

  (c) Cooling water quality requirements.

(ii) Boiler –Feed water- The use of reclaimed water differs little from use of conventional public supplies for boiler-feed water,as both require extensive additional treatment quality requirement for boiler feed make up water are dependent upon pressure at which boiler is operated.

(iii) Industrial process water-

Suitability of reclaimed water for use in industrial process depends upon particular use like-

(a) Pulp and paper.

(b) Chemical industry.

(c) Textile industry.

(d) Petroleum and coal.

12. Whenever possible, other end uses of treated effluents; such as recycling, cooling, power generation, etc. shall be considered.

13. Re-use Options: The following options for re–use of effluent have been identified: In general, public health concern is the major issue in any type of reuse of wastewater, be it for irrigation or non-irrigation utilization, especially long term impact of reuse practices. It is difficult to delineate acceptable health risks and is a matter that is still hotly debated. Potential reuse of wastewater depends on the hydraulic and biochemical characteristics of wastewater, which determine the methods and degree of treatment required. While agricultural irrigation reuses, in general, require lower quality levels of treatment, domestic reuse options (direct or indirect potable and non-potable) reuses need the highest treatment level. Level of treatment for other

reuse options lie between these two extremes. The reuse options may be (artificial recharge of aquifers is not permitted):

i. Irrigation

(a) Agriculture and forestry

(b) Landscaping

ii. Fish – farming

iii. Industry

iv. Non-potable Domestic Reuse.

The detailed project report should clearly define the best reuse option particular to town and strategy to obtain it. Action plan with clarity should be the part of Detailed Project Report (DPR), while preparing sewerage projects. Before deciding the reuse of treated waste water, authorities must full fill the water quality norms and its legal implications.

14. Governing local body can sell the treated waste water and digested sludge to generate the revenue.

5.5. On Pricing, Financing and Investment

1. In view of increasing marginal cost of wastewater collection and treatment, wastewater charges, connection fees, sewerage taxes and treatment fees shall be set to cover at least the operation and maintenance costs. It is also highly desirable that part of the capital cost of the services shall be recovered. The ultimate aim is for a full cost recovery.

2. Appropriate criteria in order to apply the "polluter pays" principle shall be established.

3. Different charges for different areas may be applied. This shall be assessed for each geographical area as a function of end users and effluent quality and will be subject to economic and social considerations.

4. Because of the limited financial resources available to Government of Rajasthan, setting investment priorities in wastewater will be compatible with government investment plans.

5. Criteria for prioritizing investments in the wastewater sector shall take into account the current and future needs of the state, needs to expand wastewater systems in urban areas and to provide wastewater systems to smaller towns and villages.

6. Priorities of wastewater projects shall not be disconnected from water supply projects and urbanization in general. Decisions will be made concerning them to attain optimum solutions to the need for services, availability of finance and availability of trained manpower.

7. Treated effluent shall be priced and sold to end users at a price covering at least the operation and maintenance costs of delivery.

8. It is the intention of the Government, through private sector participation, to transfer management of infrastructure and services from the public to the private sector, in order to improve performance and upgrade the level of service.

9. The role of the private sector will expand with management contracts, concessions and other forms of private sector participation in wastewater management.

10. The concepts of BOO/BOT shall be entertained, and the impact of such concepts on the consumers shall be continually addressed and negative impacts mitigated.

11. The private sector role in reuse of treated effluent shall be encouraged and expanded.

12. As per urban reforms (under various schemes by MOUD) 100% cost of O&M of sewerage system shall be recovered from consumer. The costs will depend on the system/technology adopted for collection of sewerage and treatment and the administration costs. It is important that the full cost of the service is assessed for each urban area instead of adopting a typical cost assessment. The full cost shall cover the following:

(i) Institutional aspect of the sanitation service e.g. the management information systems, accountancy and finance management, billing and collection, customer services, etc. and oversight activities.

(ii) Operating, maintaining (on a planned maintenance basis), repairing replacing and extending sanitation service physical infrastructure.

(iii) Keeping updated infrastructure and customer data on a GIS base.

(iv) Managers, staff, vehicles, equipment and consumables associated with the above.

(v) Consumable like chemicals etc.

(vi) Power charges.

(vii) Spare Parts.

(viii) Any other O&M contract amount

5.6. Source of Funds for Sewerage Project

(A) In general, implementation of reuse facility requires substantial capital expenses. In addition to capital cost associated with reclaimed water facility, there are also additional operation, maintenance, and replacement and administrative costs. Hence responsible agencies may consider following sources of 'Funds for Construction of Sewerage Project':

Appendix 9: Drinking Water Standards

Group	National Standards for Drinking Water[a]			WHO Guidelines for Drinking-Water Quality, 4th 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			

[a] Bureau of India Standard 10500: 2012.

[b] Health-based guideline values.

[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.

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

Appendix 10: Extract from Construction And Demolition Management Rules, 2016

[Published In the Gazette of India, Part-II, Section-3, Sub-section (ii)]
Ministry of Environment, Forest and Climate Change

NOTIFICATION

New Delhi, the 29th March, 2016

G.S.R. 317(E).-Whereas the Municipal Solid Wastes (Management and Handling) Rules, 2000 published vide notification number S.O. 908(E), dated the 25th September, 2000 by the Government of India in the erstwhile Ministry of Environment and Forests, provided a regulatory frame work for management of Municipal Solid Waste generated in the urban area of the country;

And whereas, to make these rules more effective and to improve the collection, segregation, recycling, treatment and disposal of solid waste in an environmentally sound manner, the Central Government reviewed the existing rules and it was considered necessary to revise the existing rules with a emphasis on the roles and accountability of waste generators and various stakeholders, give thrust to segregation, recovery, reuse, recycle at source, address in detail the management of construction and demolition waste.

And whereas, the draft rules, namely, the Solid Waste Management Rules, 2015 with a separate chapter on construction and demolition waste were published by the Central Government in the Ministry of Environment, Forest and Climate Change vide G.S.R. 451 (E), datedthe 3rd June, 2015 inviting objections or suggestions from the public within sixty days from the date of publication of the said notification;

And Whereas, the objections or suggestions received within the stipulated period were duly considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sections 6, 25 of the Environment (Protection) Act, 1986 (29 of 1986), and in supersession of the Municipal Solid Wastes (Management and Handling) Rules, 2000, except as respect things done or omitted to be done before such supersession, the Central Government hereby notifies the following rules for Management of Construction and Demolition Waste –

1. Short title and commencement.-(1) These rules shall be called the Construction and Demolition Waste Management Rules, 2016.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. Application.-The rules shall apply to every waste resulting from construction, re-modeling, repair and demolition of any civil structure of individual or organisation or authority who generates construction and demolition waste such as building materials, debris, rubble.

3. Definitions –(1) In these rules, unless the context otherwise requires,-

(a) " ACT' means the Environment (Protection) Act, 1986 (29 of 1986);

(b) "**construction**" means the process of erecting of building or built facility or other structure, or

building of infrastructure including alteration in these entities,;

(c) "**construction and demolition waste**" means the waste comprising of building materials, debris and rubble resulting from construction, re-modeling, repair and demolition of any civil structure;

(d) **"de-construction"** means a planned selective demolition in which salvage, re-use and recycling of the demolished structure is maximized;

(e) "demolition" means breaking down or tearing down buildings and other structures either manually or using mechanical force (by various equipment) or by implosion using explosives.

(f) "form" means a Form annexed to these rules;

(g) "local authority" means an urban local authority with different nomenclature such as municipal corporation, municipality, nagarpalika, nagarnigam, nagarpanchayat, municipal council including notified area committee and not limited to or any other local authority constituted under the relevant statutes such as gram panchayat, where the management of construction and demolition waste is entrusted to such agency;

(h) " schedule" means a schedule annexed to these rules;

(i) "service provider' means authorities who provide services like water, sewerage, electricity, telephone, roads, drainage etc. often generate construction and demolition waste during their activities, which includes excavation, demolition and civil work;

(j) "waste generator" means any person or association of persons or institution, residential and commercial establishments including Indian Railways, Airport, Port and Harbour and Defence establishments who undertakes construction of or demolition of any civil structure which generate construction and demolition waste.

(2) Words and expressions used but not defined herein shall have the same meaning defined in the ACT.

(4) Duties of the waste generator -

(1) Every waste generator shall prima-facie be responsible for collection, segregation of concrete, soil and others and storage of construction and demolition waste generated, as directed or notified by the concerned local authority in consonance with these rules.

(2) The generator shall ensure that other waste (such as solid waste) does not get mixed with this waste and is stored and disposed separately.

(3) Waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month shall segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar and shall submit waste management plan and get appropriate approvals from the local authority before starting construction or demolition or remodeling work and keep the concerned

authorities informed regarding the relevant activities from the planning stage to the implementation stage and this should be on project to project basis.

(4) Every waste generator shall keep the construction and demolition waste within the premise or get the waste deposited at collection centre so made by the local body or handover it to the authorised processing facilities of construction and demolition waste; and ensure that there is no littering or deposition of construction and demolition waste so as to prevent obstruction to the traffic or the public or drains.

(5) Every waste generator shall pay relevant charges for collection, transportation, processing and disposal as notified by the concerned authorities; Waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month shall have to pay for the processing and disposal of construction and demolition waste generated by them, apart from the payment for storage, collection and transportation. The rate shall be fixed by the concerned local authority or any other authority designated by the State Government.

(5) Duties of service provider and their contractors -

(1) The service providers shall prepare within six months from the date of notification of these rules, a comprehensive waste management plan covering segregation, storage, collection, reuse, recycling, transportation and disposal of construction and demolition waste generated within their jurisdiction.

(2) The service providers shall remove all construction and demolition waste and clean the area every day, if possible, or depending upon the duration of the work, the quantity and type of waste generated, appropriate storage and collection, a reasonable timeframe shall be worked out in consultation with the concerned local authority.

(3) In case of the service providers have no logistics support to carry out the work specified in sub-rules (1) and (2) , they shall tie up with the authorised agencies for removal of construction and demolition waste and pay the relevant charges as notified by the local authority.

(6) Duties of local authority-The local authority shall,-

(1) issue detailed directions with regard to proper management of construction and demolition waste within its jurisdiction in accordance with the provisions of these rules and the local authority shall seek detailed plan or undertaking as applicable, from generator of construction and demolition waste;

(2) chalk out stages, methodology and equipment, material involved in the overall activity and final clean up after completion of the construction and demolition ;

(3c) seek assistance from concerned authorities for safe disposal of construction and demolition waste contaminated with industrial hazardous or toxic material or nuclear waste if any;

(4) shall make arrangements and place appropriate containers for collection of waste and shall remove at regular intervals or when they are filled, either through own resources or by appointing private operators;

(5) shall get the collected waste transported to appropriate sites for processing and disposal either through own resources or by appointing private operators;

(6) shall give appropriate incentives to generator for salvaging, processing and or recycling preferably in-situ;

(7) shall examine and sanction the waste management plan of the generators within a period of one month or from the date of approval of building plan, whichever is earlier from the date of its submission;

(8) shall keep track of the generation of construction and demolition waste within its jurisdiction and establish a data base and update once in a year;

(9) shall device appropriate measures in consultation with expert institutions for management of construction and demolition waste generated including processing facility and for using the recycled products in the best possible manner;

(10) shall create a sustained system of information, education and communication for construction and demolition waste through collaboration with expert institutions and civil societies and also disseminate through their own website;

(11) shall make provision for giving incentives for use of material made out of construction and demolition waste in the construction activity including in non-structural concrete, paving blocks, lower layers of road pavements, colony and rural roads.

(7) Criteria for storage, processing or recycling facilities for construction and demolition waste and application of construction and demolition waste and its products-

(1) The site for storage and processing or recycling facilities for construction and demolition waste shall be selected as per the criteria given in **Schedule I**;

(2) The operator of the facility as specified in sub- rules (1) shall apply in **Form I** for authorization from State Pollution Control Board or Pollution Control Committee.

(3) The operator of the facility shall submit the annual report to the State Pollution Control Board in **Form II.**

(3) Application of materials made from construction and demolition waste in operation of sanitary landfill shall be as per the criteria given in **Schedule II.**

(8) Duties of State Pollution Control Board or Pollution Control Committee-

(1) State Pollution Control Board or Pollution Control Committee shall monitor the implementation of these rules by the concerned local bodies and the competent authorities and the annual report shall be sent to the Central Pollution Control Board and the State Government or Union Territory or any other State level nodal agency identified by the State Government or Union Territory administration for generating State level comprehensive data. Such reports shall also contain the comments and suggestions of the State Pollution Control Board or Pollution Control Committee with respect to any comments or changes required;

(2) State Pollution Control Board or Pollution Control Committee shall grant authorization to construction and demolition waste processing facility in **Form-III** as specified under these rules after examining the application received in **Form I**;

(3) State Pollution Control Board or Pollution Control Committee shall prepare annual report in **Form IV** with special emphasis on the implementation status of compliance of these rules and forward report to Central Pollution Control Board before the 31st July for each financial year.

(9) Duties of State Government or Union Territory Administration-

(1) The Secretary in-charge of development in the State Government or Union territory administration shall prepare their policy document with respect to management of construction and demolition of waste in accordance with the provisions of these rules within one year from date of final notification of these rules.

(2) The concerned department in the State Government dealing with land shall be responsible for providing suitable sites for setting up of the storage, processing and recycling facilities for construction and demolition waste.

(3) The Town and Country planning Department shall incorporate the site in the approved land use plan so that there is no disturbance to the processing facility on a long term basis.

(4) Procurement of materials made from construction and demolition waste shall be made mandatory to a certain percentage (say 10-20%) in municipal and Government contracts subject to strict quality control.

(10) Duties of the Central Pollution Control Board - (1) The Central Pollution Control Board shall,-

(a) prepare operational guidelines related to environmental management of construction and demolition waste management;

(b) analyze and collate the data received from the State Pollution Control Boards or Pollution Control Committee to review these rules from time to time;

(c) coordinate with all the State Pollution Control Board and Pollution Control Committees for any matter related to development of environmental standards;

(d) forward annual compliance report to Central Government before the 30th August for each financial year based on reports given by State Pollution Control Boards of Pollution Control Committees.

(11) Duties of Bureau of Indian Standards and Indian Roads Congress -The Bureau of Indian Standards and Indian Roads Congress shall be responsible for preparation of code of practices and standards for use of recycled materials and products of construction and demolition waste in respect of construction activities and the role of Indian Road Congress shall be specific to the standards and practices pertaining to construction of roads.

Schedule III
Timeframe for Planning and Implementation
[See Rule 13]

Sl. No.	Compliance Criteria	Cities with population of 01 million and above	Cities with population of 0.5-01 million	Cities with population of less than 0.5 million
1	Formulation of policy by State Government	12 months	12 months	12 months
2	Identification of sites for collection and processing facility	18 months	18 months	18 months
3	Commissioning and implementation of the facility	18 months	24 months	36 months
4	Monitoring by SPCBs	3 times a year – once in 4 months	2 times a year – once in 6 months	2 times a year – once in 6 months

The time Schedule is effective from the date of notification of these rules.

FORM – I
See [Rule 7 (2)]
Application for obtaining authorisation

To,
The Member Secretary

_____Name of the local authority or Name of the agency : appointed by the municipal authority

Correspondence address Telephone No. Fax No.	
Nodal Officer and designation (Officer authorized by the competent authority or agency responsible for operation of processing or recycling or disposal facility)	
Authorisation applied for (Please tick mark)	Setting up of processing or recycling facility of construction and demolition waste
Detailed proposal of construction and demolition waste processing or recycling facility to include the following Location of site approved and allotted by the Competent Authority. Average quantity (in tons per day) and composition of construction and demolition waste to be handled	

Appendix 11A: Rapid Environmental Assessment Checklist – Water Supply

Instructions:
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.

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:
Package No. and Description: _____

SN	Screening Question	Yes	No	Remarks
A	**Project Siting** **Is the project area**			
1	Densely populated?			
2	Heavy with development activities?			
3	Adjacent to or within any environmentally sensitive areas?			
4	Cultural heritage site			
5	Protected Area			
6	Wetland			
7	Mangrove			
8	Estuarine			
9	Buffer zone of protected area			
10	Special area for protecting biodiversity			
11	Bay			
B	**Potential Environmental Impacts** **With the project cause**			
1	Pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, soil erosion runoff?			
2	Impairment of historical/ cultural monuments/areas and loss/damage to these sites?			
3	Hazard of land subsidence caused by excessive ground water pumping?			
4	Social conflicts arising from displacement of communities?			
5	Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?			
6	Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?			
7	Delivery of unsafe water to distribution system?			
8	Inadequate protection of intake works or wells, leading to pollution of water supply?			
9	Over pumping of ground water, leading to salinization and ground subsidence?			
10	Excessive algal growth in storage reservoir?			
11	Increase in production of sewage beyond capabilities of community facilities?			
12	Inadequate disposal of sludge from water treatment plants?			

SN	Screening Question	Yes	No	Remarks
13	Inadequate buffer zone around pumping and treatment plants alleviates noise and other possible nuisances and protects facilities?			
14	Impairments associated with transmission lines and access roads?			
15	Health hazards arising from inadequate design of facilities for receiving, storing and handling of chlorine and other hazardous chemicals.			
16	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?			
17	Dislocation or involuntary resettlement of people?			
18	Disproportionate impacts on the poor, women and children, indigenous Peoples or other vulnerable groups?			
19	Noise and dust from construction activities?			
20	Increased road traffic due to interference of construction activities?			
21	Continuing soil erosion/ silt runoff from construction operations?			
22	Delivery of unsafe water due to poor O&M treatment processes (especially MOWS accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?			
23	Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?			
24	Accidental leakage of chlorine gas?			
25	Excessive abstraction of water affecting downstream water users?			
26	Competing uses of water?			
27	Increased sewage flow due to increased water supply			
28	increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant			
29	Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?			
30	Social conflicts if workers from other regions or countries are hired?			
31	Risks to community health and safety due to transport, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?			
32	Community safety risks due to both accidental and natural hazards, especially where structural elements or components of the project are accessible to the members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning			

A Checklist for Preliminary Climate Risk Screening

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

Screening Questions		Score	Remarks[70]
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?		
	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)?		
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)?		
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?		
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?		

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):
Other Comments:

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

Appendix11B: Rapid Environmental Assessment Checklist – Sewerage System

Country/Project Title:
Package No. and Description: _____

SN	Screening Questions	Yes	No	Remarks
A	**Project Siting**			
	In the project area			
1	Densely populated			
2	Heavy with development activities			
3	Adjacent to or within any environmentally sensitive areas			
4	Cultural heritage sites			
5	Protected areas			
6	Wetland			
7	Mangrove			
8	Estuarine			
9	Buffer zone			
10	Special areas for protecting bio-diversity			
11	Bay			
B	**Potential Environmental Impacts**			
	Will the project cause			
1	Impairment of historical /cultural monuments/areas and loss/damage to these sites			
2	Interference with other utilities and blocking of access to buildings, nuisance to neighboring areas due to noise, smell and influx of insects, rodents etc.			
3	Dislocation or involuntary resettlement of people			
4	Disproportionate impacts on the poor, women and children indigenous people or other vulnerable groups			
5	Impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage			
6	Overflows and flooding of neighboring properties with raw sewage			
7	Environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers			
8	Noise and vibration due to blasting and other civil works			
9	Risks and vulnerabilities related to occupational health and safety due to physical, chemical and biological hazards during project construction and operation			

SN	Screening Questions	Yes	No	Remarks
10	Discharge of hazardous material into sewers, resulting in damage to sewer system and danger to workers			
11	Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities			
12	Road blocking and temporary flooding due to land excavation during the rainy season			
13	Noise and dust from construction activities			
14	Traffic disturbances due to construction material transport and wasters			
15	Temporary silt runoff due to construction			
16	Hazards to public health due to overflow flooding and groundwater pollution due to failure of sewerage system			
17	Deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water			
18	Contamination of surface and ground water due to sludge disposal on land			
19	Health and safety hazards to workers from toxic gases and hazardous materials which may be contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and un-stabilized sludge			
20	Large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)			
	Social conflicts between construction workers from other areas and community workers?			
21	Risks to community health and safety due to the transport, storage and use and /or disposal of materials such as explosives, fuel and other chemicals during construction and operation			
22	Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project and accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning			

A Checklist for Preliminary Climate Risk Screening

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

Screening Questions		Score	Remarks[1]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?		
	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)?		
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)?		
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?		
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?		

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):
Other Comments:

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

Appendix11C: Rapid Environmental Assessment Checklist – Urban Development

Instructions:
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. This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development. Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:
Sector Division: Urban Development

REA Checklist- Urban Development

SCREENING QUESTIONS	Yes	No	REMARKS
A. **Project Siting** Is the project area…			
Densely populated?	√		
Heavy with development activities?	√		
Adjacent to or within any environmentally sensitive areas?			
Cultural heritage site			
Protected Area	√		
Wetland			
Mangrove			
Estuarine			
Buffer zone of protected area			
Special area for protecting biodiversity	√		
Bay			
B. Potential Environmental Impacts Will the Project cause…			
Impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services.		√	
Deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed?		√	
Degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)?		√	

SCREENING QUESTIONS	Yes	No	REMARKS
dislocation or involuntary resettlement of people		√	
Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	
Degradation of cultural property, and loss of cultural heritage and tourism revenues?		√	
Occupation of low-lying lands, floodplains, and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and risks due to polluting industries?		√	
Water resource problems (e.g. depletion/degradation of available water supply, deterioration for surface and ground water quality, and pollution of receiving waters?		√	
Air pollution due to urban emissions?		√	
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during project construction and operation?	√		
Road blocking and temporary flooding due to land excavation during rainy season?	√		
Noise and dust from construction activities?	√		
Traffic disturbances due to construction material transport and wastes?	√		
Temporary silt runoff due to construction?	√		
Water depletion and/or degradation?		√	
Overpaying of ground water, leading to land subsidence, lowered ground water table, and salinization?		√	
Contamination of surface and ground waters due to sludge disposal on land?	√		
Pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems?		√	
Large population influx during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?		√	

SCREENING QUESTIONS	Yes	No	REMARKS
Social conflicts if workers from other regions or countries are hired?		√	
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		√	
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?	√		

Checklist for Preliminary Climate Risk Screening

Country/Project Title:

Sector :

Subsector:

Division/Department:

Screening Questions		Score	Remarks[2]
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?		
	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)?		
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)?		
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?		
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?		

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

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

Other Comments: The proposed subproject activity involves construction of two Nalas and the anticipated environmental impacts are very marginal and the construction activity does not impose any threat to the existing climatic conditions.

Appendix 12: Outline Contents of Initial Environmental Examination Report

1. Executive Summary

- Describe concisely the critical facts, significant findings, and recommended actions of environmental assessment study as documented in the report.

1. Introduction

Purpose of the report
• Identification of project& project proponent
• Brief description of nature, size, location of the project and its importance to the country, region
• Scope of the study–details of regulatory scoping carried out (Asper Terms of Reference)

2. Description of the Project

- Describe the proposed project; its major components, including any associated facility required by and for the project (for example, access roads, power lines, water supply, quarries and borrow pits, and spoil disposal).
- Include drawings and maps showing the project's layout and components, the project site, and the project's area of influence.

3. Policy, Legal, and Administrative Framework

- Discuss national and local legal and institutional framework within which the environmental assessment is carried out.
- Also identify project-relevant international environmental agreements to which the country is a party.

4. Description of the Environment (Baseline Data)

- Describes relevant physical, biological, and socioeconomic conditions within the study area.

5. Anticipated Environmental Impacts and Mitigation Measures

- Identify, predict and assesses the project's likely positive and negative direct and indirect impacts to physical, biological, socioeconomic and impacts on livelihoods and physical cultural resources in the project's area of influence
- Examine alternatives to the proposed project site, technology, design and operation. Also state the basis for selecting the particular project design, location etc.
- Identify mitigation measures to avoid, reduce, mitigate, or compensate for adverse environmental impacts (in that order of priority)

6. Information Disclosure, Consultation

- Summarize the consultation and disclosure activities undertaken during project preparation
- Summarize comments and concerns received from affected person and other stakeholders and how these comments have been addressed in project

- Describes the planned information disclosure and consultation activities during the implementation.

7. Grievance Redress Mechanism

- Describe the grievance redress framework – process, responsibilities and timelines.

8. Environmental Management Plan

- Summarize stage wise (design, construction and operation) environmental impacts and detail mitigation and management measures (Table 1)
- Describe monitoring measures (Table 2)
- Describe implementation arrangements and responsibilities for EMP implementation

9. Conclusion and Recommendation

- Provide the conclusions drawn from the assessment and provide recommendations

Appendix 13: Semi-Annual Environmental Monitoring Report Template

This template must be included as an Appendix in the IEE that will be prepared for the project. It can be adapted to the specific project as necessary.

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	Roles
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	Contract Status (specify if under bidding or contract awarded)	Status of Implementation (Preliminary Design/Detailed Design/On-going Construction/Completed/O&M)[1]	If On-going Construction	
				%Physical Progress	Expected Completion Date

[1] If on-going construction, include %physical progress and expected date of completion

II. Compliance status with National/State/Local statutory environmental requirements2

Package No.	Subproject Name	Statutory Environmental Requirements[3]	Status of Compliance[4]	Validity if obtained	Action Required	Specific Conditions that will require environmental monitoring as per Environment Clearance, Consent/Permit to Establish[5]

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 IEE Documentation Status

[2] 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.
[3] Specify (environmental clearance? Permit/consent to establish? Forest clearance?Etc.)
[4] Specify if obtained, submitted and awaiting approval, application not yet submitted
[5] *Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.*

Package Number	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)		

- For each package, provide name/s and contact details of contractor/s' nodal person/s for environmental safeguards.

Package-wise Contractor/s' Nodal Persons for Environmental Safeguards

Package Name	Contractor	Nodal Person	Email Address	Contact Number

- With reference to approved EMP/site-specific EMP/construction EMP, complete the table below

Summary of Environmental Monitoring Activities (for the Reporting Period)[6]

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						

[6] Attach Laboratory Results and Sampling Map/Locations

Construction Phase						
Operational Phase						

Overall Compliance with CEMP/ EMP

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

V. Approach and methodology for environmental monitoring of the project

- Briefly describe 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)

- Discuss the general condition of surroundings at the project site, with consideration of the following, whichever are applicable:

○ Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
○ Identify if muddy water is escaping site boundaries or if muddy tracks are 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 are intact following heavy rain;
○ Identify designated areas for concrete works, chemical storage, construction materials, and refueling. Attach photographs of each area in the Appendix.
○ 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 in the Appendix.
- Indicate if there are any activities being under taken out of working hours and how that is being managed.

- Briefly discuss the basis for environmental parameters monitoring.
- Indicate type of environmental parameters to be monitored and identify the location.
- Indicate the method of monitoring and equipment 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				

Surface Water Quality Results

S.No.	Parameters			
		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.	Totalresidual 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. ASBESTOS MANAGEMENT

Information on encountered or potential asbestos materials and capacity building activities on project sites should be included in this section.

FORM I – ASBETOS INVENTORY, INSPECTION AND ACTION FORM **Format: RUIDP/IIA/ LOCATION/NAME OF DBO CONTRACTOR/HSE 002/YEAR**

Location:	
Site coordinates:	
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**		

MATRIX FOR TRAINING & RECORDS

Format: RUIDP/INSP.MATRIX/LOCATION/NAME OF DBO CONTRACTOR/HSE 001/YEAR			
S. No.	**Aspects of Asbestos Materials**	**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:			
C. DOCUMENTS AND RECORDS			
4.	Site Inventory		
5.	List of Asbestos materials storage and installation points		

6.	Structure of Asbestos materials management committee		
D. INVENTORY			
1.	Inventory of Asbestos materials		
	Number of Asbestos materials/ pipes		
	Dimensions of Asbestos materials/ pipes		
	Total volume of Asbestos materials/ 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 Asbestos materials	
		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 (PPE)**		
	Record of PPE		
	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: **EHS Officer Signatory:**		

ASBESTOS MANAGEMENT
In-situ Storage of Asbestos materials

S.No	Activity	Number of Stacks	Area occupied	Details of Asbestos materials 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 Asbestos materials storage, new area should be • Minimum 10-15 ft away from campus habituation. • 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 Authorised Experts Only. • Register to be maintained for Entry& Exit of personals. • Register to be maintained for Entry & Exit of Asbestos materials • Labels to be displayed in legible format • Specific training of Asbestos materials to be inducted in the Asbestos materials storage area for residing population in the campus.					
Details of transit storage of Asbestos materials to be maintained as per norms in an isolated storage room full covered					

VIII. 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).

IX. 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).

X. SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

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

XI. APPENDIXES

- Photos
- Summary of consultations
- Copies of environmental clearances and permits
- Sample of environmental site inspection report
- all supporting documents including **signed** monthly environmental site inspection reports prepared by consultants and/or contractors
- Others

Appendix 14: RUDSICO office order and Sample Grievance Registration Form

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RUIDP

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/ 1282 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.adb.org/projects/42267-026/main#project-documents

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 RP 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 RP.
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, PIUand the Contractor will resolve the issued 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 documents 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/ PO Environment or other official of PMUand 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 dependent 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 andwill maintain Grievance Registers(refer annexure 1 &2).

~~(G. S. Hada)~~ 15/18
Addl. Project Director, RUIDP

F3(301)(50)RUIDP/PMU/PH-IV/WS/GENERAL/ 1283-84 Dated: ~~.04.2018~~ 04/05/18
Copy to following for information and necessary action.
1) PA to PD /CE /FA/DyPD(A)/SE(WS)/SE(WW)/PO(Environment)/PO(Social)/, RUIDP, Jaipur
2) All EE, PIU, Phase-IV for ensureing maintenance of the Grievance register and helpline and for resolving of Grievances.

Chmandhaj
(K. M. Mandawaria)
PO(Co-ord.&Social)

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

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 15: Sample Construction Site Checklist for EMP Monitoring

Project Name: RSTDSP **Name of the Subproject:** **Contractor:**	**Yes (√) No (x)**
Monitoring **Details:**	
EHS supervisor appointed by contractor and available on site	
Construction site management plan (spoils, safety, material, 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 and when required only	
Tarpaulins used to cover sand and other loose material when transported by vehicles	
After unloading, wheels and undercarriage of vehicles cleaned prior to leaving the site	
No Asbestos Cement pipes disturbed/removed during excavation	
No chance finds encountered during excavation	
Work is planned in consultation with traffic police	
Work is not being conducted during heavy traffic	
Work at a stretch is completed within a day (excavation, pipe laying and 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 and public is 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 work sites 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 and safe construction practices	
Deep excavation is conducted with land slip/protection measures	
First aid facilities are available on site and workers informed	

Project Name: RSTDSP **Name of the Subproject:** **Contractor:**	**Yes (√) No (x)**
Monitoring **Details:** _____	
Drinking water provided at the site	
Toilet facility provided at the site	
Separate toilet facility is provided for women workers	
Workers camps are maintained cleanly	
Adequate toilet and 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	

Appendix 16: Quarterly Progress Report Checklist
Environment Safeguards QPR checklist[79]

Activity	Yes / No	Remarks (If Answer Is **No**)
A. For subproject packages under bidding		
1. IEEs cleared by ADB?		
2. IEEs/EMPs included in the bidding documents?		
3. Are there changes in the scope of work of the cleared IEEs?		
4. Core labor standards and environment, health and safety (EHS) incorporated in Section 8 of the bid documents?		
5. BOQ line item includes EMP requirements?		
6. IEE disclosed in form and language understood by stakeholders and affected persons (APs)?		
For subproject packages with contracts awarded (no works yet)		
1. All statutory clearances/permits obtained?		
2. Each contractor appointed EHS and/or safety officer?		
3. Baseline regarding condition of roads, agricultural land and other infrastructure prior to start of transportation of materials and construction has been recorded?		
4. Contractor has established tie-ups with local hospitals/clinics for emergencies onsite?		
5. For DBO packages, detailed design completed and updated IEE submitted to ADB?		
6. For civil works packages, site-specific EMP submitted to ADB?		
For subproject packages with contracts awarded and works on-going		
1. Contractors have appointed EHS and/or safety officer onsite per subproject package?		
2. Site-specific EMP posted onsite?		
3. Contractors' records of accidents / incidents submitted to PMU on a monthly basis?		
4. Contractors provided PMU with a notification/incident report of any accident(s) within 24 hours of its occurrence?		
5. Reports of complaints/grievances reported monthly to PMU?		
6. Records of information disclosure/consultations submitted by PIUs to PMU monthly?		

[79] This checklist should provide the Project's **general** compliance to environment safeguards during the reporting period. The indicators are aligned with project loan agreement, PAM, IEEs and ADB's Sustainable Development Safeguards Division Safeguards project performance rating. The detailed environmental safeguards compliance status should be provided in the semi-annual environmental monitoring report.

7. Records of site inspection by PIU submitted to PMU monthly?		

Appendix 17: WHO Interim Guidance – Water, Sanitation, Hygiene and Waste Management for the COVID19 virus

World Health Organization

unicef

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 concur, noting that the human coronaviruses transmissible gastroenteritis coronavirus and mouse hepatitis virus demonstrated a 99.9% die-off in from 2 days[9] at 23°C to 2 weeks[10] 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.[10] 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 coxsackieviruses, which have a protein coat. For effective centralized disinfection, there should be a residual concentration of free chlorine of $\geqslant$0.5 mg/L after at least 30 minutes of contact time at pH $<$8.0.[12] 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 outerwear, 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.[14] 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.[14]

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".[15] 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.[16] 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 on sprayers and faucets to prevent aerosolized faecal 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).[21] 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 precautions[18] 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.[25] 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 peroxyacetic acid at concentrations of 500–2000 mg/L.[26]

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 offsite, 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, in-situ 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.[19] 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.[27] 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.

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WHO continues to monitor the situation closely for any changes that may affect this interim guidance. Should any factors change, WHO will issue a further update. Otherwise, this interim guidance document will expire 2 years after the date of publication.

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