

Initial Environmental Examination

Document Stage: Draft
Project Number: 42267-031
April 2020

**IND: Rajasthan Secondary Towns Development
Sector Project – Didwana Sewerage Subproject
(Nagaur District)**

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

CURRENCY EQUIVALENTS

(as of 28 April 2020)

| | | |
|---------------|---|------------------|
| Currency unit | – | Indian rupee (₹) |
| ₹ 1.00 | = | \$ 0.0131 |
| \$1.00 | = | ₹ 76.122 |

ABBREVIATIONS

| | | |
|-----------|---|--|
| ADB | – | Asian Development Bank |
| ASI | – | Archaeological Survey of India |
| CTE | – | Consent to Establish |
| CTO | – | Consent to Operate |
| CPCB | – | Central Pollution Control Board |
| EAC | – | Expert Appraisal Committee |
| EHS | – | Environmental Health & Safety |
| EIA | – | Environmental Impact Assessment |
| SEIAA | – | State Environmental Impact Assessment Authority |
| EMP | – | Environmental Management Plan |
| GOI | – | Government of India |
| GOR | – | Government of Rajasthan |
| IEE | – | Initial Environmental Examination |
| PIU | – | Project Implementation Unit |
| PMU | – | Project Management Unit |
| LSGD | – | Local Self Government Department |
| MOEF&CC | – | Ministry of Environment, Forest and Climate Change |
| DWC | – | Double Wall Corrugated |
| NHAI | – | National Highways Authority of India |
| NOC | – | No Objection Certificate |
| PHED | – | Public Health Engineering Department |
| PMDSC | – | Project Management and Design Supervision Consultant |
| PWD | – | Public Works Department |
| REA | – | Rapid Environmental Assessment Checklist |
| ROW | – | right-of-way |
| RPCB | – | Rajasthan State Pollution Control Board |
| RUIDP | – | Rajasthan Urban Infrastructure Development Project |
| RSTDSP- | – | Rajasthan Secondary Towns Development Sector Project |
| SPS (ADB) | – | Safeguard Policy Statement, 2009 |
| SPS | – | sewage pumping station |
| STP | – | sewage treatment plant |
| UIDSSMT | – | Urban Infrastructure Development Scheme for Small and Medium Towns |
| ULB | – | Urban Local Body |
| WTP | – | Water Treatment Plant |

WEIGHTS AND MEASURES

| | |
|-----------------|---------------------------|
| °C | degree celsius |
| km | kilometer |
| LPCD | liters per capita per day |
| mm | milli meter |
| m | meter |
| MLD | million liters per day |
| mm | millimeter |
| nos. | numbers |
| km ² | square kilometer |

NOTE

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

This initial environmental examination report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, management, or staff, and may be preliminary in nature. Your attention is directed to the "terms of use" section on ADB's website.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

CONTENTS

| | Page |
|--|-------------|
| I. INTRODUCTION | 1 |
| A. Background | 1 |
| B. Purpose of Initial Environmental Examination | 2 |
| C. Report Structure | 3 |
| II. DESCRIPTION OF THE PROJECT | 3 |
| A. Present Status of Water Supply and Sewerage | 3 |
| B. Infrastructure Improvements Proposed in Didwana City under RSTDSP | 4 |
| C. Proposed Subproject Components | 7 |
| D. Subproject Benefits | 9 |
| E. Implementation Schedule | 9 |
| III. ANALYSIS OF ALTERNATIVES | 20 |
| IV. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK | 23 |
| A. ADB Policy | 23 |
| B. National and State Laws | 25 |
| V. DESCRIPTION OF THE ENVIRONMENT | 42 |
| A. Physical Resources | 42 |
| B. Ecological Resources | 47 |
| C. Economic Development | 48 |
| D. Socio Cultural Resources | 49 |
| E. Environmental Settings of Proposed Sites | 50 |
| VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES | 58 |
| A. Introduction | 58 |
| B. Location Impacts | 59 |
| C. Design Impacts | 60 |
| D. Pre- Construction Impacts | 68 |
| E. Construction Impacts | 69 |
| F. Operation and Maintenance Impacts | 81 |
| VII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE | 84 |
| A. Overview | 84 |
| B. Public Consultation | 84 |
| C. Information Disclosure | 86 |
| VIII. GRIEVANCE REDRESS MECHANISM | 87 |
| A. Project Specific Grievance Redress Mechanism | 87 |
| XI. ENVIRONMENTAL MANAGEMENT PLAN | 90 |
| A. Environmental Management Plan | 90 |
| B. Institutional Requirements | 130 |
| C. Capacity Building and Development | 141 |
| D. Monitoring and Reporting | 143 |
| E. EMP Implementation Cost | 143 |

APPENDIXES

1. REA Checklist Sewerage Treatment
2. Drinking Water Standards, Ambient Air Quality, Vehicle, Diesel Generator Emissions Standards
3. Ambient Noise Standards and Noise limit for DG set
4. Effluent Discharge Standards for Sewerage Treatment Plant by order of NGT dated 30 April 2019
5. Pages from Rajasthan State Sewerage and Wastewater Policy for reuse of treated effluent and sludge
6. Guidelines for Reuse of Treated Effluent and Sludge from STP for Beneficial Purposes
7. Compliance with Environmental Criteria for Subproject Selection
8. Extract from Construction and Demolition Management Rules, 2016
9. Salient Features of Major Laws Applicable to Contractor
10. Sample Outline Spoil Management Plan
11. Sample Outline Traffic Management Plan
12. Public Consultations Conducted During Project Preparation
13. Minutes of City Level Stakeholder Committee (CLC) Meeting
14. IFC benchmark standards for workers accommodation
15. Guidelines and Emergency Plan for Handling and Storing Chlorine
16. Semi Annual Environmental Monitoring Report Format
17. Sample Environmental Site Inspection Report
18. Sample Grievance Registration Form
19. Officer order for establishing GRM
20. Management Plan for Night works at Project Sites
21. Photographs of Existing and Proposed Sites
22. Environmental Monitoring Plan - Ambient Air, Noise, Water and Soil
23. Guidelines for Safety during Monsoon/Heavy rainfall
24. Audit Report of Existing Sewerage System of Didwana
25. Details of land availability, ownership and status of No Objection Certificate (NOC) for sites
26. Biodiversity Assessment Report for Didwana
27. MOU between Nagar Palika and Farmers regarding Reuse of Treated effluent and disposal

EXECUTIVE SUMMARY

Rajasthan Secondary Towns Development Sector Project (RSTDSP), the fourth phase of investment projects financed by Asian Development Bank (ADB) and implemented by the Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited-Externally Aided Projects (RUDSICO), previously known as Rajasthan Urban Infrastructure Development Project (RUIDP). RSTDSP will support the ongoing efforts of the Government of Rajasthan (GOR) towards improving the water and wastewater services in about 14 towns¹. RSTDSP seeks to improve WSS services in secondary towns with populations between 20,000-115,000 through a sector loan modality. The project is aligned with the following impact(s): access to potable, affordable, reliable, equitable, and environmentally sustainable drinking water supply in all urban areas of Rajasthan improved;² and health status of urban population, especially the poor and under-privileged improved.³ The project will have the following outcome: urban service delivery in secondary towns of Rajasthan improved. There are three outputs.

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

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

Output 3: Institutional and human capacities strengthened for service improvements, gender equality and sustainability. Under the sector project: (i) at least 500 women will gain professional experience through an internship program at RUDSICO, (ii) about 500 staff and 500 elected representatives of project ULBs, including 80% of eligible women, will report increased knowledge on O&M of WSS services, CWIS, financial sustainability and GESI action plan implementation, (iii) about 500 girls will report enhanced knowledge in conducting water audits in schools and households, and (iv) data platforms will be established in all project towns.⁵

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

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

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

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

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

Didwana City sewerage subproject is one of the subprojects proposed under the investment component of Phase IV of RUIDP. Didwana town is divided in 11 Zones and at present sewerage system exists in Zone-1 (40%), Zone-2 (100%), Zone-3 (100%), Zone-4 (100%), Zone-6 (30%), Zone-7 (15%) & Zone-8 (100%) and many zones are still not covered. Due to lack of sewerage system, most of the households in un-covered depend on septic tanks for disposal of sewage. Effluent from septic tanks and sullage is let off into open drains which ultimately collect in low lying areas and natural drains in the outskirts of the town.

Screening and assessment of potential impacts. ADB requires consideration of environmental issues in all aspects of the Bank's operations, and the requirements for Environmental Assessment are described in ADB's SPS (2009). As per the Government of India environmental impact assessment (EIA) Notification, 2006, this subproject does not require EIA study or Environmental Clearance. The potential environmental impacts of the subproject have been assessed using ADB rapid environmental assessment (REA) checklist for Sewerage. The potential negative impacts were identified in relation to preconstruction, construction and operation phases. This Initial Environmental Examination (IEE) addresses the infrastructure components proposed under Didwana sewerage subproject.

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

Didwana sewerage subproject is classified as environmental category B as per the ADB SPS 2009 as no significant impacts are envisaged. Accordingly, this Initial Environmental Examination (IEE) assesses the environmental impacts and provides mitigation and monitoring measures to ensure that there are no significant impacts as a result of the project.

The subproject is formulated to address gaps in sewerage infrastructure in a holistic and integrated manner. One of the main objectives of RSTDSP is to provide safe sewage collection and with the on-going investments in sewage treatment, this will have an important effect on public health and environment. Investments under this subproject include: Sewerage: (i) Construction of 1 Nos of STP (3 MLD) near Mela Maidan (Existing STP Campus) with one treated effluent storage reservoir (TESR) of 300 KL, Treated effluent elevated reservoir (TEER) of 150 KL Capacity (22 m Staging) for reuse of treated effluent (ii) 2 nos. of SPS: SPS-1 at Degana road (1.7MLD) and SPS-2 near RSEB Powerhouse on Ladnu Road (1.30MLD) (iii) laying sewer lines of the length of 61km of new sewers (including 10 km trenchless) (iv) construct 3.70 km of pumping mains (150mm and 200mm diameter of DI material) (v) House service connection-3800 nos. (vi) Electrical and Mechanical works (vii) One nos of consumer relation management centre (CRMC) in the proposed SPS campus Rajasthan State Electricity Board (RSEB) campus (viii) Operation and Maintenance of sewerage system-10 years.(ix) Faecal sludge and septage management (FSSM) to provide low costs sanitation where sewer network is not an immediate requirement for population on outskirts and scattered habitation till laying of sewer line.

Description of the Environment. Subproject components are located in Didwana City in Nagaur and in its immediate surroundings which were converted into urban use for many years ago, and there is no natural habitat left at these sites. The project sites are located in government lands for structures and for pipe laying in existing road right-of-way (ROW). There are no protected areas, wetlands, mangroves, or estuaries in or near the project locations. No wildlife is reported in any project site. Soils are deep, and do not require cutting of rocks for pipe laying. The climate of Didwana City is dry and hot in summers and cold in winters. Rainfall is medium in Didwana City.

Potential Environmental Impacts and Mitigation Measures. Potential impacts were identified in relation to location, design, construction and operation of the improved infrastructure. During the construction phase, impacts mainly arise from the need to dispose of large quantities of waste soil and disturbance of residents and traffic. These are common temporary impacts of construction in urban areas, and there are well developed methods for their mitigation. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. DDR is prepared separately for the Didwana City Subproject and addresses issues resulting mainly from laying of sewer/pipelines in the proposed areas of town.

Environmental Management. An environmental management plan (EMP) is included as part of this IEE, which includes (i) mitigation measures for environmental impacts during implementation; (ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting; (iii) public consultation and information disclosure; and (iv) a grievance redress mechanism. A number of impacts and their significance have already been reduced by amending the designs. The construction phase EMP will be included in civil work bidding and contract documents.

Locations and siting of the proposed infrastructures were considered to further reduce impacts. These include (i) locating facilities on government-owned land to avoid the need for land acquisition and relocation of people; and (ii) laying of pipes in ROW alongside main/access roads, to reduce acquisition of land and impacts on livelihoods specifically in densely populated areas of the town.

Measures such as appropriate scheduling of works (non-monsoon season, low traffic hours, etc.) and minimizing inconvenience by best construction methods will be employed like trenchless pipe laying for sewer for the depth of more than 3.5 m and in areas where traffic is more. Traffic management plan will be prepared by contractor before start of construction works for pipe/sewer-laying works on busy roads. In the operational phase, all facilities and infrastructure will operate with routine maintenance, which should not affect the environment. Facilities will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only.

Mitigation measures have been developed to reduce all negative impacts to acceptable levels. Mitigation will be assured by a program of environmental monitoring to be conducted during construction. The environmental monitoring program will ensure that all measures are implemented and will determine whether the environment is protected as intended. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. Any requirements for corrective action will be reported to the ADB. The details of cost estimate (budgetary provision) for mitigating the anticipated impacts by proposed subproject component is approx. **₹318,91,347/- (Three Crore Eighteen Lakhs Ninety One Thousand three Hundred Forty-seven only)** for effective implementation of the Environment Management Plan.

Implementation Arrangements. The Local Self Government Department (LSGD) of Government of Rajasthan is the Executing Agency (EA) and existing RUIDP is the Implementing Agency (IA). The LSGD is responsible for overall strategic planning, guidance and management of the RUIDP and for ensuring compliance with loan release conditions and loan covenants. A policy support unit will be established in the LSGD to support the government for implementation of the tranche release policy actions under the program loan. RUIDP is responsible for planning, implementation, monitoring and supervision, and coordination of all activities under the RUIDP. The RUIDP will engage consulting firms– (i) Construction Management and Supervision Consultants (CMSC); (ii) Project Management and Capacity Building Consultants (PMCB); and (iii) Community Awareness and Public Participation Consultant (CAPP) to provide support in implementation of Phase-IV project. Project Implementation Units (PIUs), one each of in all project towns, shall be set up directly to assist in implementation. PMU will support PIUs in implementation, management and monitoring of the project. PMU and PIUs will be assisted by CMSC, PMCB and CAPP. PIU will appoint construction contractors to build infrastructure. Once the infrastructure is built and commissioned, the contractors shall operate and maintain the infrastructure for the first 10 years and later the ULBs shall look at alternative arrangements. Project Officer (Environment) at PMU and Safeguard Officer at each of the PIUs are responsible for environment management and monitoring activities and will be supported by Safeguard coordinator from Supervision Consultant town staff/team and Environment Safeguard Specialist of Supervision Consultants. Contractor personnel will also include an Environment, Health and Safety (EHS) supervisor.

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

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

Monitoring and Reporting. The PMU, PIU and consultants will be responsible for monitoring and reporting. During construction, results from internal monitoring by the DBO contractor will be reflected in their monthly EMP implementation reports to the PIU. PIU with the assistance of

CMSC, will monitor the compliance of Contractor, prepare a quarterly environmental monitoring report (QEMR) and submit to PMU. The PMU will oversee the implementation and compliance and will submit Semi-Annual Environmental Monitoring Reports (SEMR) to ADB. ADB will post the environmental monitoring reports on its website. Monitoring reports will also be posted on RUDSICO /PMU websites.

Conclusions and Recommendations. The citizens of the Rajasthan will be the major beneficiaries. The subproject is primarily designed to improve environmental quality and living conditions of Rajasthan Town through provision of sewerage. The benefits arising from this subproject include: (i) better public health particularly reduction in waterborne and infectious diseases; (ii) reduced risk of groundwater contamination; (iii) reduced risk of contamination of treated water supplies; and, reduced dependence on fresh water resource due to reuse of treated wastewater, and (iv) improvement in quality of water due to prevention of disposal of untreated effluent.

The subproject is therefore unlikely to cause significant adverse impacts. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures. Based on the findings of the IEE, there are no significant impacts and the classification of the project as category "B" is confirmed. The subproject is not covered by the GOI EIA Notification (2006).

Recommendations. The following are recommendations applicable to the subproject to ensure no significant impacts:

- (i) Obtain all statutory clearances at the earliest time possible and ensure conditions/provisions are incorporated in the detailed design;
- (ii) Include this IEE in bid and contract documents;
- (iii) Ensure that the project sites are cleared of solid waste and other nuisance materials disposed in designated disposal sites per Solid Waste Management Rules 2000 and its amendment;
- (iv) Ensure that sludge management protocols are compliant with environmental regulations (Solid Waste Management Rules 2000 and its amendment) and solid waste disposal should have a designated site (dumping on vacant lot is not allowed);
- (v) Update the asbestos management plan per site-specific conditions;
- (vi) Update/revise this IEE based on detailed design and/or if there are unanticipated impacts, change in scope, alignment, or location;
- (vii) Conduct safeguards induction to the contractor upon award of contract;
- (viii) Strictly supervise EMP implementation;
- (ix) Ensure contractor appointed qualified EHS officers prior to start of works;
- (x) Documentation and reporting on a regular basis as indicated in the IEE;
- (xi) Continuous consultations with stakeholders;
- (xii) Timely disclosure of information and establishment of grievance redressal mechanism (GRM);
- (xiii) Involvement of contractors, including subcontractors, in first level GRM;
- (xiv) Commitment from PMU, PIUs, project consultants, and contractors to protect the environment and the people from any impact during project implementation.

I. INTRODUCTION

A. Background

1. Rajasthan Secondary Towns Development Sector Project (RSTDSP), the fourth phase of investment projects financed by Asian Development Bank (ADB) and implemented by the Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited (RUDSICO), previously known as Rajasthan Urban Infrastructure Development Project (RUIDP). RSTDSP will support the ongoing efforts of the Government of Rajasthan (GOR) towards improving the water and wastewater services in about 14 towns⁶. RSTDSP seeks to improve WSS services in secondary towns with populations between 20,000-115,000 through a sector loan modality. The project is aligned with the following impact(s): access to potable, affordable, reliable, equitable, and environmentally sustainable drinking water supply in all urban areas of Rajasthan improved;⁷ and health status of urban population, especially the poor and under-privileged improved.⁸ The project will have the following outcome: urban service delivery in secondary towns of Rajasthan improved. There are three outputs:

- (i) **Output 1: Water supply infrastructure in project towns improved with climate-resilient and inclusive features.** By 2027: (i) about 1,350 kilometers of water supply pipelines will be commissioned through a district metered area approach for effective NRW management, (ii) about 100,000 households will be connected to an improved water supply system (including at least 95% BPL households) with 100% functional meters allowing for the introduction of volumetric billing, (iii) 3 new water treatment plants will be commissioned with total capacity of at least 28 million liters per day, and (iv) 2 water treatment plants will be rehabilitated.
- (ii) **Output 2: Sanitation systems in project towns improved with climate-resilient, cost-effective, and inclusive features.**⁹ By 2027: (i) about 1,300 kilometers of sewers will be constructed, (ii) 19 STPs with co-treatment of wastewater and fecal sludge and with a total capacity of about 80 million liters per day will be commissioned and 2 existing STPs will be upgraded to meet current effluent standards, (iii) about 103,000 new household connections (including at least 95% BPL households) to sewer system will be installed, (iv) 1 fecal sludge treatment plant with total 10 kilo liters per day capacity will be commissioned, and (v) agreements for reuse of wastewater mainly for industry or agriculture will be signed in at least 5 project ULBs.
- (iii) **Output 3: Institutional and human capacities strengthened for service improvements, gender equality, and sustainability.** Under the sector project: (i) at least 500 women will gain professional experience through an internship program at RUDSICO; (ii) about 500 staff and 500 elected representatives of project ULBs, including 80% of eligible women, will report increased knowledge on

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

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

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

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

O&M of WSS services, CWIS, financial sustainability, and GESI action plan implementation; (iii) about 500 girls will report enhanced knowledge in conducting water audits in schools and households; and (iv) data platforms will be established in all project towns.¹⁰

2. A series of subprojects will be implemented under the Project, with each subproject providing improvements to water supply or sewerage or both in a project town. Didwana sewerage subproject is one of the subprojects proposed in RSTDSP. At present, there are 11 Zone in sewerage system and sewerage system exists in Zone-1 (40%), Zone-2 (100%), Zone-3 (100%), Zone-4 (100%), Zone-6 (30%), Zone-7 (15%) & Zone-8 (100%) and many zones are still not covered.¹¹ After execution of proposed project, whole town within the municipal limit will be benefitted by sewerage system. Asian Development Bank (ADB) requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for environmental assessment are described in ADB's Safeguards Policy Statement (2009). Accordingly, this Initial Environmental Examination (IEE) has been conducted to assess the environmental impacts and provide mitigation and monitoring measures to ensure that there are no significant impacts as a result of the subproject.

B. Purpose of Initial Environmental Examination

3. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for environmental assessment are described in ADB's Safeguard Policy Statement (SPS), 2009. The potential environmental impacts of the subproject have been assessed using ADB Rapid Environmental Assessment (REA) Checklist for sewerage treatment (Appendix 1). Then potential negative impacts were identified in relation to pre-construction, construction and operation of the improved infrastructure, and results of the assessment show that the subproject is unlikely to cause significant adverse impacts. Thus, this initial environmental examination (IEE) has been prepared in accordance with ADB SPS requirements for environment category B projects.

4. The Didwana sewerage subproject is proposed for implementation under the design-build-operate (DBO) modality, where in which the design is carried out by the selected bidder based on the feasibility/preliminary project report prepared prior to bidding. Thus, this IEE is based on the preliminary project report prepared by RUDSICO (PMU). The IEE was based mainly on field reconnaissance surveys and secondary sources of information. No field monitoring (environmental) survey was conducted, however, the environmental monitoring program developed as part of the environmental management plan (EMP) will require the contractors to establish the baseline environmental conditions prior to commencement of civil works. The results will be reported as part of the environmental monitoring report and will be the basis to ensure no degradation will happen during subproject implementation. Stakeholder consultation was an integral part of the IEE.

5. This IEE will be updated and finalized during detailed design stage to reflect change in scope of works, change in location of component and change in cost due to addition or subtraction of components which can change the environmental impacts. The revised IEE shall supersede

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

¹¹ Existing sewerage system of Didwana town was sanctioned in the year 2012 and 5.0 MLD STP is already commissioned. In the existing project whole town was divided into eleven zones based on the natural drainage pattern of the topography out of this 11 Zones, Zone-2, Zone-3, Zone-4 & Zone-8 are 100% covered and remaining uncovered/ partially covered areas are taken up this project. – Source DPR.

the earlier version of IEE and shall be contractually applicable to the contractor after approval from PMU and ADB.

6. The implementation of the subprojects will be governed by Government of India and Rajasthan and other applicable environmental acts, rules, regulations, and standards. Environmental safeguards will be followed in accordance with the ADB SPS, 2009. During the design, construction, and operation of the project the borrower/client will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards.

C. Report Structure

7. This Report contains the following 11 sections including the executive summary at the beginning of the report:

- (i) Executive Summary;
- (ii) Introduction;
- (iii) Description of the Project;
- (iv) Analysis of alternatives ;
- (v) Policy, Legal and Administrative Framework ;
- (vi) Description of the Environment;
- (vii) Anticipated Environmental Impacts and Mitigation Measures;
- (viii) Public consultation and information disclosure;
- (ix) Grievance Redress Mechanism;
- (x) Environmental management plan; and
- (xi) Conclusions and Recommendations

II. DESCRIPTION OF THE PROJECT

8. Didwana is a town and a municipality in Nagaur district of Rajasthan state in India. Didwana is located at 27.4°N & 74.57°E and at average elevation 336 m (1102 ft) above MSL. The municipal area of the city is about 18.16 Sq. Km. It is a Tehsil head quarter of Nagaur district. It is located of 90 Km from district head quarter Nagaur, 192 Km from State capital Jaipur and 150 Km from Ajmer by road. Nearest railway station is Didwana which is within the city. Nearest Airport is Sanganer (Jaipur) which is about 195 km away from Didwana. Didwana City is one of the 40 project towns selected for implementation of the ADB funded RUIDP Phase-IV projects. Under the investment component of the project, it is proposed to improve the sewerage system in Didwana City and cover whole town within municipal limit by Sewerage System.

A. Present Status of Water Supply and Sewerage

9. **Water Supply.** At present, Didwana town meets the water demand from groundwater sources. Groundwater is extracted from 29 tube wells. Total water extracted from groundwater source is 3.60 MLD. For future, surface water source from Nagaur Lift Water Supply Project (NLWP) is proposed. 13.01 MLD surface water shall be made available from major water supply project viz., NLWP for Didwana Town, which is under execution and targeted to be commissioned by July 2020. Augmentation of water supply for 135 LPCD is being done by PHED. Presently water supply is intermittent days (2-3 days intervals) for one hour only. Water supply is not regulated in all the areas; in some areas of town water is supplied in 4-5 days.

10. **Sewerage.** Partial sewerage system exists in Didwana and out of 11 zones, many zones are either partially covered or are uncovered. Project was undertaken in UIDSSMT project under Govt. of India (80%), Govt. of Rajasthan (10%) and ULB (10%) funding. Existing sewerage system of Didwana town, sanctioned in the year 2012, covered Zone-1 - 40%, Zone-2 -100%, Zone-3-100%, Zone-4-100%, Zone-6-30%, Zone-7-15% & Zone-8 -100% and remaining zones were left uncovered. At present, this project which includes a 5.0 MLD STP based on SBR technology was commissioned and located at Mela Maidan in Didwana town.

11. Length of sewer line laid under existing sewerage project is 87.67 km having with dia. varying from 200 mm to 900 mm. 5.0 MLD STP based on SBR process was also constructed and at present in running condition. 1 no 4.59 MLD Sewage pumping station was also constructed under the same project at Khatiyon Ka Mohalla and pumping main had also been laid from SPS to manhole at Node no 422 (near Ajmeri Gate). Environment audit report of existing STP is given in Appendix-19.

12. In the absence of safe disposal system of sewage in some part of town, as mentioned above, the people of Didwana City are facing unhealthy and unhygienic living conditions. Therefore, the Municipality, other local authorities and public representatives are also demanding facilities of improved sewerage system covering whole town on priority basis.

B. Infrastructure Improvements Proposed in Didwana City under RSTDSP

13. **Sewerage Works.** Under RSTDSP, it is proposed to develop a sewerage system in Didwana City to collect, treat, and dispose/reuse the domestic wastewater safely. This is being provided in a combination of underground sewerage system including treatment facility, and Fecal Sludge and Septage Management (FSSM) system in areas that are not fully developed at present and not feasible to provide sewer network. About 80% of the total base year population (2021) is proposed to be covered by sewerage system, while the rest 20% will be covered by FSSM. The objectives of the proposed sewerage works are:

- (i) Construction of sewerage network, including house sewer connection and collection of wastewaters from point of generation;
- (ii) Construction of energy efficient and mechanized Sewage Treatment Plant and electromechanical machinery;
- (iii) Septage management and decentralized wastewater treatment systems in suitable areas;
- (iv) Provision for reuse of treated effluent etc.;
- (v) To ensure 100% house service connections for wastewater collection; and
- (vi) To ensure sustainability of the project by implementing a comprehensive asset management plan focusing on an integrated approach to operation and maintenance to minimize lifecycle costs.

14. The sewer system will be designed as a separate sewer system that carries only the domestic/municipal wastewater. The open drain system that exists in the town will cater to storm runoff. No industrial wastewater will be allowed into the sewers. This subproject complies with the environmental subproject selection criteria (Appendix-7) agreed between the government and the ADB.

15. Excavation for the pipe/sewer laying works will be undertaken through open trenching, which will be maximum width of 1m only on one side of the road ROW with maximum length, an average 70 m for sewers. Excavation, laying of pipes and backfilling will be completed within the day. Subsequent to completion of works, road reinstatement will be undertaken by the contractor

as part of the civil works. The same shall be mentioned in the bid document to make it binding on the contractor.

16. **Sewage treatment.** It is proposed to develop Sequential Batch Reactor (SBR) based sewage treatment facility that will treat the incoming sewage to stringent discharge standards specified in this IEE and included in the bid documents. SBR is a cyclic activated sludge treatment process and provides highest treatment efficiency possible in a single step biological process. One treatment plant (3.0 MLD) is proposed to meet the demand.

17. Proposal for SBR type of sewage treatment plant. Sewage shall be fed into the Cyclic Activated Sludge Process/SBR Process Basins for biological treatment to remove BOD, COD and Suspended Solids. SBR is a Cyclic Activated Sludge Treatment process. It provides highest treatment efficiency possible in a single step biological process. The SBR System is operated in a batch reactor mode. This eliminates all the inefficiencies of the continuous processes. A batch reactor is a perfect reactor, which ensures 100% treatment. Two modules are provided to ensure continuous treatment. The complete process takes place in a single reactor, within which all biological treatment steps take place sequentially. No additional settling unit, Secondary Clarifier is required.

18. **Reuse of treated effluent.** The Rajasthan State Sewerage and Wastewater Policy, 2016, promotes the reuse of treated sewage for non-potable applications, and also to make sewerage projects environmentally sustainable. This policy:

- (i) aims to ensure improved health status of urban population, specially the poor and under privileged, through the provision of sustainable sanitation services and protection of environment;
- (ii) promotes the reuse and provides guidance on the same;
- (iii) prioritizes reuse in irrigation (agriculture, forestry, and landscaping), followed by fish farming, industry, and non-potable domestic reuse;
- (iv) requires monitoring of treated wastewater quality, soil quality etc.;
- (v) prohibits artificial recharge of aquifers using treated wastewater, and promotes construction of storage tanks to store treated wastewater to facilitate reuse;
- (vi) prescribes that the detailed project report (DPR) of a sewerage project should clearly define the best reuse option specific to the town and prepare a Reuse Action Plan part of the DPR duly following the water quality norms and legal implications; and
- (vii) suggests use of sludge produced from the treatment as fertilizer and soil conditioner after processing.

19. To further the implementation of the Policy, to promote the reuse and provide guidance to the stakeholders, the Local Self Government Department (LSGD) is currently in the process of publishing "Guidelines for Reuse of Treated Wastewater in Rajasthan 2019". These guidelines:

- (i) promote the use the treated wastewater and envisages to maximize the collection and treatment of sewage generated and reuse of treated wastewater on a sustainable basis, thereby reducing dependency on freshwater resources; and
- (ii) promotes the use of treated wastewater as an economic resource.

20. It is proposed to reuse the treated effluent for use of agriculture, horticulture, development of urban forestry etc. and remaining treated effluent is proposed to be discharged in to nearby vacant area having depression, where existing STP is discharging it's treated effluent, from where it is being used for construction works of roads and other purposes. In order to safeguard the interest of users of treated effluent, it is proposed to apply technology/process to achieve very low

BOD (BOD₁₀) and suspended solids in the treated effluent. The treated effluent reuse plan shall be developed and implemented by the Contractor in consultation with the Municipality authorities who shall be guided by the RUDSICO and the PMDSC experts, as well. Treated water will be used by Farmers of nearby villages of Didwana. Memorandum of agreement with treated water users are in Appendix-27.

21. **Discharge of treated wastewater.** The excess / surplus treated wastewater that is not reused will be discharged into nearby land, water channels/drains, and necessary facilities like pipelines and pumping requirements, will be developed. Didwana City is in Nagaur district, which is located in western Rajasthan, part of Thar desert. At present, wastewater from the houses, and run off during the rains, accumulates in the low-lying areas in the town. There are drainage pumping stations set up by municipality in the low-lying areas in the town, from where accumulated wastewater/water is pumped to outside the town, and discharged on land, which again accumulates in low lying areas. Due to sandy soil, and high temperature, large proportion of accumulated water is lost due to evaporation and infiltration. Treated water are designed to discharge in vacant land near the STP of under possession of Nagar Palika, Didwana. But at present treated water will be disposed at vacant land available by private owners as per agreement of nearby villages. Memorandum of agreement for the owners of the land are in Appendix- 27.

22. **Sludge treatment and disposal.** A Sludge Sump shall be provided to collect thickened sludge from SBR basins. Supernatant from the sump will be returned to inlet/equalization tank for treatment. Sludge from sump will be pumped to sludge thickener, and the thickened sludge will be pumped to mechanical sludge dewatering system (such as centrifuge). Dewatered sludge cake will further air dried in a sludge storage shed for 15 days and disposed in an identified site. Sewage sludge generated from the SBR process has undergone sufficient treatment for stabilization and pathogen reduction. Additionally, the industrial effluents do not get into the wastewater collection system thereby avoiding any toxic constituents being part of the sludge generated from the wastewater treatment process. Hence, the sludge generated is of high quality that can be applied on land. Considering that the sludge from the SBR process is composed of both inorganic and organic materials, large concentration of some plant nutrients and much smaller concentrations of numerous trace elements and organic chemicals, the sludge can be put to good use when applied on land. Under the project, the sludge reuse plan shall be developed and implemented by the Contractor in consultation with the Municipality authorities who shall be guided by the RUDSICO and the PMCBC experts, as well.

23. **Operation and maintenance (O&M) of Sewerage system.** The DBO contractor will operate and maintain the system for a period of 10 years after completion of construction and commissioning the new system. This will include the following:

- (i) Sewage pumping system to pump sewage to STP including maintenance of entire system and maintaining the infrastructure (power charges to be paid by the Employer);
- (ii) Sewage treatment plant (STP) including maintenance of entire system and maintaining the infrastructure (power charges to be paid by the Employer);
- (iii) Managing the sewerage network for collection of sewage including maintenance of entire system from property chambers up to disposal outfall of Sewage to STP
- (iv) Sampling treated effluent to ensure that it meets the guaranteed treatment parameters;
- (v) Provide house connections for collection of sewage from house properties on approval or sanction by Employer;
- (vi) Contractor will provide continuous on-the-job trainings that will start from the day the contractor gets mobilized, and other capacity building programs by the contractor as

- important regular activities for staff of the Employer, PHED and Nagar Palika Didwana;
and
(vii) Maintaining environmental norms at entire system components.

24. **Fecal Sludge and Septage Management (FSSM).** It is proposed to provide FSSM system in areas where the population density is low (less than 100 persons per hectare) and will not generate sewage in adequate quantity to convey by sewer network. FSSM will provide low cost sanitation in areas where sewer network is not an immediate requirement, will make septage collection, treatment and effluent management environment- friendly. There are 30 municipal wards and wards 1, 2, 13, 27 and 30 are having this low density and unfavorable topography. Under the FSSM, fecal sludge / septage will be collected from the household level septic tanks using truck mounted mobile desludging equipment and transported to Sewage Treatment Plant (STP) for treatment. STP will have necessary provisions to receive and treat the septage along with the wastewater received via sewer network. STP will be designed accordingly by the successful bidder during the detailed design phase to comply with the treated effluent discharge standards specified in the bidding documents.

25. **Operation and maintenance (O&M) of FSSM.** The DBO contractor will operate and maintain the system for a period of 10 years. This will include the following:

- (i) Desludging the septic tanks/pits from the individual houses using mobile truck mounted desludging equipment;
- (ii) Transportation of the vehicle to STP and dispose-off septage to Inlet chamber/screen chamber of STP; and
- (iii) Cleaning of the tank and proper garaging of the vehicle at designated place.

C. Proposed Subproject Components

26. Proposed Subproject components complies with the environmental subproject selection criteria agreed between the Government and the ADB (Appendix 7). Table 1 shows the nature and size of the various components of the Sewerage subprojects.

Table 1: Didwana Subproject Components

| Infrastructure | Function | Description | Location |
|---|--|--|--|
| Sewerage | | | |
| Sewage collection network including house connections | Collect wastewater from houses and convey by a combination of gravity and pressure pumping to pumping station and ultimately to the STPs | HDPE DWC SN8 -50 km, RCC pipes NP4 -1.0 km, Trenchless Method adopting with HDPE PE-100 / PN-6 - 10 Km Railway crossing – NIL NH Crossing – NIL. Construction of Manholes; House service connection- 3800 Nos. | Sewers will be laid underground in the roads and internal streets in the town. Sewers will be located in the centre of the road. The existing/proposed water pipes are located on side of the roads, and therefore sewers will be laid in the centre without distributing the water pipes. |
| Sewage Treatment Plant (STP) | Treatment of collected wastewater to meet stipulated discharge standards | <i>New – 1 STP</i> • 3.0MLD SBR | Near Mela Maidan. Will be constructed on the available land which is under the possession of Nagar Palika. |

| Infrastructure | Function | Description | Location |
|---|---|--|--|
| Sewage Pumping Station (SPS) | Sewer pumping stations are used to move wastewater to higher elevations in order to allow transport by gravity flow until the sewage reaches treatment plant. | <i>New – 2 SPS</i> <ul style="list-style-type: none"> 1.7MLD Degana Road 1.3MLD ner RSEB powerhouse on Ladnun Road | for SPS is available in RSEB sub-station campus, which shall be transferred/allocated to Nagar Palika for construction of SPS and land transfer is under process. Another land proposed for SPS is at Degana Road near Salt Lake, both the lands are available with Nagar Palika and shall be made available for proposed SPSs works (letter from Nagar Palika is given and attached in Appendix-25) Nagar Palika will make encumbrance free land available for both SPSs. |
| Treated wastewater storage tanks | Store the treated wastewater for reuse, and also provide adequate pressure / elevation for supply | <i>New</i> <ul style="list-style-type: none"> one treated effluent storage reservoir (TESR) of 300KL Treated effluent elevated reservoir (TEER) of 150KL Capacity (22mtr Staging) for reuse of treated effluent. | Co-located at the STP location - Near Mela Maidan. Will be constructed on the available land which is under the possession of Nagar Palika. |
| Outflow sewer | Disposal of treated effluent – surplus/excess treated effluent that is not put to reuse will be discharged through outflow sewer | Treated water are designed to discharge in vacant land near the STP of under possession of Nagar Palika, Didwana. But at present treated water will be disposed at vacant land available by private owners as per agreement of nearby villages | Details of location are given in Figure 8. |
| FSSM | | | |
| Truck mounted mobile desludging equipment | Desludging of septage from household pits/ septic tanks, transportation and discharge to STP | Mobile tankers with suction and discharge arrangements – number of tankers to be procured will be estimated during the detailed design | Mobile equipment. FSSM has been proposed for Wards which are having low population density, unfavorable topography and safe disposal of waste water generation from these wards is also a major problem. |

27. Locations of STP and SPSs in google map is shown in Figure 1 to Figure 3 and sensitive receptor map of STP in Figure 7, locations of all project locations are shown in SOI Toposheet in Figure- 4, layout of proposed STP with SBR technology in Figure 5, and proposed Sewer Networks are presented in Figure 6, 8 & 9. Photographs of proposed subproject locations are given in Appendix-15.

28. Coordinates of proposed components are given below.

Table 2: Coordinates of Subproject Components

| Components | Latitude | Longitude |
|---|-----------------|------------------|
| STP (3.0 MLD) Near Mela Maidan | 27°23'6.42"N | 74°33'4.27"E |
| SPS-1 (1.7 MLD) near Degana Road | 27°22'39.67"N | 74°33'29.82"E |
| SPS-2 (1.30 MLD) near RSEB Powerhouse on Ladnu Road | 27°24'59.07"N | 74°33'21.47"E |
| Outfall sewer / discharge point | 27°23'04.5456"N | 74°33'03.3120"E |

D. Subproject Benefits

29. The subproject is primarily designed to improve environmental quality and living conditions of Didwana City through provision of sewerage. The benefits arising from this subproject include: (i) better public health particularly reduction in waterborne and infectious diseases; (ii) reduced risk of groundwater contamination; (iii) reduced risk of contamination of treated water supplies; and, (iv) improvement in quality of water bodies due to disposal of treated effluent meeting disposal standards.

E. Implementation Schedule

30. The detailed design of this subproject will be completed by December 2018. After the approval, bid has prepared and invited on March 2019. The contract will be awarded in June 2020. Construction will take about 36 months after the award of works. Dates of works awards will be finalized by RUDSICO-EAP in due course of time.

Figure 1: Location of Existing and Proposed STP Land near Mela Maidan in Google Map



Figure 2: Location of Proposed SPS-1 near Degana Road in Google Map



Figure 3: Location of Proposed SPS-2 at RSEB powerhouse in Google Map

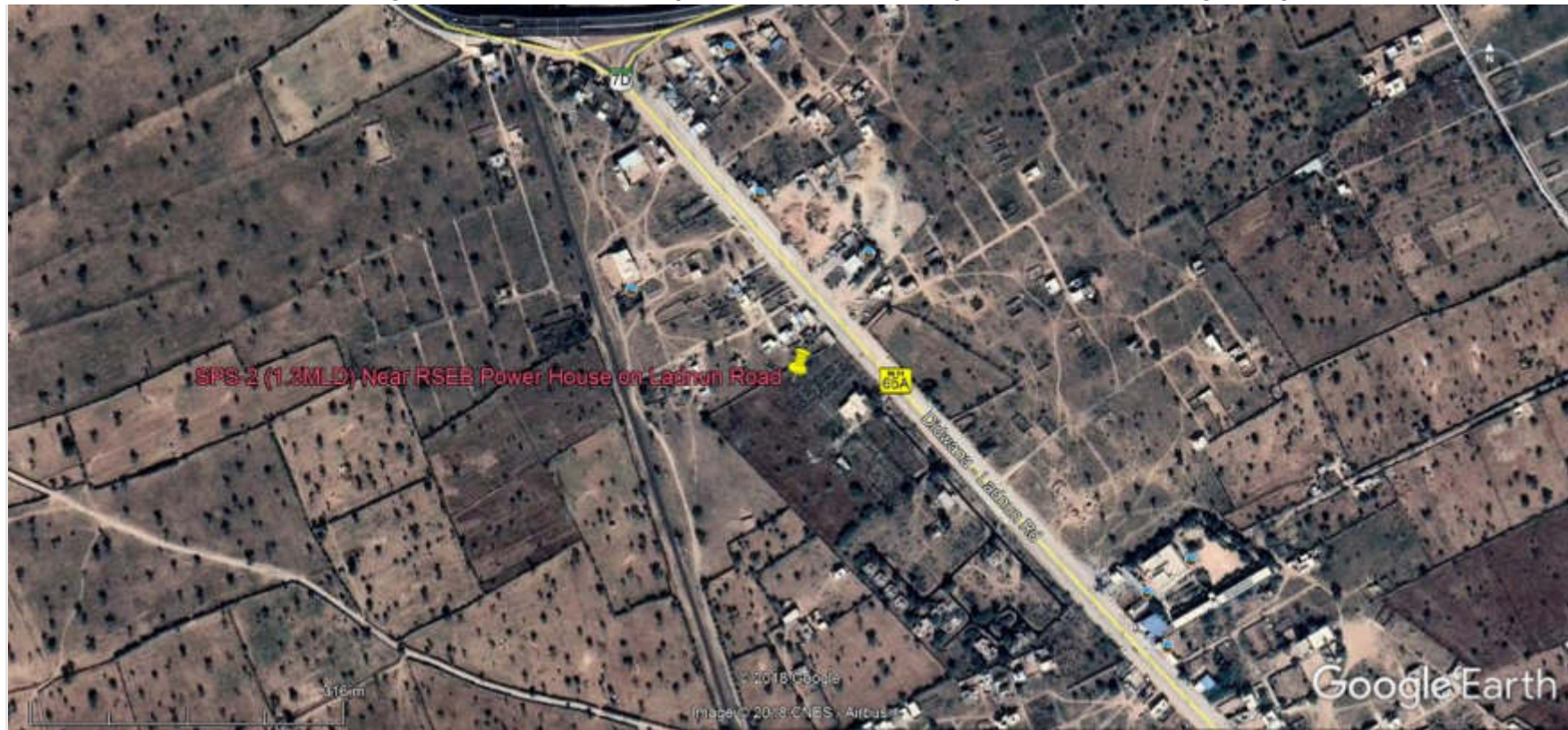


Figure 4: Location of Proposed STP and SPS on Toposheet

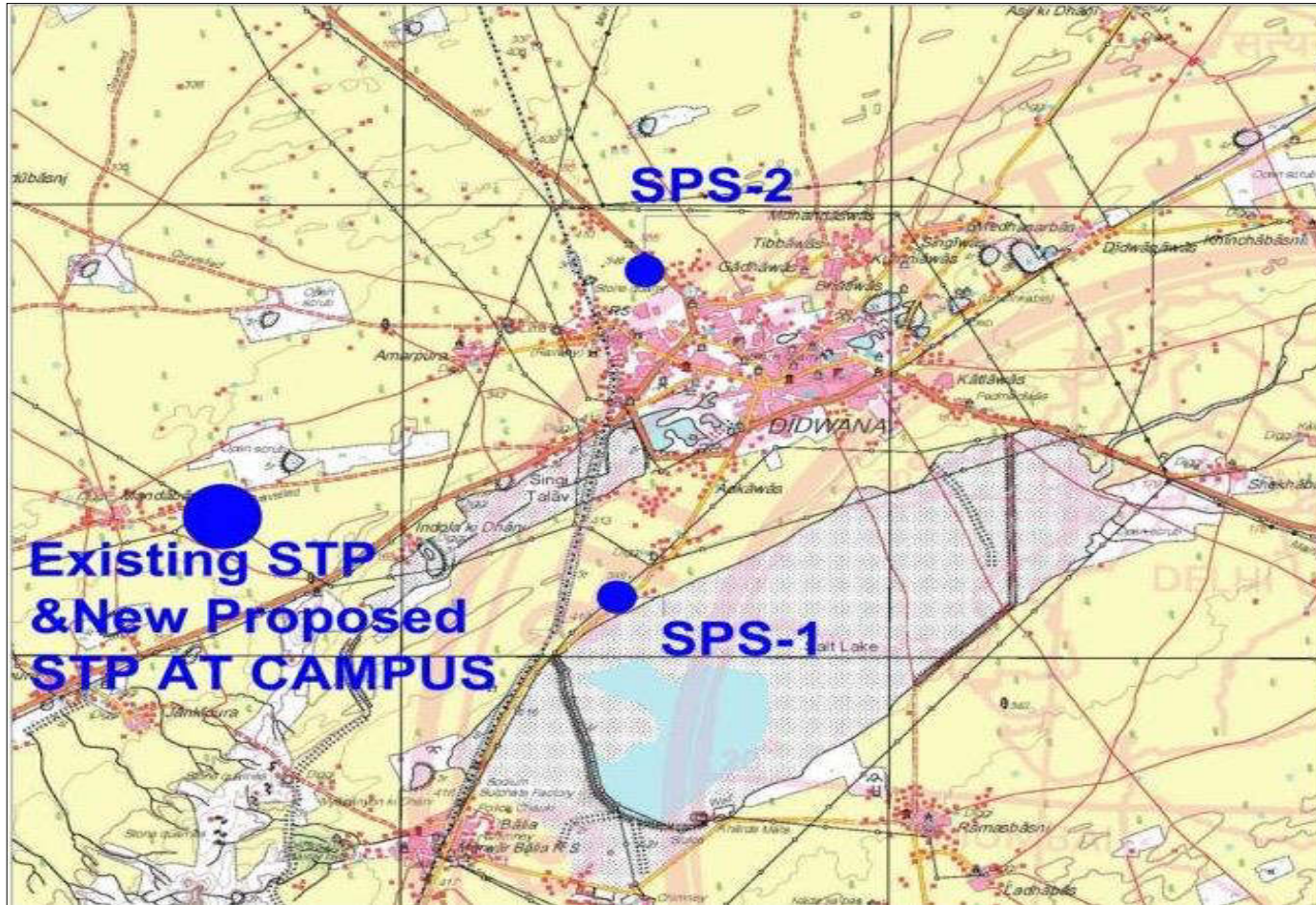


Figure 5: Layout of Proposed STP with SBR Technology in Didwana

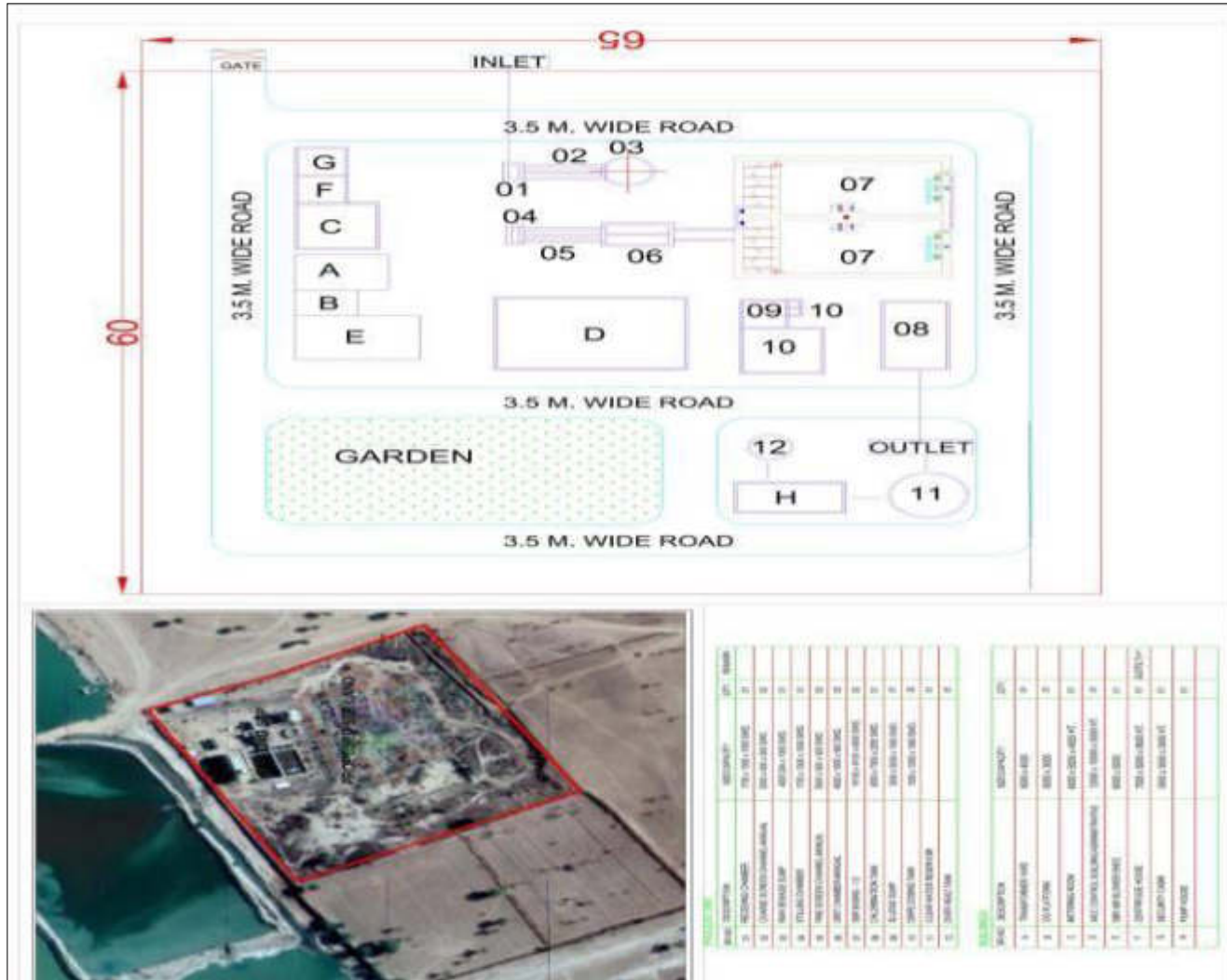


Figure 6: Proposed Sewer Networks and Zones in Didwana

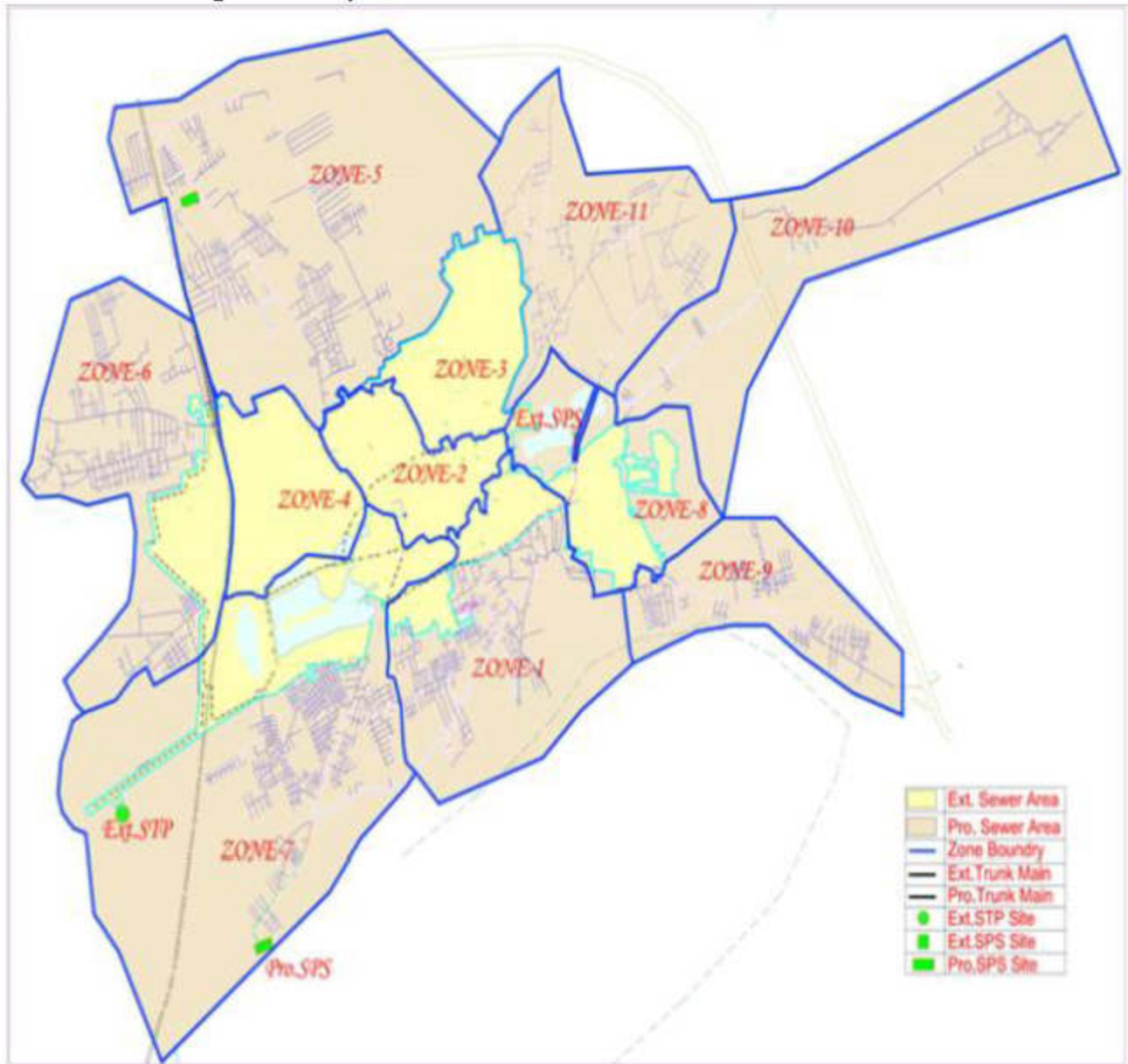


Figure 7: STP location and distance of Sensitive receptors on Google Earth



Figure 8: STP disposal location on Sewer Network Map in Didwana

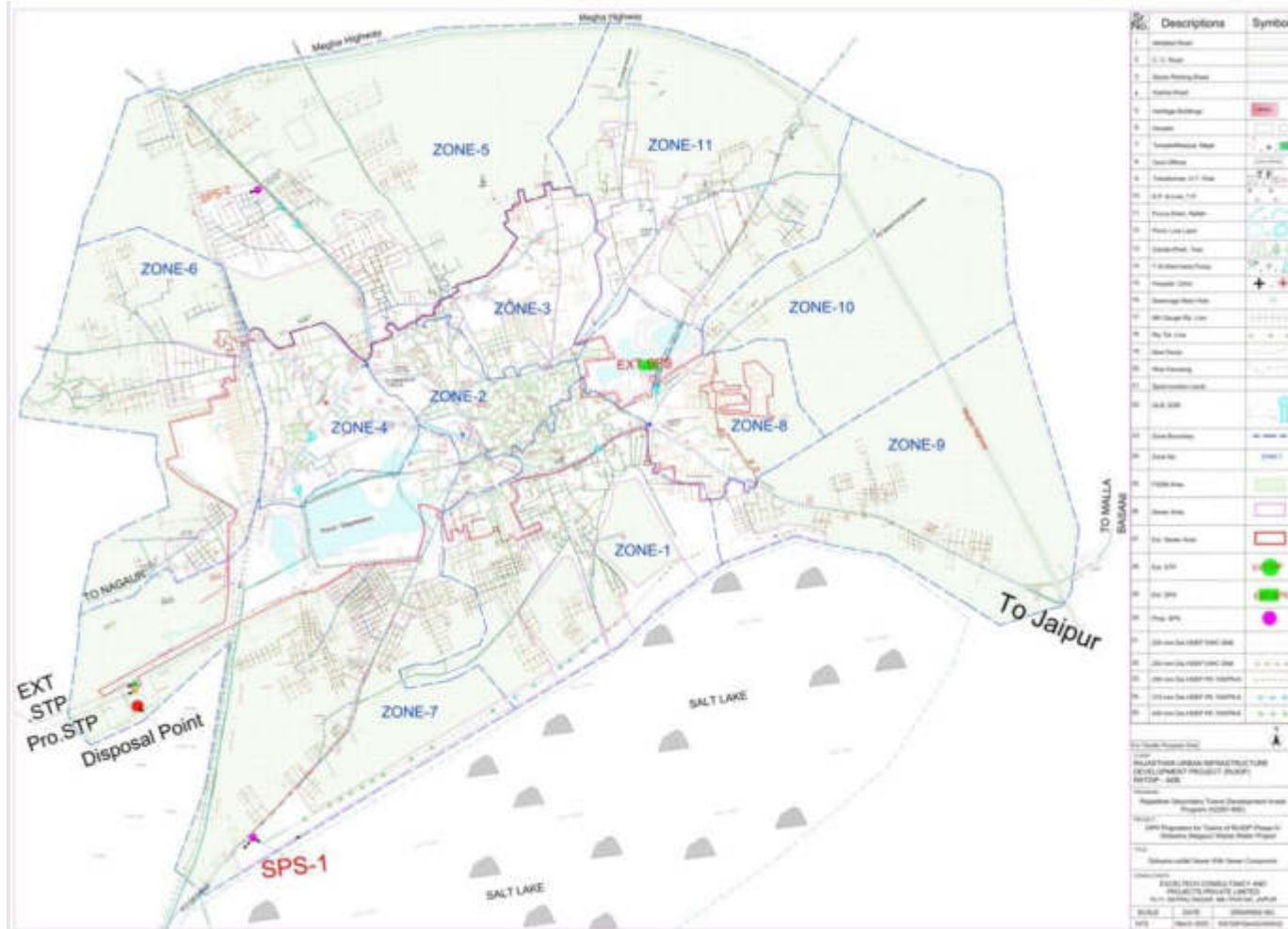


Figure 9: Layout of Sewer Network showing Trenchless Trunk Line, FSSM area, STP and SPSs

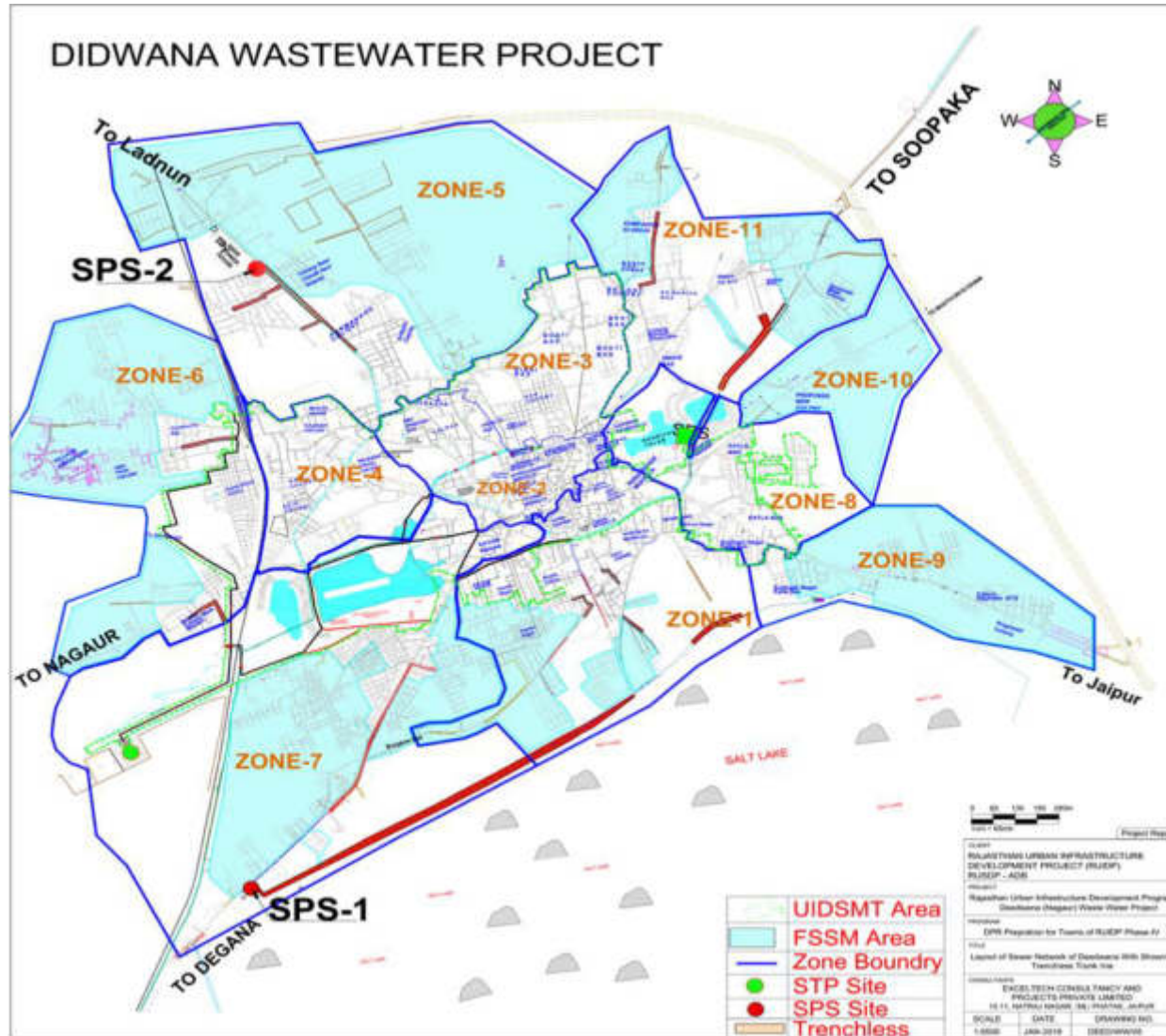
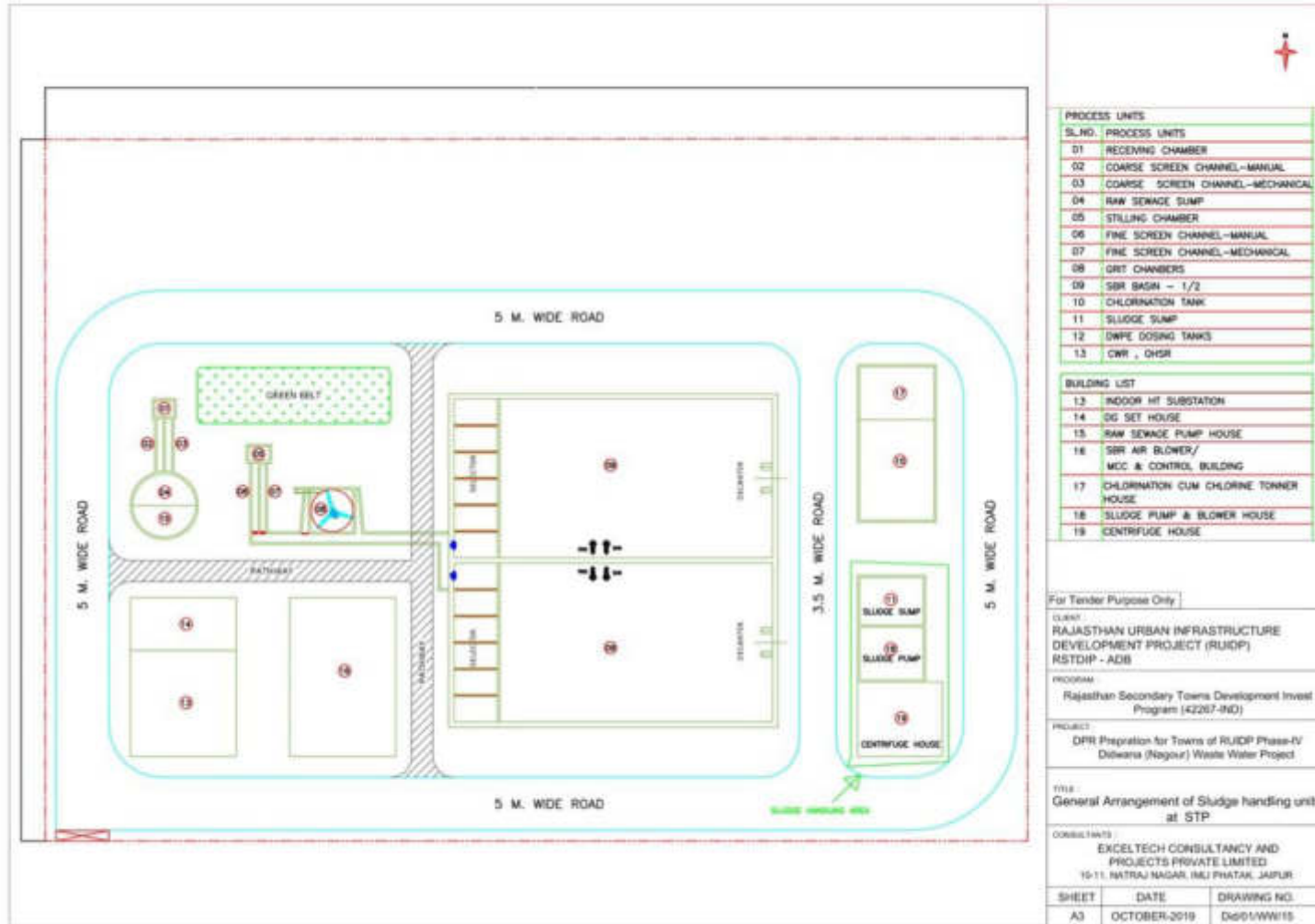


Figure 10: Layout of STP showing Sludge Handling Area



III. ANALYSIS OF ALTERNATIVES

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

32. The proposed sewerage subproject component in Didwana town include sewage collection network, transmission, treatment and treated wastewater reuse and disposal. Descriptions of various alternatives considered for critical components such as sewage treatment, treated wastewater disposal etc., are presented in the following Table 3.

Table 3: Analysis of Alternatives

| 1 | Project Need- No Project Alternative | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------|--|---|---|---|------|-------------------------------|-------------------|---|---------------------------------------|-----------------------|---------------|---------------|-------------------------------------|-----------------|-----|---------|---------|---------|---------|-----|----------|----------|----------|----------|------------------|---------|---------|----------|---------|----------------|--------------|--------------|--------------|---------|-------------------|--------------|--------------|--------------|--------|---------------------|-------|-------|---|--------|----------------|---|---|---|---|
| Type of Alternative | Sewage treatment technology | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Description of alternatives | <p>Various secondary treatment technologies have been considered in the sewage treatment process after the primary treatment consisting of screening and grit removal. Secondary treatment is the critical process that removes the organic putrescible organic matters and brings down the BOD of the effluent to meet the discharge standards. Following process technologies considered: Waste Stabilization Ponds; Aerated Lagoons; Up Flow Anaerobic Sludge Blanket (UASBR) + FAL; Conventional Activated Sludge Process; and Cyclic Activated Sludge Process/Sequential Batch Reactor (SBR)</p> <p>A comparison of various treatment technologies is presented below in terms of merits of the process over key parameters like quality characteristics and land requirement:</p> <table border="1"> <thead> <tr> <th>Item</th> <th>Conventional Activated Sludge</th> <th>Extended Aeration</th> <th>UASB followed by Facultative Aerobic Lagoon</th> <th>Cyclic Activated Sludge Process / SBR</th> </tr> </thead> <tbody> <tr> <td>Performance (Typical)</td> <td>Mostly stable</td> <td>Mostly stable</td> <td>Varying with temperature variations</td> <td>Complete Stable</td> </tr> <tr> <td>BOD</td> <td><30 ppm</td> <td><30 ppm</td> <td><30 ppm</td> <td><10 ppm</td> </tr> <tr> <td>COD</td> <td><250 ppm</td> <td><250 ppm</td> <td><250 ppm</td> <td><100 ppm</td> </tr> <tr> <td>Suspended solids</td> <td><50 ppm</td> <td><50 ppm</td> <td><100 ppm</td> <td><10 ppm</td> </tr> <tr> <td>Total Nitrogen</td> <td>No Treatment</td> <td>No Treatment</td> <td>No Treatment</td> <td><10 ppm</td> </tr> <tr> <td>Total Phosphorous</td> <td>No Treatment</td> <td>No Treatment</td> <td>No Treatment</td> <td><2 ppm</td> </tr> <tr> <td>Coliform removal, %</td> <td>60-90</td> <td>60-90</td> <td>-</td> <td>99.99%</td> </tr> <tr> <td>Re-use Options</td> <td>can only be used for low end usages like flushing and gardening tertiary treatment required for high and usages like construction</td> <td>can only be used for low end usages like flushing and gardening tertiary treatment required for high and usages like construction</td> <td>can only be used for low end usages like flushing and gardening tertiary treatment required for high and usages like construction water, industrial</td> <td>Can be used for low end usages as well as for high end usages without any tertiary treatment.</td> </tr> </tbody> </table> | | | | Item | Conventional Activated Sludge | Extended Aeration | UASB followed by Facultative Aerobic Lagoon | Cyclic Activated Sludge Process / SBR | Performance (Typical) | Mostly stable | Mostly stable | Varying with temperature variations | Complete Stable | BOD | <30 ppm | <30 ppm | <30 ppm | <10 ppm | COD | <250 ppm | <250 ppm | <250 ppm | <100 ppm | Suspended solids | <50 ppm | <50 ppm | <100 ppm | <10 ppm | Total Nitrogen | No Treatment | No Treatment | No Treatment | <10 ppm | Total Phosphorous | No Treatment | No Treatment | No Treatment | <2 ppm | Coliform removal, % | 60-90 | 60-90 | - | 99.99% | Re-use Options | can only be used for low end usages like flushing and gardening tertiary treatment required for high and usages like construction | can only be used for low end usages like flushing and gardening tertiary treatment required for high and usages like construction | can only be used for low end usages like flushing and gardening tertiary treatment required for high and usages like construction water, industrial | Can be used for low end usages as well as for high end usages without any tertiary treatment. |
| Item | Conventional Activated Sludge | Extended Aeration | UASB followed by Facultative Aerobic Lagoon | Cyclic Activated Sludge Process / SBR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Performance (Typical) | Mostly stable | Mostly stable | Varying with temperature variations | Complete Stable | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BOD | <30 ppm | <30 ppm | <30 ppm | <10 ppm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| COD | <250 ppm | <250 ppm | <250 ppm | <100 ppm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Suspended solids | <50 ppm | <50 ppm | <100 ppm | <10 ppm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Nitrogen | No Treatment | No Treatment | No Treatment | <10 ppm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Phosphorous | No Treatment | No Treatment | No Treatment | <2 ppm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Coliform removal, % | 60-90 | 60-90 | - | 99.99% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Re-use Options | can only be used for low end usages like flushing and gardening tertiary treatment required for high and usages like construction | can only be used for low end usages like flushing and gardening tertiary treatment required for high and usages like construction | can only be used for low end usages like flushing and gardening tertiary treatment required for high and usages like construction water, industrial | Can be used for low end usages as well as for high end usages without any tertiary treatment. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | | |
|--|--|--|--|--|--|
| | | water, industrial usages, cooling water etc. | water, industrial usages, cooling water etc. | usages, cooling water etc. | |
| Land requirement (m ² /person) | 0.1-0.18 | 0.08-0.15 | 0.2-0.25 | 0.035-0.07 | |
| Process Power requirement (kWh/person/year) | 12-15 | 16-19 | 4-5 | 6-8 | |
| Sludge handling | Sludge needs digestion prior to drying on beds or use mech. devices | Digested sludge, dry on beds or use mech. devices | Digested sludge, dry on beds or use mech. Devices | Digested sludge, dry on beds or use mech. devices | |
| Equipment requirement (excluding screening and grit removal) | Aerators, recycle pumps, scrapers, thickeners, digester, dryers, gas equipment | Aerators, recycle pumps, sludge scrapers, (for large settlers) | Nil (gas collection optional) | Diffuse aeration system, recycle sludge and waste sludge pumps, decanters | |
| Operational characteristics | Skilled Operation required | Simpler than activated sludge | Simpler than activated sludge | Complete automatic operation by computer and PLC. Negligible manpower Intervention required | |
| Special features | Considerable equipment and skilled operation required especially if gas collection and usage involved. Method considered mainly for large sized plants | BOD removal high, effluent nitrified relatively high power requirement, favoured for small and medium sized plants | Minimal to negligible power requirement of the system makes it an economical alternative if gas revenue is neglected land requirement is also relatively small but depends on type of past treatment adopted | Highest treatment efficiency with crystal quality power requirement is 50% of conventional technologies land requirement is less than 50% of conventional technologies | |

Selected Alternatives

Selected processes: Sequential batch reactor (SBR)
 The genesis of selecting a suitable treatment process is primarily correlated with degree of treatment aimed to be achieved. In India, the latest court Order of April 2019 (NGT Order dated 30-04-2019) mandates all the civic authorities to adopt the treated sewage characteristics applicable are as shown in table below:

| Parameter | Standards |
|-------------------------------|------------------------------------|
| BOD, mg/l | 10 |
| TSS, mg/l | 20 |
| COD, mg/l | 50 |
| Nitrogen-Total, mg/l | 10 |
| Phosphorus- Total, , mg/l | 1 |
| Faecal Coliform (MPN/ 100 ml) | 100 Desirable 230 (Permissible) |

SBR provides highest treatment efficiency possible in a single step biological process.

| | |
|-----------------------------|--|
| | The system is operated in a batch reactor mode this eliminates all the inefficiencies of the continuous processes. A batch reactor is a perfect reactor, which ensures 100% treatment. Separate modules are provided to ensure continuous treatment. The complete process takes place in a single reactor, within which all biological treatment steps take place sequence. The complete biological operation is divided into cycles. Each cycle is of 3 – 5-hour duration, during which all treatment steps take place. |
| 2 | Treated waste water disposal |
| Type of Alternatives | Treated wastewater disposal – reuse applications |
| Description of alternatives | <p>(i) Discharge of treated wastewater into ponds / on land (ii) Reuse the treated wastewater in non-potable uses</p> <p>Rajasthan is a water scarce region and receives low rainfall. Recognizing the importance of treated wastewater in reducing the demand on water, Sewerage and Wastewater Policy, 2016, of Rajasthan promotes the reuse of treated sewage for non-potable applications, and to make sewerage projects environmentally sustainable. This policy prioritizes reuse in irrigation (agriculture, forestry, and landscaping), followed by fish farming, industry and non-potable domestic reuse. Policy suggests construction of storage tanks to store treated wastewater to facilitate reuse. Policy prescribes that the detailed project report (DPR) should clearly define the best reuse option specific to the town and prepare a Reuse Action Plan part of the DPR following water quality norms and legal implications.</p> <p>Accordingly, it is proposed to utilize the treated wastewater for non-potable uses. A detailed Reuse Action Plan will be prepared during the detailed design phase, and, implemented. It is also proposed that the excess / surplus treated wastewater which is not being utilized in reuse will be discharge into local drains/streams and necessary facilities – pipelines and pumping facilities, will be developed.</p> |
| Selected Alternative | Reuse in non-potable applications and discharge excess/surplus into local pond/ drain |
| 3 | Project Locations |
| Description of alternatives | <p>Location of two SPS one at Degana Road and another at RSEB campus are selected to utmost consideration to energy efficiency. Gravity flow systems have been adopted. The sites are selected considering no involuntary resettlement.</p> <p>STP location. Based on the technical feasibility of gravity flow system, sewerage system in Didwana is designed and optimized with one sewage treatment plant (STP). Site selection is guided by technical suitability, availability of government owned one existing STP and adequate vacant land is available within existing campus near Mela Maidan, Didwana town and site is away from habitation. Disposal point is quite located approx.- 50m south direction. Site selected for STP is away from habitation and surround by agricultural land (nearest habitation is approx. 730 m from proposed STP site. Although a 100m distance away from habitation is desirable as far as possible, due to lack of suitable lands and also considering the selected superior and compact sewage treatment technology (SBR), the proposed STP site are selected.</p> <p>Sewer lines. Sewer and water supply pipes are proposed along the roads/streets in the town within the road right of way (ROW). In wider roads water pipes will be laid in the road shoulder beside the tarmac, and in narrow roads, where there is no space, pipes will be laid in the road carriage way by break opening the tarmac. Sewers will be mostly laid in the centre of the road, away from water pipes. There are existing asbestos cement pipes underground, the alignment will be fine tuned during the detailed design, to avoid existing AC pipe alignments as far as possible</p> |

IV. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

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

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

- (i) **Category A.** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA) is required.
- (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 (IEE) 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 if it involves investment of ADB funds to or through a FI.

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

36. **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.

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

borrowers/clients, and to identify and plan appropriate measures to address outstanding compliance issues.

38. **Public Disclosure.** The IEE will be put in an accessible place (e.g., local government offices, libraries, community centers, etc.), and a summary translated into local language for the project affected people and other stakeholders. The following safeguard documents will be put up in ADB's website so that the affected people, other stakeholders, and the public can provide meaningful inputs into the project design and implementation:

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

39. **Consultation and Participation.** ADB SPS require borrower to conduct meaningful consultation¹² 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.

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

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

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

43. **Occupational Health and Safety.** ADB SPS requires the borrower¹³ to ensure that workers¹⁴ are provided with a safe and healthy working environment, taking into account risks

¹² Per ADB SPS, 2009, meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

¹³In case where responsibility is delegated to subproject contractors during construction phase, borrower shall ensure that the responsibilities on occupational health and safety are included in the contract documents.

¹⁴Including nonemployee workers engaged by the borrower/client through contractors or other intermediaries to work on project sites or perform work directly related to the project's core functions.

inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. Borrower shall take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work, including: (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

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

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

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

B. National and State Laws

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

48. **Environmental assessment.** The GOI EIA Notification of 2006 (replacing the EIA Notification of 1994), sets out the requirement for Environmental Assessment in India. This states

that environmental clearance is required for specified activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are categorized as A or B depending on the scale of the project and the nature of its impacts.

49. None of the components of this sewerage system subproject falls under the ambit of the EIA Notification 2006, and, therefore EIA Study or environmental clearance is not required for the subproject.

50. **Applicable environmental regulations.** Besides EIA Notification 2006, there are various other acts, rules, policies and regulations currently in force in India that deal with environmental issues that could apply to infrastructure development. The specific regulatory compliance requirements of the subproject are shown in Table 4.

Table 4: Applicable Environmental Regulations

| Law | Description | Requirement | Relevance to Project Phase |
|---|---|--|-----------------------------------|
| EIA Notification | Projects indicated in the schedule of this notification requires EIA study and environmental clearance. | None of the components of this subproject falls under the ambit of the notification; no EIA study or environmental clearance required | - |
| National Environment Policy (NEP), 2006. | NEP is a comprehensive guiding document in India for all environmental conservation programs and legislations by Central, State and Local Government. The dominant theme of this policy is to promote betterment of livelihoods without compromising or degrading the environmental resources. The policy also advocates collaboration method of different stakeholders to harness potential resources and strengthen environmental management. | RSTDSP should adhere to NEP principle of "enhancing and conservation of environmental resources and abatement of pollution". | All phases of project |
| Rajasthan State Environment Policy, 2010 including And Rajasthan Environment Mission and Climate Change | Follows the National Environment Policy, 2006 and core objectives and policies are: -Conserve and enhance environmental resources; assure environmental | Project implementation should adhere to the policy aims of: conservation and enhancement of environmental resources, integration of environmental concerns into projects/plans, and capacity building in environmental management. | All phases of project |

| Law | Description | Requirement | Relevance to Project Phase |
|---|---|--|----------------------------|
| Agenda for Rajasthan (2010-14) | <p>sustainability of key economic sectors; and, improve environmental governance and capacity building</p> <ul style="list-style-type: none"> - 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 <p>Tasks force set up for six key areas</p> | <p>Under water sector, major concerns, as the policy notes, are huge water losses and wastage, declining water availability, pollution.</p> <p>Relevant recommendations for the project include control of losses, integrated water resources management, control of raw water pollution¹⁸, reuse and recycling.</p> <p>Avoid/minimize use of forest lands.</p> <p>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.</p> | |
| Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments (1987) | <p>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.</p> | <p>Proposed STP will require CTE (prior to start of construction works) and CTO (prior to start of operation) from Rajasthan State Pollution Control Board (RSPCB)</p> <p>All relevant forms, prescribed fees and procedures to obtain the CTE and CTO can be found in the RPCB website. (http://environment.rajasthan.gov.in)</p> | Construction and Operation |

| Law | Description | Requirement | Relevance to Project Phase |
|---|---|--|-----------------------------------|
| | <p>These conditions regulate the quantity and quantity of effluent, the location of discharge and the frequency of monitoring of effluents. Any component of the subproject having the potential to generate sewage or trade effluent will come under its purview. Such projects have to obtain Consent to establish (CTE) under Section 25 of the Act from Rajasthan Pollution Control Board (RPCB) before starting implementation and Consent to Operate (CTO) before commissioning.</p> | | |
| <p>Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.</p> | <p>This Act was enacted to achieve prevention, control and abatement of air pollution activities by assigning regulatory powers to Central and State boards for all such functions. The Act also establishes ambient air quality standards. The projects having potential to emit air pollutants into the atmosphere have to obtain CTE and CTO under Section 21 of the Act from RPCB. The occupier of the project/facility has the responsibility to adopt necessary air pollution control measures for abating air pollution.</p> | <p>The following will require CTE and CTO from RSPCB: (i) Diesel generators); (ii) Batching Plant hot mix plants; and (iii) stone crushers, if installed for construction.</p> <p>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) If ready mix concrete and hot mix bitumen is procured from third party, contractor to ensure that the plants, from where material is being purchased is having CTE/CTO and copy should be collected from third party and submitted in PIU</p> | <p>Construction and operation</p> |
| <p>Biodiversity Act of 2002</p> | <p>This Act primarily addresses access to genetic resources and associated knowledge by foreign individuals, institutions or companies, to ensure equitable sharing of</p> | <p>Not Applicable</p> | <p>-</p> |

| Law | Description | Requirement | Relevance to Project Phase |
|---|---|---|----------------------------|
| | benefits arising out of the use of these resources and knowledge to the country and the people. | | |
| Wildlife Protection Act, 1972 and amendment 1991 | This overarching Act provides protection to wild animals, birds, plants and matters connected with habitat protection, processes to declare protected areas, regulation of wildlife trade, constitution of state and national board for wildlife, zoo authority, tiger conservation authority, penalty clauses and other important regulations. | Not applicable – none of the project components are located in or near protected areas. | Construction |
| Forest (Conservation) Act, 1980 | The Forest (Conservation) Act prohibits the use of forest land for non-forest purposes without the approval of Ministry of Environment Forests and Climate Change (MoEFCC), Government of India | Not applicable; none of the components of the subproject are located in forest. | Construction |
| Environmental (Protection) Act, 1986 amended in 1991 and the following rules/notifications: | This is an "umbrella" legislation that empowers the Central Government to take all necessary measures to protect and improve the quality of the environment and prevent, control and abate environmental pollution. Empowers central government to enact various rules to regulate environmental pollution, including standards for quality of air, water, noise, soil; discharge standards or allowable concentration limits for environmental pollutants, handling of | There are rules / notifications that have been brought out under this Act, which are relevant to RSTDSP, and are listed below | Construction and operation |

| Law | Description | Requirement | Relevance to Project Phase |
|--|--|---|----------------------------|
| | hazardous substances, locating/prohibiting industries, etc., | | |
| Environmental Standards (ambient and discharge). | Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards | Appendix 2 provides applicable standards for ambient air quality, emission limits and emission stack height requirements for diesel generators Appendix 4 provides STP discharge standards | Construction and operation |
| Noise Pollution (Regulation and Control) Rules, 2000 amended up to 2010. | Rule 3 of the Act specifies ambient air quality standards in respect of noise for different areas/zones. | Appendix 3 provides applicable noise standards, and noise limits for diesel generators | Construction and operation |
| Indian Drinking Water Standards | Gives details of the permissible and desirable limits of various parameters in drinking water as per the Bureau of Indian Standards | Appendix 2 provides drinking water standards | Construction and operation |
| Solid Waste Management Rules 2016 | Responsibility of Solid Waste Generator segregate and store the waste generated in three separate streams namely bio-degradable, non- biodegradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorized waste pickers or waste collectors as per the direction or notification by the local authorities from time to time; store separately construction and demolition waste, as and when generated, in his own premises and shall dispose off as per the Construction and Demolition Waste Management Rules, 2016; (iii) No waste generator shall throw, burn or burry the solid waste generated by him, | Contractor to follow all the rules during construction works | Construction and operation |

| Law | Description | Requirement | Relevance to Project Phase |
|---|--|--|----------------------------|
| | on streets, open public spaces outside his premises or in the drain or water bodies. | | |
| Construction and Demolition Waste Management Rules 2016 | <p>Every waste generator shall segregate construction and demolition waste and deposit at collection centre or handover it to the authorized processing facilities. Shall ensure that there is no littering or deposition so as to prevent obstruction to the traffic or the public or drains.</p> <p>Large generators (who generate more than 20 tons or more in one day or 300 tons per project in a month) shall submit waste management plan and get appropriate approvals from the local authority before starting construction or demolition or remodeling work.</p> <p>Large generators shall have environment management plan to address the likely environmental issues from construction, demolition, storage, transportation process and disposal / reuse of C and D Waste.</p> <p>Large generators shall segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar.</p> <p>Large generators shall pay relevant charges for collection, transportation, processing and disposal as notified by the concerned authorities;</p> | <p>Construction waste shall be collected at stockpile area for 8-10 days and will be sent to disposal site. Disposal site shall be identified and allotted by Nagar palika after mobilization of contractor (during SIP period) and can't be mentioned at this time.</p> <p>Contractor to follow all the rules during construction works.</p> <p>Sludge or any material if classified as hazardous waste / material is to be handled and disposed according to this Rules</p> <p>Excerpts from C and D Rules are provided in Appendix 8.</p> | Construction |

| Law | Description | Requirement | Relevance to Project Phase |
|---|---|---|-----------------------------------|
| Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, | Responsibilities of the occupier for management of hazardous and other wastes.- (1) For the management of hazardous and other wastes, an occupier shall follow the following steps, namely:- (a) prevention; (b) minimization; (c) reuse, (d) recycling; (e) recovery, utilization including co-processing; (f) safe disposal. (2) The occupier shall be responsible for safe and environmentally sound management of hazardous and other wastes. (3) The hazardous and other wastes generated in the establishment of an occupier shall be sent or sold to an authorized actual user or shall be disposed of in an authorized disposal facility. (4) The hazardous and other wastes shall be transported from an occupier's establishment to an authorized actual user or to an authorized disposal facility in accordance with the provisions of these rules. (5) The occupier who intends to get its hazardous and other wastes treated and disposed of by the operator of a treatment, storage and disposal facility shall give to the operator of that facility, such specific information as may be needed for safe storage and disposal. (6) The | Contractor to comply all the requirements of this Act, if there are any hazardous wastes, are generated, handled or managed during construction and operation works. However, it is unlikely that it will involve any hazardous waste. Sludge generated from STP, if the incoming sewage mixes with industrial wastewater, there is a possibility of STP sludge classified as hazardous waste. Proper measures will be included to avoid mixing of industrial wastewater into sewage. | Construction and operation |


| Law | Description | Requirement | Relevance to Project Phase |
|---|---|---|----------------------------|
| | 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 or near to designated wetland area. | |
| Ancient Monuments and Archaeological Sites and Remains Act, 1958 and Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010. | The Act designates areas within 100 meters (m) of the "protected monument/area" as "prohibited area" and beyond that up to 200 m as "regulated area" respectively. No "construction" is permitted in the "prohibited area" and any construction activity in the "regulated area" requires prior permission of the Archaeological Survey of India (ASI). | Not applicable - there are no protected monuments / places of archeological / historical places in or near Didwana City In case of chance finds, the contractor/ PIU will be required to follow a protocol as defined in the Environmental Management Plan (EMP) | Construction |
| The Building and Other Construction Workers (BOCW) Act 1996 and | Employer shall- Provide and maintain, at suitable point, sufficient quantity of wholesome drinking water, such | Contractors are required to follow all the provisions of BOCW Act and Rajasthan BOCW Rules. Salient features of Rajasthan BOCW Rules are- | Construction |

| Law | Description | Requirement | Relevance to Project Phase |
|--|---|---|----------------------------|
| Rajasthan Building and Construction Workers Rules 2009 | <p>point shall be at least 6 meters away from any washing areas, urinals or toilets</p> <p>Provide sufficient urinals and latrines at convenient place, easily accessible by workers</p> <p>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</p> <p>Provide crèche with proper accommodation, ventilation, lighting, cleanliness and sanitation if more than fifty female workers are engaged</p> <p>Provide first aid facilities in all construction sites</p> <p>For safety of workers employer shall provide- Safe access to site and workplace</p> <p>Safety in demolition works</p> <p>Safety in use of explosives</p> <p>Safety in operation of transporting equipment and appoint competent person to drive or operate such vehicles and equipment</p> <p>Safety in lifting appliance, hoist and lifting gears</p> <p>Adequate and suitable lighting to every workplace and approach</p> <p>Prevention of inhalation of dust, smoke, fumes, gases during construction works and provide adequate ventilation in workplace</p> | <p>Chapter III, section 17- Registration of establishments</p> <p>Chapter VIII, section 61- Hours of works, intervals or rest and spread over, overtime</p> <p>Section 62- weekly rest</p> <p>Section 63- night shift</p> <p>Section 67- registers of workers</p> <p>Section 68- Muster roll, wages register</p> <p>Section 70- latrine and urinal facilities</p> <p>Chapter XI- Safety and Health</p> <p>Section 78- fire protection</p> <p>Section 79- emergency action plan</p> <p>Section 80- fencing of motors</p> <p>Section 81- lifting and carrying of weight</p> <p>Section 82- H andS policy</p> <p>Section 83- dangerous and harmful environment</p> <p>Section 84- Overhead protection</p> <p>Section 88- eye protection</p> <p>Section 89- PPEs</p> <p>Section 90- electrical hazards</p> <p>Section 97- use of safety helmets and shoes</p> <p>Chapter XIII-lifting appliances and gears</p> <p>Chapter XV- transport and earth moving equipment</p> <p>Chapter XVI- concrete works</p> <p>Chapter XVII- demolition works</p> <p>Chapter XVIII-Excavation and tunneling</p> <p>Chapter XX- ladders and step ladders</p> <p>Chapter XXII- structural frame and formworks</p> <p>Chapter XXIV- medical facilities and first aid box</p> | |

| Law | Description | Requirement | Relevance to Project Phase |
|--|---|--|-----------------------------------|
| | <p>and confined space Safety in material handling and stacking/unstacking Safeguarding the machinery with flywheel of moving parts Safe handling and use of plants operated by compressed air Fire safety Limit of weight to be lifted by workers individually Safety in electric wires, apparatus, tools and equipment Provide safety net, safety sheet, safety belts while working at height (more than 1.6 m as per OSHA) Providing scaffolding, ladders and stairs, lifting appliances, chains and accessories where required Safety in pile works, concrete 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</p> | | |
| <p>Contract Labor (Regulation and Abolition) Act, 1970; The Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979</p> | <p>Provides for welfare measures to be provided by the Contractor to contract labor and in case the Contractor fails to provide, the same are required to be provided by the Principal Employer by Law. The principal employer is required to take</p> | <p>Applicable to all construction works in the project Principle employer (RUDSICO-EAP) to obtain Certificate of Registration from Department of Labour, as principle employer Contractor to obtain license from designated labor officer Contractor shall register with Labor Department, if Inter-state migrant workmen are engaged Adequate and appropriate amenities</p> | <p>Construction and operation</p> |

| Law | Description | Requirement | Relevance to Project Phase |
|---|--|---|----------------------------|
| | <p>Certificate of Registration and the Contractor is required to take a License from the designated Officer. The Act is applicable to the establishments or Contractor of principal employer if they employ 20 or more contract labor.</p> <p>The inter-state migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home up to the establishment and back, etc.,</p> | <p>and facilities shall be provided to workers including housing, medical aid, traveling expenses from home and back, etc.,</p> <p>Appendix 9 provides applicable labor laws including amendments issued from time to time applicable to establishments engaged in construction of civil works.</p> | |
| The Child Labour (Prohibition and Regulation) Act, 1986 | <p>Prohibits employment of children below 14 years of age in certain occupations and processes</p> <p>Employment of child labor is prohibited in building and construction Industry.</p> | No child labour shall be employed | Construction and operation |
| Minimum Wages Act, 1948 | <p>Minimum wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment.</p> <p>Construction of buildings, roads and runways are scheduled employment.</p> | <p>Applicable to all construction works in the project</p> <p>All construction workers should be paid not less than the prescribed minimum wage</p> | Construction and operation |
| Workmen Compensation Act, 1923 | Provides for compensation in case of injury by accident arising out of and during the course of employment. | Compensation for workers in case of injury by accident | Construction and operation |
| Equal Remuneration Act, 1979 | Provides for payment of equal wages for work of equal nature to male and female workers and not for making discrimination against | Equal wages for work of equal nature to male and female workers | Construction and operation |

| Law | Description | Requirement | Relevance to Project Phase |
|---|--|---|----------------------------|
| | female employees in the matters of transfers, training and promotions etc. | | |
| Rajasthan State Environment Policy, 2010 including And Rajasthan Environment Mission and Climate Change Agenda for Rajasthan (2010-14). | Follows the National Environment Policy, 2006 and core objectives and policies are: -Conserve and enhance environmental resources; assure environmental sustainability of key economic sectors; and, improve environmental governance and capacity building - it recommends specific strategies and actions to address the key environmental issues: water resources, desertification and land degradation, forest and biodiversity, air quality, climate change: adoption and mitigation, mining, industry, tourism, energy, urban development, etc. -Establishment of Environment Mission under the chairpersonship of the Chief Minister and a Steering Committee under the chairpersonship of Chief Secretary, Government of Rajasthan Tasks force set up for six key areas | -Project implementation should adhere to the policy aims of conservation and enhancement of environmental resources, integration of environmental concerns into projects/plans, and capacity building in environmental management -under water sector, major concerns, as the policy notes, are huge water losses and wastage, declining water availability, pollution - Relevant recommendations for the project include control of losses, integrated water resources management, control of raw water pollution, reuse and recycling -avoid/minimize use of forest lands With reference to Climate change adoption and mitigation following should be considered in the project: - diminishing flows in surface water bodies, and groundwater depletion, and revival traditional water bodies as water sources (lakes/tanks) - equal stress on demand side management in water -minimize energy use - design energy efficiency systems- | Operation |
| 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, | The crux is waste avoidance: the practice inculcated should focus the on minimal waste generation. Waste Collection: In the project circumstance, the waste is referred to the damaged powered asbestos which will be collected in the Permissible plastic bags to be disposed to the nearest TSDF facilities. | Construction |

| Law | Description | Requirement | Relevance to Project Phase |
|--|---|--|----------------------------|
| | transportation and final disposal of final disposal of asbestos and asbestos containing products. | | |
| 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. | <p>The following signs and personal protective equipment shall be used in handling ACM.</p>  | Construction |
| IS 11451: Safety and Health Requirements related to Occupational Exposure to Asbestos contaminated Products. | These standard details the occupational exposure allowable and safety at workplace to be enforced. | In the project the norms pertaining to limiting number of hours working with ACM will be 8.0 hrs/48 hrs a week and the medical examination has to be periodic, the environmental monitoring has to be done as per the protocol. The safety at workplace shall be enforced. | Construction |
| IS 11768: Waste Disposal Procedure for Asbestos Containing Products. | The protocol pertaining to disposal of the waste is emphasized. | The collection of ACM powered will be in permissible plastic bags, which will be twisted tight at the neck so that the wear and tear due to abrasion will be minimum and the transportation of the asbestos waste has to be done by the authorized vendor to the approved landfill site. | Construction |
| The Rajasthan Monuments, Archaeological Sites and | Any construction/excavation work in the 'protected area' (as declared by | Not applicable - there are no protected monuments in the town In case of chance finds, the contractor/ | Construction |

| Law | Description | Requirement | Relevance to Project Phase |
|---|---|---|----------------------------|
| Antiquities Act, 1961; the Rajasthan Monuments, Archaeological Sites and Antiquities (amendment) Act 2007 | GOR under the Act) requires priori permission of Department of Archeology and Museums -Application under the Rules shall be submitted to Director, State Archeological Department, at least 3 months prior to the work. Department provides conditional permission, including time for completion, procedures to be followed during the work and for chance finds etc. | PIU will be required to follow a protocol as defined in the Environmental Management Plan (EMP). | |
| Rajasthan Forest Act, 1953, and Rajasthan Forest Rules, 1962 | This Act makes the basis for declaration of Reserved Forests, constitution of village forest committees, management of reserved forests and penalties and procedures. | Not applicable; none of the components / pipeline alignment are in forest areas. | Construction |
| International conventions and treaties | | | |
| Ramsar Convention, 1971 | The Ramsar Convention is an intergovernmental treaty that provides the framework for national action and international co-operation for the conservation and wise use of wetlands and their resources. India is one of the signatories to the treaty. The Ramsar convention made it mandatory for the signatory countries to include wetland conservation in their national land use plans. | There are no Ramsar sites in or near Didwana. Not applicable to Didwana sewerage subproject. | - |
| Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973 | India is a signatory of this convention which aims to control international commercial trade in endangered species | Not applicable in this project as no endangered species of wild fauna and flora is found in project town. | - |

| Law | Description | Requirement | Relevance to Project Phase |
|---|---|--|----------------------------|
| Montreal Protocol 1992 | India is a signatory of this convention which aims to reduction in the consumption and production of ozone-depleting substances (ODS), while recognizing differences in a nation's responsibilities. Ozone depleting substances are divided in two groups Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbon carbons (HCFCs) | Not applicable in this project as no ODS are involved in construction works | - |
| Basel Convention on Trans-boundary Movement of Hazardous Wastes, 1989 | India is a signatory of this convention which aims to reduce trans-boundary movement and creation of hazardous wastes | Contractor to follow the provisions of Hazardous Waste Rules 2016 for storage, handling, transport and disposal of any hazardous waste emerged during construction works Under this Convention, asbestos or asbestos waste in the form of dust and fibers is classified as hazardous waste. | - |
| Convention on Migratory Species of Wild Animals (CMS), 1979 (Bonn convention) | CMS, also known as Bonn convention, was adopted in 1979 and entered into force on 1 November 1983, which recognizes that states must be the protectors of migratory species that live within or pass through their national jurisdictions, and aims to conserve terrestrial, marine and avian migratory species throughout their ranges. Migratory species threatened with extinction are listed on Appendix I of the Convention. CMS Parties strive towards strictly protecting these species, conserving or restoring the places where they live, mitigating obstacles to migration and controlling | Not applicable to this project as no migratory species of wild animals are reported in the project areas. | - |

| Law | Description | Requirement | Relevance to Project Phase |
|-----|--|-------------|----------------------------|
| | other factors that might endanger them. Migratory species that need or would significantly benefit from international cooperation are listed in Appendix II, and CMS encourages the Range States to conclude global or regional agreements. | | |

51. Clearances/ permissions to be obtained prior to start of construction. Table 5 shows the list of clearances/permissions required for project construction. This list is indicative, and the contractor should ascertain the requirements prior to start of the construction and obtain all necessary clearances/permission prior to start of construction.

Table 5: Clearances and permissions required for Construction activities

| Sl. No | Construction Activity | Statute under which Clearance is Required | Implementation | Supervision |
|--------|---|---|--------------------|-------------|
| 1 | Land for Project Activity- Allotment and Approval for specific land use | ULB | PIU | PMU |
| 2 | Tree Cutting | State Forest Department/ Revenue (Tehsildar) | PIU and Contractor | PIU |
| 3 | Use of Construction Area- Approval for use of Railway right-of-way (ROW). | North Western Railway Division and other Utility Agencies such as BSNL, PHED, if required | PIU | PIU/PMU |
| 4 | Hot Mix Plants, Crushers, Batching Plants and DG set | Consent to Establish (CTE) and Consent to Operate (CTO) from Rajasthan Pollution Control Board (RPCB) | PIU and Contractor | PIU |
| 5 | Material Sourcing- Approval for sourcing stones and sand from quarries and sand mining and borrow areas | Permission from District Collector / State Department of Mines and Geology | Contractor | PIU |
| 6 | New Quarries, Sand Mining and Borrow Areas | Environmental Clearance under EIA Notification 2006 | Contractor | PIU |
| 7 | Construction and Operation of new STP including discharge of treated effluents and disposal of sludge | Consent to Establish (CTE) and Consent to Operate (CTO) from Rajasthan Pollution Control Board (RPCB) under Water Act, 1974 | PIU and Contractor | PIU |

| Sl. No | Construction Activity | Statute under which Clearance is Required | Implementation | Supervision |
|--------|--|--|----------------|-------------|
| 8 | 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 |
| 9 | Temporary Traffic Diversion Measures | District Traffic Police | Contractor | PIU |
| 10 | Construction Waste and Demolition Debris Management | Approval from Nagar Palika for disposal site is required per Construction and Demolition Waste Management Rules 2016 | Contractor | PIU |
| 11 | Labour License | Labour Commissioner, Government of Rajasthan | Contractor | PIU |
| 12 | Use of Vehicles and Equipment- Pollution Under Control (PUC) Certificate | Motor Vehicle Rules, 1989 | Contractor | PIU |

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

V. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

1. Location, Area & Connectivity

53. Didwana is a town and a municipality in Nagaur district of Rajasthan state in India. Didwana is located at 27.4°N & 74.57°E and at average elevation 336 m (1102 ft) above MSL. No heritage site is existing in Didwana. The municipal area of the city is about 18.16 km². It is a Tehsil head quarter of Nagaur district. It is located of 90 Km from district head quarter Nagaur, 192 Km from State capital Jaipur and 150 Km from Ajmer by road. Nearest railway station is Didwana which is within the city. Nearest Airport is Sanganer (Jaipur) which is about 195 km away from Didwana. Location map of Didwana is shown in Figure-11 below.

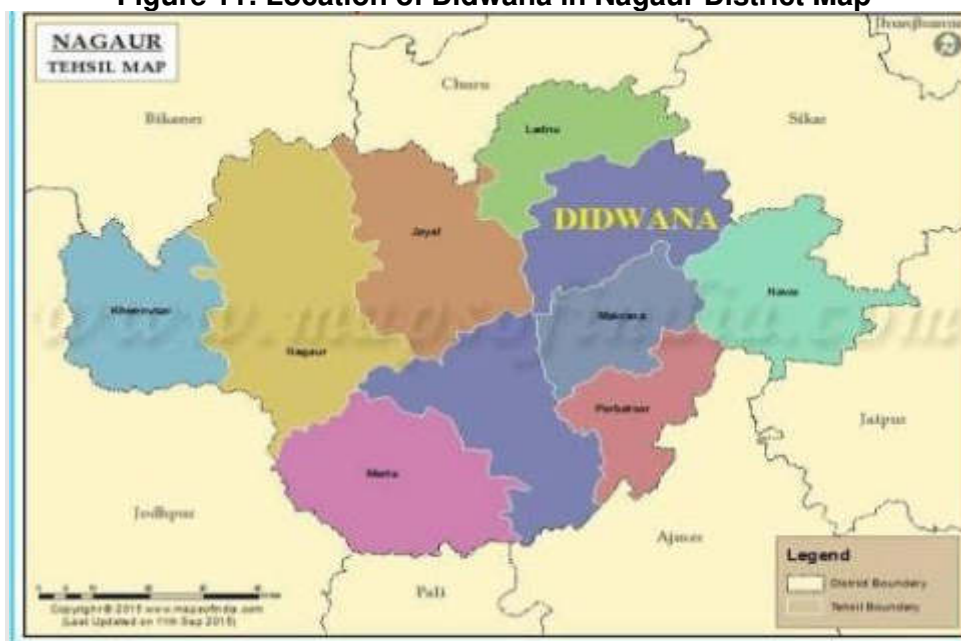
54. Didwana Salt Lake: The Thar Desert of India is endowed with a large number of saline lakes notably the Sambhar, Didwana, Kuchaman, Lunkaransar and the Pachhadra. The oval shaped Didwana playa lies in the semi-arid part of western Rajasthan near the eastern edge of the Thar Desert dune fields, NW of the Sambhar playa. These lakes are shallow and ephemeral. The Didwana playa, the second largest playa in the eastern part of the Thar Desert, is 5.6 km long and 2.4 km wide and supports commercial salt production. The thickness of lake sediment

package is reported to be 20m and comprises fine grained clays and silts, with abundant calcite, gypsum, and halite, associated with hypersaline water. The playa is flanked by isolated hills of quartzite and slate to its SW margin and by longitudinal dunes to its NW margin. The playa is mainly fed by rainwater during monsoons and there is no major drainage feeding the playa. The playa is filled with water during the rainy season but remains dry for most parts of the year.

55. Nagaur district forms a part of the Great Thar desert and is covered mainly by Aeolian sands masking the hard rocks. The various rock types of the district belong to the Delhi Super Group, the Erinpura Granite, the Malani igneous Suite and the Marwar Super Group and the palana formation. The rocks of the Alwar group are well exposed in the Eastern part of the district and comprise arkose, grit, and schist. The rocks of the Delhi Super Group have been intruded by the Sendra.

56. Thick gypseous beds of the district provide reserves of about 953 million tons from Dhankoria, Bhadwasi, and Nagaur deposits. Lignite occurrences have been reported from around Merta Road.

Figure 11: Location of Didwana in Nagaur District Map



57. Soil characteristics. Four types of soils have been reported in the district viz, clay, clay loam, sandy loam and sandy soil. The general texture of the soil in the area is sandy loam to clayey loam which is further classified into "Barani" or unirrigated and "Chahi" or irrigated soil. A part of Nagaur tehsils and south-eastern part of Merta tehsils has deep sandy loam, while red loamy soil exists elsewhere in the Merta tehsils except on the banks of river Luni, Light loamy soil occurs in Parbatsar tehsils away from hill ranges. A longitudinal belt from Didwana to Nawa extending up to Sambhar Lake has the characteristics of alkaline soil. Distribution of different types of soils is shown in the following Table 6.

Table 6: Soil types of Nagaur District

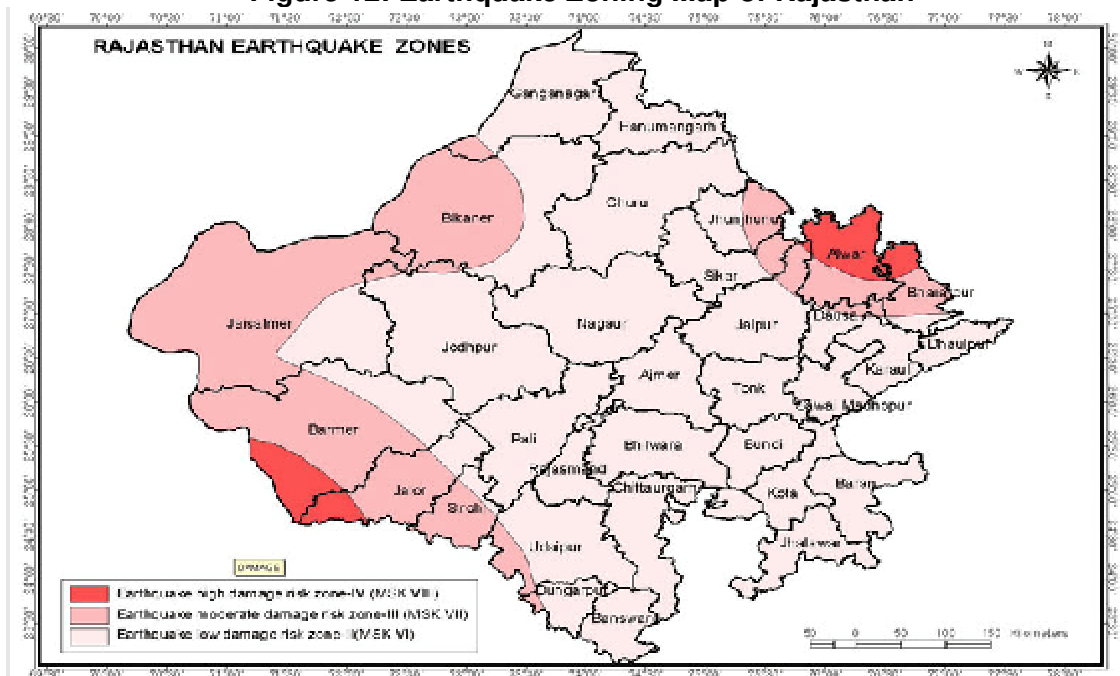
| S. No. | Soil type | Area (hec.) | Block |
|--------|------------|-------------|--|
| 1 | Clay | 22840 | Nagaur, Jayal, Merta, Riyan, Parbatsar |
| 2 | Clay Loam | 134450 | Nagaur, Didwana, Jayal, Riyan, Merta, Degana, Makrana, Ladnun, Parbatsar, Mundwa |
| 3 | Sandy Loam | 472905 | Makrana, Ladnu, Parbatsar, Mundwa, Didwana, Nagaur, Didwana, Jayal, Riyan, Merta, Degana |
| 4 | Sandy | 565705 | Nagaur, Khuchaman, Jayal, Riyan, Merta, Degana, Makrana, Ladnun, Parbatsar, Didwana. |

Source: CGWB Nagaur, 2013.

58. Didwana city falls under the clayey loamy soil condition. This means 80% of the total soil composition is of sand and silt, while 20% comprises of soft clay. Moreover, over the years the ground water level of the entire district has fallen from 10 to 25 m below the land surface. Among the entire Nagaur district, Didwana city and some other places have got some agricultural activities present. The loamy soil patches have kept this region favorable to agriculture. Almost 92% of the total working residents are either engaged in agricultural produce or in salt industry. Babul, Shisham, Peepal, Akara, Dhanwood, Neem and Rohira are the main trees found in this.

2. Seismology

59. In viewpoint of seismicity, District Nagaur lies in a stable zone. In the seismic zoning map of India, the district comes in a Zone-II (Least Active). Seismic zoning map of Rajasthan showing Nagaur District is given in Figure 12 below:

Figure 12: Earthquake Zoning Map of Rajasthan

3. Climatic Conditions

60. The climate of Didwana is hot and dry. The maximum temperature during summer months is ranging from 28°C to 40°C quiet frequently and during winter months range is 6°C to 22°C. The mean annual rainfall is around 300 mm. The month of July marks the beginning of the monsoon season that lasts till September. Winds blow manly in April to September from south west & from October to March from North East in summers. Humidity is ranges from 20-55% therefore most of the summer months are dry weather.

61. Climate Change Projections: Temperature and rainfall are the main climatic factors that determine eco-climate of the area. Diurnal variations in temperature could be seen in the state of Rajasthan. Temperature reaches above 50°C in summer and 0° in winter in some of district in the state. Average temperature projections from global climate models (PRECIS) suggest a strong increase in temperature for state of Rajasthan. Baseline data of temperature from 1975 to 2005 has been considered. Projections of maximum temperature predicted that temperature varies from 0.6°C in 2020s to 3.2°C in 2080s. Projection trends of minimum temperature increases clearly stated that minimum temperature of atmosphere in the state is slightly increases from 0.9°C in 2020s to 3.9°C in 2080s. In context of precipitation, available rainfall projection from global climate models (PRECIS) suggest an increase in average rainfall for state of Rajasthan depicts that based on the baseline data of precipitation from 1975 to 2005, projection of average annual rainfall varied from 6.6% in 2020s to 9.1% in 2080s. The models also suggest an increase in the duration of dry spells as well as a tendency towards more intense rainfall events. Any likely increase in precipitation would occur in the northern part of the state and any decrease in the southern part of the state.

62. By the proposed sewerage project, all the treated water will be used in beneficial purposes such as Agriculture etc. that is the major component of the region's economy which is largely dependent on rainfall for agricultural activities. Treated waters from the STP shall supplement the available water resources in the region and will lead to more crops per drops in the area/regions. Further, it shall make the agricultural sector less dependent on precious groundwater resources in the area/region.

4. Surface Water

63. No surface water resource in the Nagaur district has been reported except a few salt lakes. There is salt lake (Sambhar Lake) at south west of Didwana having an area of 777 hectare. The Nawa tehsil also shares a part of wellknown Sambhar Lake in Jaipur district. There are eight (8) numbers of ponds in the district. Out of these 5 are in Degana and 3 in Parbatsar blocks. River Luni is a non-perennial river, it rises near Pushkar in Ajmer district and after passing over the western slopes of the Aravali, it crosses Nagaur district in the south and flows through it towards the west for nearly 37 km. before entering into Pali. (Source: Ground Water Information, Nagaur District, Central Ground Water Board, Govt. of India).

64. Didwana Lake is the main lake of this sub-urban city. This is a continental saline lake with a thick calcified boulder conglomerate bed. SPS at Degana road is proposed near this salt lake. Mitigation measures will be required to avoid pollution of this lake due to proposed SPS during design and construction period.

5. Groundwater

65. Chemical quality of ground water in Nagaur district is generally brackish to saline with few pockets having fresh water with E.C. less than 2000 micro mhos/cm at 25°C. Then there are some

areas suffering from high fluoride. The ground water quality is brackish to saline from east of Merta to Degana and from Didwana to Nagaur *via* Jayal block in the central, western, northwestern part of the district. In this big pocket E.C. of ground water is more than 3000 micro mhos/cm at 25°C. There are some pockets namely eastern part of Rian southern part of Degana, major part of Parbatsar, north and northeastern part of Kuchaman, western and northwestern part of the Merta block, major part of Mundawa, Kuchera Khanwar-Gagawana area of Jayal block, south eastern part of Didwana, northern and south western part of Ladnun block, where the E.C. of ground water is within 3000 micro mhos/cm at 25°C. There are two salt lake area where ground water having E.C. more than 10000 micro mhos.

66. Ground water in the alluvium is in general better in quality than that found in the sandstones of Nagaur and Palana series, and Meta sediments. The fluoride content of ground water in Nagaur district varies from less than 1 ppm to 10 ppm. In a longitudinal belt extending from Manasar in Nagaur blocks to Indawar in Merta block the fluoride is more than 4 ppm. There is another big pocket in the south-eastern part of the district covering parts of Parbatsar, Makrana and Degana blocks where the fluoride is much over 4 ppm and the area is called Banka-patti (fluoride affected area). Depth of ground water in pre-monsoon period varies from 5 meters to 32 mtrs and in post-monsoon period from 5 meters to 28 mtrs in Didwana. (Source: Ground Water Information, Nagaur District, Central Ground Water Board, Govt. of India).

67. Report on Ground water status of Nagaur District including Didwana is given in Table 7 overleaf:

Table 7: Ground Water Status of Nagaur

| Block | Type of area | Total annual replenishable resource (mcm) | Net annual ground water availability (mcm) | Annual ground water withdrawal for irrigation (mcm) | Annual groundwater withdrawal for domestic and other uses (mcm) | Annual ground water withdrawal for all uses (mcm) | Stage of ground water development (%) | Category |
|--------------------------------------|--------------|---|--|---|---|---|---------------------------------------|--------------|
| Degana (Excluding Saline) | NC | 42.7205 | 38.4485 | 46.7125 | 14.9088 | 61.6213 | 160.27 | OVER EXPLO. |
| Didwana (Excl. Saline) | NC | 63.2149 | 56.8934 | 74.0685 | 18.1200 | 92.1885 | 162.04 | OVER EXPLO. |
| Jayal (Excl. Saline) | NC | 59.3985 | 53.4587 | 37.4225 | 19.9040 | 57.3265 | 107.24 | OVER EXPLO. |
| Kuchaman (Excl. Saline) | NC | 72.3797 | 65.9525 | 160.0143 | 16.2400 | 176.2543 | 267.24 | OVER EXPLO. |
| Ladnun (Excl. Saline) | NC | 42.8697 | 38.5827 | 23.6406 | 11.8307 | 35.4714 | 91.94 | CRITICAL |
| Makrana (Excl. Saline) | NC | 49.2807 | 44.3526 | 32.2364 | 14.9456 | 47.1820 | 106.38 | OVER EXPLO. |
| Merta (Excl. Saline) | NC | 50.7527 | 45.6774 | 120.8390 | 13.4400 | 134.2790 | 293.97 | OVER EXPLO. |
| Mundwa (Excl. Saline) | NC | 70.8171 | 63.7354 | 170.5655 | 29.9520 | 200.5175 | 314.61 | OVER EXPLO. |
| Nagaur (Excl. Saline) | NC | 55.8985 | 50.5966 | 24.7045 | 17.0560 | 41.7605 | 82.54 | SEMICRITICAL |
| Parbatsar (Excl. Saline) | NC | 38.4671 | 34.6204 | 42.0653 | 7.9083 | 49.9736 | 144.35 | OVER EXPLO. |
| Riyan (Excl. Saline) | NC | 58.3085 | 52.4776 | 61.4845 | 11.2704 | 72.7549 | 138.64 | OVER EXPLO. |
| TOTAL OF DISTRICT (Excluding Saline) | NC | 604.1080 | 544.7959 | 793.7536 | 175.5758 | 969.3294 | 177.93 | |
| TOTAL OF SALINE | | 54.9100 | 49.4189 | 8.3073 | 4.9440 | 13.2513 | 26.81 | |

Source: Ground Water Information, Nagaur District, CGWB.

6. Air Quality

68. Ambient air quality in Rajasthan is monitored by Rajasthan Pollution Control Board. However, at present there is no monitoring station in Didwana City or Nagaur. However, few monitoring in past have been done in Nagaur District by RUIDP and it was observed ambient air quality in district Nagaur is well within the permissible limits. But as these monitoring locations in Nagaur are more than 69kms (aerial distance from Didwana City), the data shall not reflect the air quality for Didwana City.

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

70. Air quality monitoring shall be conducted in the pre-construction phase (SIP period) by the contractor and shall be updated in IEE.

7. Noise

71. As there are no major industries or other activities, which may create high noise in Didwana City, the main source of noise pollution in the city area is traffic on the Main and Busy roads. The other inner and connecting roads are quite peaceful.

72. Baseline ambient noise quality monitoring of Didwana City is not done during initial design phase and shall be done during the SIP period by contractor and shall be updated in IEE.

B. Ecological Resources

73. Flora: The flora of the district is not rich owing to its geographical situation and scanty rainfall. The south-eastern areas including a part of the northern tehsils of Ladnun and Didwana are much greener than the northwest region of district. Khejri trees are commonly found in the district. The leaves are used as fodder. It also gives gum. Apart from commercial value, this tree is considered holy. The tree also plays an important role in checking soil erosion. The other common species found in the district are babul, neem, shisham, peepal, rohira, kalsi, dhangood, akara and rohira trees provide timber and is used for making furniture. Dhangood is generally used for making cots. A common shrub-phog provides building material from its roots & twigs. Common grass found in the district include bargers, bhambar etc.

74. The district of Nagaur is poor in forest resources. The total area under forest including hills is reported to be 240.92 sq km, which is 1.3 percent of total geographical area of the district. Scanty rainfall and other geographical constraints account for this. The western part of the district is divided of natural vegetation cover except for herb and grass which grows on low sand dunes. However, the south-eastern part of the district and part of the northern tehsil of Ladnun and Didwana have much greater greenery as compared to north-west part of the district. (Source: Brief Industrial Profile of Nagaur District, Ministry of MSME, Govt. of India)

75. Fauna: Wild Animals such as chinkaras and black bucks which are rarely seen in this area are protected species under the Rajasthan Wild Animals and Birds Protection Act (1951). Among the small game, only titars are found. Other fauna of the district consists of deer, hare, jackal, pig, wild cat and birds. The common birds fluttering in the district include bulbul, suganchiri, and mor (peacocks). No wild fauna is found in the urban areas of Didwana and near to any proposed site

under this project. Biodiversity Assessment Report for the town of Didwana is discussed in Appendix 26.

C. Economic Development

1. Land use

76. Under the Rajasthan Urban Improvement Act, 1959, the Master plan for Didwana is prepared for the year 1998-2023. The state Government issued a notification, under Sec 3 (1) of Rajasthan Urban Improvement Act, 1959 and required preparation of the Didwana Master Plan. This was required to ensure that housing schemes and industrial development should occur in a concurrent manner with efficient provision of basic urban facilities such as housing, schools, dispensaries, parks and recreation centre etc.

77. As per master plan (1998-2023), out of total municipal area of 1250 acre, 951 acres was developed area (76%), out of which 53.66 % was residential area and only 3% area was under commercial category. The proposed and existing land use pattern is shown in Table 8 below.

Table 8: Land Use of Didwana

| S. No. | Use | Land Use - 1998 | | Proposed Land Use - 2023 | |
|--------|------------------------------|-----------------|-------------------------|--------------------------|-------------------------|
| | | Area in Acre | % age of developed area | Area in Acer | % age of developed area |
| 1 | Residential | 509.4 | 53.66 | 1348 | 54.05 |
| 2 | Commercial | 28.5 | 3 | 152 | 6.09 |
| 3 | Industrial | 3 | 0.32 | 114 | 4.57 |
| 4 | Governmental | 10.10 | 1.06 | 28 | 1.12 |
| 5 | Public & Semi Public | 110.70 | 11.64 | 292 | 11.71 |
| 6 | Recreational | 10 | 1.05 | 187 | 7.50 |
| 7 | Circulation | 279.30 | 29.27 | 373 | 14.96 |
| | Developed Area | 951 | 100 | 2494 | 100% |
| 8 | Govt. Reserved (Vacant) | 185 | | | |
| 9 | Agriculture, Forests & Hills | 15.30 | | 93.53 | |
| 10 | Water Bodies | 98.70 | | 3 | |
| | Urbanised Area | 1250 | | 2016 | |

Source: Didwana Master Plan 1998-2023.

2. Industry & Agriculture

78. At present there are no major industries in the town and the development of RIICO industrial area is also under progress. Nagaur district is also an important salt producing area, Nawa and Didwana tehsil being the major ones. Moreover, Sambhar Area (although forming part of Jaipur district) is quite close to the salt belt of Nagaur district. The salt production is over 6,57,000 tones per year. As such, the industries, based on common salt area local resource could sustain inter-alia, the following plants. (i) Caustic Soda plant (ii) Soda ash plant (iii) Chlorine gas plants. (iv) Sodium sulphate plant. (Source: Brief Industrial Profile of Nagaur District, Ministry of MSME, Govt. of India)

3. Infrastructure

79. **Water Supply.** At present, Didwana town meets the water demand from groundwater sources. Groundwater is extracted from 29 tube wells. Total water extracted from groundwater source is 3.60 MLD. For future, surface water source from Nagaur Lift Water Supply Project (NLWP) is proposed. 13.01 MLD Surface water shall be made available from major water supply project NLWP for Didwana Town, which is under execution and targeted to be commissioned up to July 2020. Augmentation of water supply for 135 LPCD is being done by PHED. Presently water supply is intermittent days (2-3 days intervals) for one hour only. Water supply is not regulated in all the areas; in some areas of town water is supplied in 4-5 days.

80. **Sewerage.** Partial Sewerage System exist in Didwana and out of 11 Zone, many zones are either partially covered or are un-covered. Existing sewerage system of Didwana town, sanctioned in the year 2012, covered Zone-1 - 40%, Zone-2 - 100%, Zone-3 - 100%, Zone-4 - 100%, Zone-6 - 30%, Zone-7 - 15% & Zone-8 - 100% and remaining zones were left uncovered. At present this project is commissioned and includes 5.0 MLD STP.

81. Length of sewer line laid under existing sewerage project is 87.67 Km having dia varying from 200 mm to 900 mm. 5.0 MLD STP based on SBR process was also constructed and at present in running condition. The treated effluents are discharged on to the Mela Maidan which overflows into the lake beside the Mela Maidan. 1 no 4.59MLD Sewage pumping station was also constructed under the same project at Khatiyon ka mohalla and pumping main had also been laid from SPS to manhole at Node no 422 (near Ajmeri Gate).

82. In the absence of safe disposal system of sewage as mentioned above, the people of Didwana City are facing unhealthy and unhygienic living conditions. Therefore, Municipality, other local authorities and public representatives are also demanding facilities of improved sewerage system on priority basis.

83. **Solid Waste Management.** Presently solid waste is collected daily on door to door basis in whole town and disposed unsegregated in several low lying areas of the town. There is no facility of segregation and landfill sites in the town. Nagar Palika is having 8 auto tipper and 3 tractors for collection and disposal of solid waste. There is no charge from households for collection of municipal solid waste.

84. **Power Supply.** Ajmer Vidyut Vitran Nigam Ltd, (AVVNL) supply electricity in Nagaur district. Electricity is supplied for 15-18 hours in a day in the town.

85. **Transport.** There is Didwana Railway Station in Didwana, which connects the town with Churu and Jodhpur. Bus stand is also present from where private and roadways buses runs on daily basis to Jodhpur, Jaipur, Churu and other important cities of Rajasthan and India.

D. Socio Cultural Resources

1. Demography

86. As of 2011 India census, Didwana had a population of 53,749. Males constitute 52% of the population and females 48%. Didwana has an average literacy rate of 58%, lower than the national average of 59.5%: male literacy is 70% and, female literacy is 46%. In Didwana, 17% of the population is under 6 years of age.

87. The town has been growing steadily since 1951. The growth of the town has been phenomenal during 1961-71 when there was an influx of population of immigrants to this town. However, thereafter also the growth was not stable. The average decadal increase is 28.71%.

The last decadal (2001-2011) growth is only 20.31%. Details of decadal population growth rate of Didwana city is shown in Table 9 below-

Table 9: Details of decadal population growth rate of Didwana city

| Census Year | Population | Increase in Population | Growth rate (%) |
|-------------------------|------------|------------------------|-----------------|
| 1951 | 12007 | | |
| 1961 | 13547 | 1540 | 12.83% |
| 1971 | 18242 | 4695 | 34.66% |
| 1981 | 23937 | 5695 | 31.22% |
| 1991 | 32889 | 8952 | 37.40% |
| 2001 | 44675 | 11786 | 35.84% |
| 2011 | 53749 | 9074 | 20.31% |
| Average Increase | | 6957 | 28.71% |

Source: Census of India & DPR.

2. History, Culture and Tourism

88. The city is very famous for its Hindu Tradition Culture and Philosophy and the Maths are must visit for all Hindu Devotees once in lifetime. The temples of these maths are very beautifying and pure the heart. Though they may not be as big as other temples, but they are regarded very high for Hindu community.

89. The name Didwana used to be 'Deen Deewana' as this is a mystic land of Islamic Sufi movement and epicenter. Abdul Ghaffar Rumi stayed here while traveling with Khwaja Moinuddin Chishti. The great Usmani family of the city still resides in Didwana. The Sufi triangle of Ajmer, Nagaur and Didwana gave a mystic journey of anyone. The Great Akbar made a mosque named 'Qila Masjid' (Fort Mosque) in the loving memory of the footsteps of Khwaja Moinuddin Chishti. The Qila Masjid is within the area where The Great Usmani family is residing after Abdul Ghaffar Rumi stayed.

90. The Shree Shyam Maharaj Ji Ka Mandir is famous since 400 years old. Further it is also famous for two famous old maths based on the Ramanuja Sampradaya, namely, the Jahlaria Math headed by Sri Sri 1008 Swami Ghanshyamacharyaji Maharaj and The Nagoria Math headed by Sri Sri 1008 Swami Vishnu Prapannacharyaji Maharaj. The city is historically known for Fort Mosque (Qila Mosque) built by Emperor Akbar in the memory of Sufi Saint.

91. The town is famous for its Ved Vidhyalya where Brahmin students are taught about Veda, dharma and other aspects of the Hindu Religion. The city is also closely related with the formation of a Marwari Business community Maheshwari this city was earlier called as Abhanagari. The town is more than 5000 years old and has long history of great teachers who have taken the Hindu Religion a long way and have shown the way how to lead life, how to grow etc.

E. Environmental Settings of Proposed Sites


92. STP (3.0 MLD) will be constructed in the available vacant land in the existing STP Campus. The proposed land is adjacent to Mela Maidan. There are around 30-40 trees and few shrubs present in the land. Few habitations exist near the STP land but more than 500 mtrs away. No wildlife exists near the proposed site. Tree cutting may be required during construction of STP. During final design (SIP), contractor is required to avoid tree cutting as much as possible and replantation to be done in the ratio of 1:3 as per RUIDP policy. There is no wildlife reported at this site.


93. Treated effluent shall be reused for beneficial purposes for which proposal of one treated effluent storage reservoir (TESR) of 300KL, Treated effluent elevated reservoir (TEER) of 150KL Capacity (22 mtr Staging) for reuse of treated effluent. Contractor will propose the best methods of reuse of treated effluent and sludge as per guidelines of CPHEEO (guidelines are attached as Appendix-6) and best international practices in consultation with RUIDP and Municipality and submit a plan in RUIDP for approval. Excess or unused treated effluent shall be discharged in to adjacent depression/natural stream located at about 800m away from the STP.

94. **Proposed site of SPSs-** SPS-1 (1.7 MLD) is proposed at Degana Road, this land is vacant and no trees exist at this location. The land is under jurisdiction of Nagar Palika and shall be made available for construction of proposed SPS by Nagar Palika. There are few scattered residences and also activities of salt production and packaging is being done near to proposed SPS site, no wild life exist near to proposed site. Other site for SPS-2 (1.3MLD) is proposed in RSEB powerhouse on Ladnu road. There are 2-3 trees in the proposed site. Few habitations (RSEB colony and other residence) exist near the SPS land there is a bituminous road for approach to proposed site. The land is under jurisdiction of Nagar Palika and shall be made available for construction of proposed SPS by Nagar Palika.

95. Details of lands availability are given in Appendix-25. Photographs of proposed sites are given in Appendix-21. Site environmental features of proposed component are given in below table10:

Table 10: Site Environmental Features

| S. No. | Subproject Component | Environmental Features of the Site | Photographs |
|--------|---|---|--|
| 1 | Construction of STP 3 MLD, TEER, TESR and Pump House Near Mela Maidan | <p>STP will be constructed in the available vacant land in the existing STP Campus near Mela Maidan. There are around 30-40 trees and few shrubs present in the land. Flat land (not under any productive use) is available within existing STP campus. The campus is well defined boundary wall. STP disposal map is given in figure 13 and sensitive receptor /habitation map is given in figure 7.</p> <ul style="list-style-type: none"> • The proposed site is well connected with approach road and then pakka road. • No wildlife reported from the area so far. • No sensitive receptor/habitation exist in vicinity of proposed STP site. • Discharge of STP will be used by farmers for agricultural purposes of nearby villages. |  |

| S. No. | Subproject Component | Environmental Features of the Site | Photographs |
|---------------|--------------------------------|--|--|
| 2 | SPS (1.7 MLD) near Degana Road | <p>Sewage pumping station is proposed at Degana Road, Flat land is available and vacant. The land is under jurisdiction of Nagar Palika and shall be made available for construction of proposed SPS by Nagar Palika. There are few habitation and also activities of salt production and packaging is being done near to proposed SPS site, no wild life reported from the area so far. No trees exist at the proposed. Site is well connected with black top road. SPS near Degana Road on google is given in figure 14.</p> |  |


| S. No. | Subproject Component | Environmental Features of the Site | Photographs |
|---------------|---|--|--|
| 3 | SPS (1.3 MLD) at RSEB campus near Ladnun Road | <p>Site is proposed in RSEB powerhouse on Ladnun road. There are 2-3 trees in the proposed site. Few habitations (RSEB colony and other residence) exist near the SPS land there is a bituminous road for approach to proposed site. The land is under jurisdiction of Nagar Palika. No wildlife reported from the area so far. Flat land is available and adequate space is available for proposed work. The campus is well defined boundary wall. SPS map on google is given in figure 15.</p> |  |

Figure 13: STP disposal map of Didwana, Rajasthan

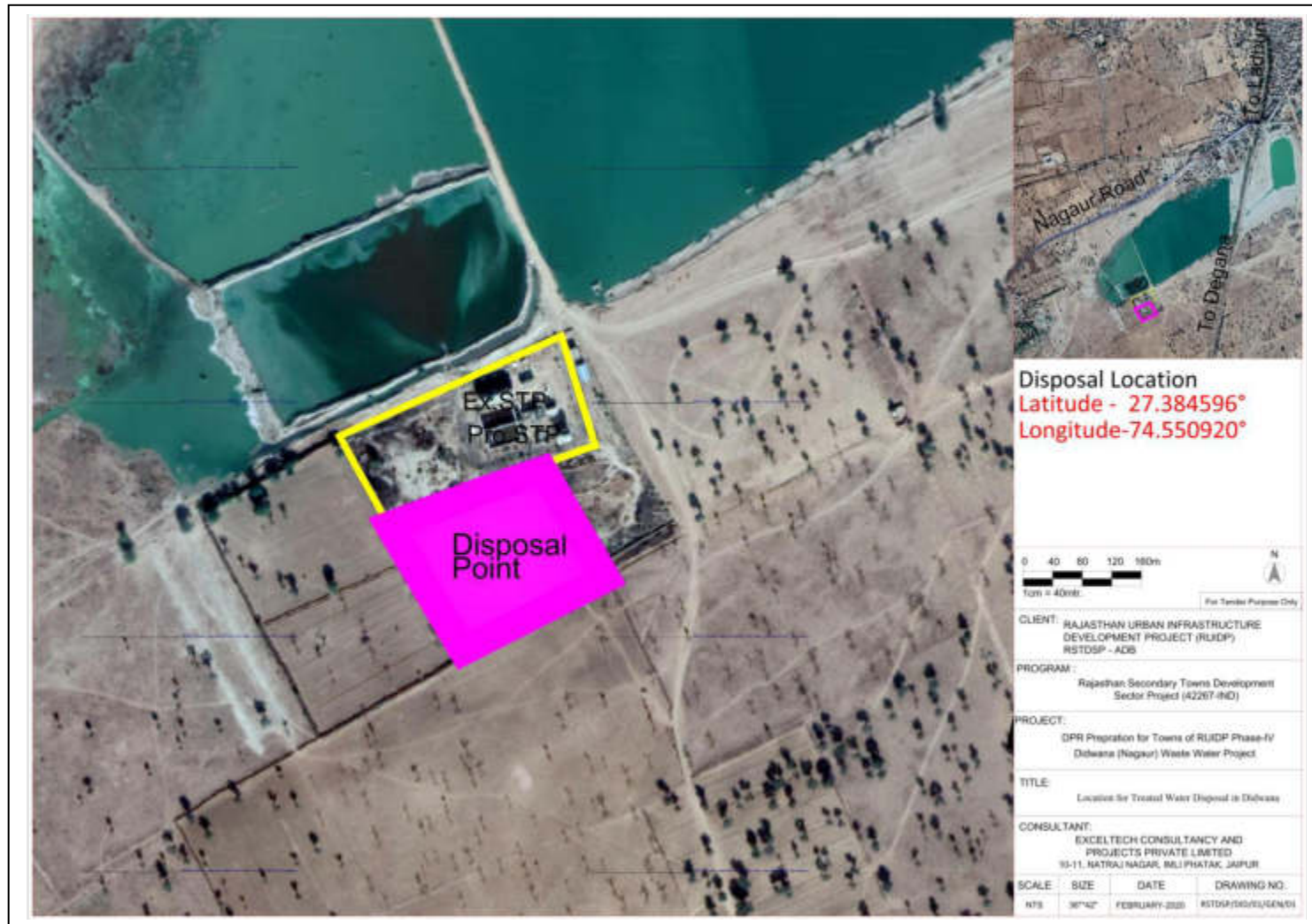


Figure 14: SPS near Degana Road and distance from habitation, Didwana

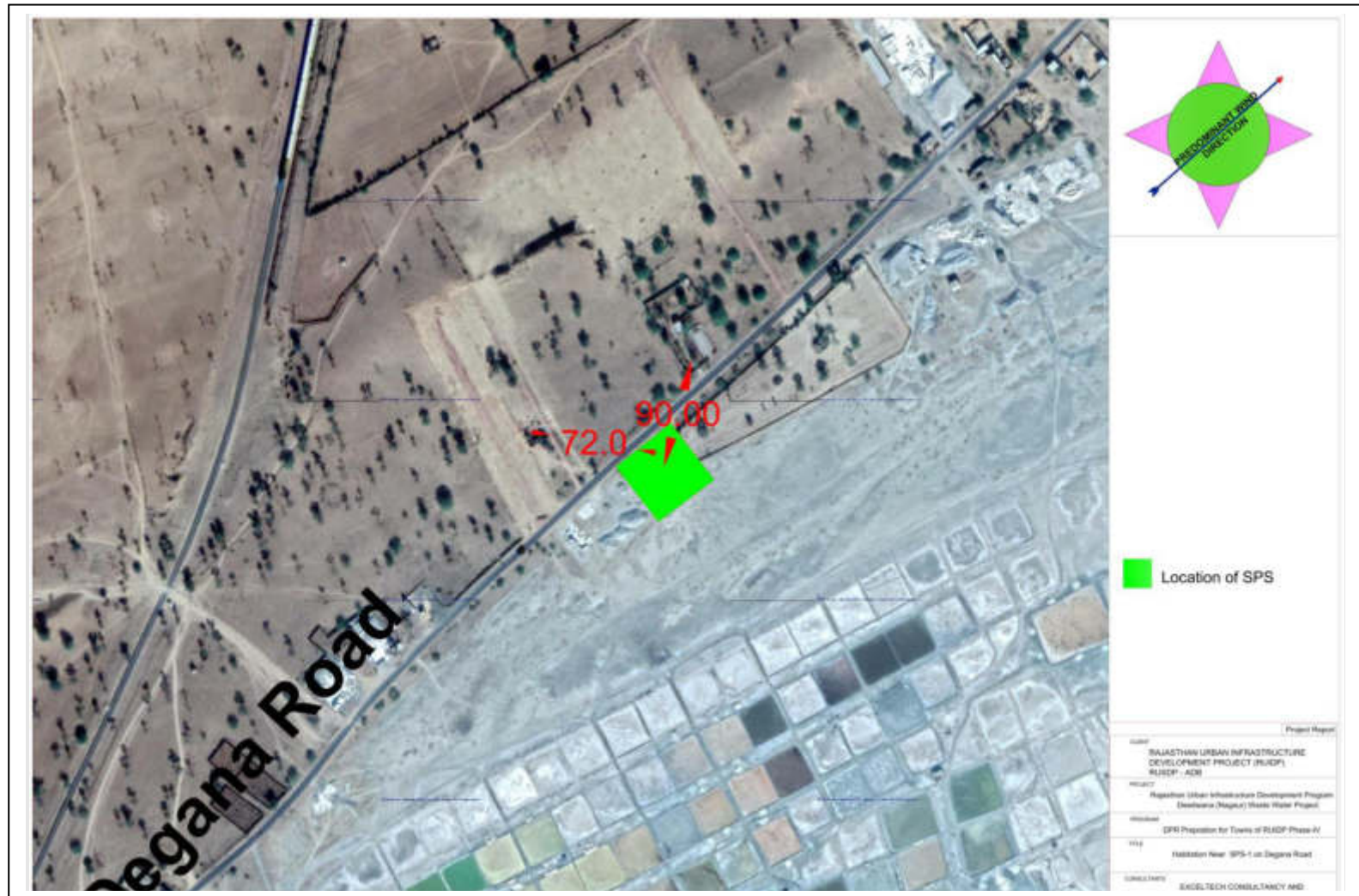


Figure 15: SPS at RSEB powerhouse campus and distance from habitation, Didwana



VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Introduction

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

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

- (i) **Location impacts** include impacts associated with site selection and include loss of on-site biophysical array and encroachment either directly or indirectly on adjacent environments. It also includes impacts on people who will lose their livelihood or any other structures by the development of that site.
- (ii) **Design impacts** include impacts arising from Investment Program design, including technology used, scale of operation/throughput, waste production, discharge specifications, pollution sources and ancillary services.
- (iii) **Pre-Construction Impacts** include impacts which are anticipated during construction works but planning are required for proposed mitigation measures before start of construction works i.e. during SIP period such as taking consents from various departments, planning for construction and workers camps, deployment of safety officer, arrangement of required barricades and caution boards etc.
- (iv) **Construction impacts** include impacts caused by site clearing, earthworks, machinery, vehicles and workers. Construction site impacts include erosion, dust, noise, traffic congestion and waste production.
- (v) **O&M impacts** include impacts arising from the operation and maintenance activities of the infrastructure facility. These include routine management of operational waste streams, and occupational health and safety issues.

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

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

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

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

through public rights-of-way and existing roads hence, land acquisition and encroachment on private property will not occur.

B. Location Impacts

102. Location of Sewage Treatment Plants: STP of 3.0 MLD is proposed near Mela Maidan in the government land in existing campus of STP, which belongs to Municipality (Nagar Palika). There are few habitations within 500 mtrs near to the proposed site. Therefore, all the precautions should be taken during construction to minimize the impacts on nearby residents. Additionally, designs should ensure that odour and air pollution from the operation of the STPs do not affect the health of the residents near the STP. As per preliminary survey 50 trees (planted recently by contractor of existing STP), shrubs and bushes are present at site, therefore tree cutting may be required during construction of STP. During final design (SIP), contractor is required to avoid tree cutting as much as possible and replantation to be done in the ratio of 1:3 as per RUIDP policy. There are no wildlife reported at this site. Treated effluent is managed through one treated effluent storage reservoir (TESR) of 300KL, one treated effluent elevated reservoir (TEER) of 150KL capacity (22 mtr staging) for reuse of treated effluent. Disposal location of proposed STP is given in Figure 13. Disposal of treated effluent will be in government land, no other land will be disturbed. The treated effluent shall meet the relevant CPCB standards for disposal of effluent on to land or surface waters. Hence, there are no adverse impact anticipated due to existing and proposed STP & their disposal location.

103. Mitigation measures to avoid smell and visual pollution shall be taken in consideration during design in Service Improvement Plan preparation period by DBO contractor. Dense plantation in the periphery of STP campus shall be done to avoid adverse impacts on aesthetics and reduce smell also. It is also worth to mention here that proposed SBR technology of STP will evolve low foul smell and smell generated can be mitigated through dense plantation around STP site. Mitigation measures to avoid smell and visual pollution shall be taken in consideration during design in Service Improvement Plan preparation period by DBO contractor. Dense plantation in the periphery of STP campus shall be done to avoid adverse impacts on aesthetics and reduce smell also. It is also worth to mention here that proposed SBR technology of STP will evolve low foul smell and smell generated can be mitigated through dense plantation around STP site.

104. Location of SPS at Degana Road. SPS-1 (1.7MLD) is proposed in the vacant Govt. land at Degana Road, which belongs to Municipality (Nagar Palika). As per preliminary survey, only shrubs and bushes are present at site therefore no tree cutting will be required during construction. There are few habitations and salt packing / transportation work at a distance of more than 500 mtrs from the proposed site. Hence, it is suggested that buffer secondary tank facility should be made available to prevent any leakage of sewage during power outages. Also, alternative power arrangements should be made available so as to ensure that the design residence time is not exceeded at any point of time during the operation of the SPS.

105. Location of Sewage Pumping Station at RSEB campus: For locating sewage pumping station SPS-2-(1.3 MLD) land is available/ identified in RSEB powerhouse on Ladnu Road. Land is under jurisdiction of Nagar Palika and shall be made available for construction of SPS. There are residences present near the site. Therefore, mitigation measures such as odour control measures and alternative power arrangement to ensure that the design residence time is not exceeded at any point of time during operation of the SPS 2 should be implemented to minimize the impacts on nearby residents. As for preliminary survey 2-3 trees (except bushes) are present at site therefore tree cutting is anticipated.

106. Locations impacts of Sewerage Networks: The sewerage collection networks will traverse through different city roads within ROW. Therefore, no impacts are envisaged regarding location. These works will require advance permission from concerned authority for road cutting and traffic diversion etc. No tree cutting will be required as per preliminary design and if any tree cutting will be required during execution, mitigation measures shall be adopted.

107. It has to be ensured that the PIU/contractor obtains the desired consents from RPCB for construction and operation of STP and the treated effluent should meet the parameters as set by CPCB/RPCB. Contractor will also ensure compliances to all the conditions laid out in the CTE.

C. Design Impacts

108. Design of the Proposed Components. The Central Public Health and Environmental Engineering Organization (CPHEEO) manual suggests a design period of 15/30 years in general while designing the systems for water supply and sewerage components. It is proposed to consider 2051 as the design year for all the components in order to maintain unanimity in the design period and design population. Accordingly, 2017 shall be the base year and 2036 the intermediate year to cross check the designs pertaining to intermediate demand. The rate of water supply has been taken as 135 lpcd for 100% population. Sewage generation is 85% of water supply (including 5% to account for infiltration). Sewage generation is 85 percent of water supply (including 5 percent to account for infiltration). Technical design of sewerage (STP, reuse arrangements, sewer mains and network including manholes and house connections, etc.), follows the relevant national planning and design guidelines, include the Sewerage and Wastewater Policy of Rajasthan 2016.

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

- (i) Locating components and facilities appropriately by avoiding sensitive locations like forests and protected areas (environmentally, socially, and archeologically).
- (ii) Reuse of treated wastewater from STP for non-potable uses thereby reducing the load in freshwater resources
- (iii) Adopting a combined approach of sewerage system and fecal sludge and septage management to cover 100% population of the town with safe collection, conveyance and treatment of sewage generated in the town
- (iv) Provision of appropriate personal protection equipment to the workers and staff
- (v) Treatment and reuse of sludge from treatment process; providing a covered shed of adequate space to air dry the processed sludge for at least 15 days at STPs
- (vi) Designing the entire system to maintain optimal flow and terminal pressure, and optimizing the overall energy usage.
- (vii) Avoiding usage of asbestos containing materials

110. Design of Sewage Treatment Plant. One STP of capacity 3 MLD is proposed to be constructed at the identified site to treat the sewage generated from Didwana town. It is proposed to establish STP based on SBR (sequential batch reactor) process, followed by disinfection by chlorine. As the bid is DBO type, detailed design of the STP will be carried out by the contractor to the following specific discharge standards. Currently for STPs in India, the standards notified by Ministry of Environment, Forests and Climate Change (MOEFCC) in 2017 (see column (4) in table below) are applicable. However, under RSTDSP, PMU has decided to base the STP design on discharge standards for STPs suggested by CPCB in 2015, which are more stringent. The strident standards also facilitate maximum utilization of treated wastewater for reuse in various

purposes following the Sewerage and Wastewater Policy, 2016, of Rajasthan. It is also to be noted that, in April 2019, the National Green Tribunal (NGT) in one of its orders directed MOEFCC to reconsider stringent standards for STPs. Treated wastewater standards are given in below table 11.

Table 1: Proposed Raw and Treated Wastewater Characteristics for STP Design

| S. No | Parameter | Proposed Discharge Standards for Didwana STP | MOEF&CC STP Discharge Standards, 2017 | CPCB discharge standards, 2015# | IFC Guideline value for sewage discharge | WHO Guideline Value for safe use in agriculture |
|-------|--|--|---------------------------------------|---------------------------------|--|---|
| 1 | pH | 6.5 – 9.0 | 6 – 9 | 6.5-9.0 | 6 - 9 | 6 – 9 |
| 2 | Biochemical Oxygen Demand (BOD) (mg/l) | ≤10 | <30 <20 (metro cities) | <10 | 30 | - |
| 3 | Chemical Oxygen Demand (COD) (mg/l) | ≤50 | - | 50 | 125 | - |
| 4 | Total Suspended Solids (TSS) (mg/l) | ≤20 | <100 and <50 | <20 | 50 | - |
| 5 | Total Nitrogen (mg/l) | <10 | - | <10 | 10 | - |
| 6 | Ammonical Nitrogen (mg/l) | <5 | - | <5 | - | - |
| 7 | Total Phosphorus (mg/l) | - | - | - | 2 | - |
| 8 | Fecal Coliform MPN/100 ml | 100 (Desirable) and 230 (Permissible) | <1000 | <100 | - | <1000 |
| 9 | Oil and grease, mg/l | - | - | - | 10 | - |
| 10 | Nematodes, number of eggs per litre | - | - | - | - | 1 |

MOEF&CC= Ministry of Environment, Forest and Climate Change; CPCB = Central Pollution Control Board; IFC = International Finance Corporation, the World Bank Group
in April 2019, the National Green Tribunal (NGT) in one of its orders directed MOEFCC to reconsider the standards issued in 2015 for STPs.

111. The STP is based on SBR technology and is designed to meet the latest standards defined in the NGT order dated 30.04.2019 (refer Appendix 4)

112. In this regard, it should be noted that National Green Tribunal in its order dated 30.04.2019 (Appendix-4), stayed the implementation of "Effluent discharge standards for Sewage Treatment Plant" by MOEF&CC Notification Dated 13th October 2017 that proposed lower standards than those defined in the above table and hence is no longer applicable.

113. One of the critical aspects in sewerage system operation is, change in raw sewage characteristics at inlet of sewage treatment plant may affect the process and output quality. STPs are designed for municipal wastewater, which does not include industrial effluent. Characteristics of industrial effluent widely vary depending on the type of industry, and therefore disposal of effluent into sewers may greatly vary the inlet quality at STP and will upset process and affect the

efficiency. Although legally the disposal of effluent meeting certain standards is allowed into municipal sewers (refer Appendix-4), the monitoring of the same is not-practical.

114. To prohibit the industrial discharge into municipal sewers following measures should be considered:

- (i) No industrial wastewater shall be allowed to dispose into municipal sewers
- (ii) No domestic wastewater from industrial units shall be allowed into municipal sewers
- (iii) Ensure that there is no illegal discharge through manholes or inspection chambers
- (iv) Conduct public awareness programs; in coordination with RPCB, issue notice to all industries for compliance
- (v) Conduct regular wastewater quality monitoring (at inlet and at outlet of STP) to ensure that the treated wastewater quality complies with the national effluent standards

115. Appropriate design of STP and pumping station are being adopted in the project which includes energy efficient pumps and technology suitable for treatment and disposal of sewage. Sequential Batch Reactor (SBR) is being adopted for sewage treatment which is the best suitable technologies proven for such treatments and locations. Therefore, no design impacts will arise during proposed works.

116. **Treated wastewater Reuse /disposal.** Rajasthan is a water scarce region and receives low rainfall. Recognizing the importance of treated wastewater in reducing the demand on water, Sewerage and Wastewater Policy, 2016, of Rajasthan promotes the reuse of treated sewage for non-potable applications, and to make sewerage projects environmentally sustainable. Government of Rajasthan adopted this policy to ensure "improved health status of urban population, specially the poor and under privileged, through the provision of sustainable sanitation services and protection of environment". To further promote the reuse and provide guidance, Policy prioritized reuse in irrigation (agriculture, forestry, and landscaping), followed by fish farming, industry and non-potable domestic reuse. Policy requires monitoring of treated wastewater quality, soil quality etc., Policy prohibits artificial recharge of aquifers using treated wastewater, and promotes construction of storage tanks to store treated wastewater to facilitate reuse. Policy prescribes that the detailed project report (DPR) should clearly define the best reuse option specific to the town and prepare a Reuse Action Plan part of the DPR following water quality norms and legal implications. LSGD is currently in the process of publishing Guidelines for Reuse of Treated Wastewater in Rajasthan 2019 to promote the reuse and provide guidance to the stakeholders. Guidelines promotes the use the treated wastewater and envisages to maximize the collection and treatment of sewage generated and reuse of treated wastewater on a sustainable basis, thereby reducing dependency on freshwater resources

117. Policy provided priority to reuse in agricultural for unrestricted irrigation. It suggests blending of treated wastewater with fresh water to improve quality where possible, and crops to be irrigated shall be selected to suit the irrigation water, soil type and chemistry. Policy requires monitoring of accumulation of heavy metals and salinity. It encourages farmers to use modern and efficient irrigation technologies, and to ensure protection of on-farm workers and crops. As a contingency measure, policy requires regular monitoring of treated water quality, and emergency alerts to users in any event of deterioration of quality. Policy prohibits use of treated wastewater for artificial recharge (Excerpts from Policy on Reuse is provided in Appendix 5).

118. During rainy season treated effluent will be disposed to nearby available natural drain/ depression/ low lying area, provision of pipe from STP to ultimate disposal point is already taken as per location agreed by Municipal Board and Employer Representative.

119. Reuse Options. Following the Sewerage and Wastewater Policy, 2016, the draft Guidelines on Reuse provides the following reuse applications:

- (i) Agriculture, horticulture, irrigation
- (ii) Gardening in park
- (iii) Road washing and water sprinkling to reduce fugitive dust
- (iv) Industries including mining
- (v) Recreational ponds and lakes
- (vi) Social forestry
- (vii) Construction Activities
- (viii) Firefighting and other municipal uses
- (ix) Railway
- (x) Thermal power plants
- (xi) Cantonments
- (xii) Individual Users

120. **Reuse Plan.** The State Policy require the Sewerage Detailed Project Report provide reuse options and strategy to implement reuse, and detailed Reuse Action Plan. As the Didwana subproject is proposed under DBO, the Reuse plan will be prepared by the DBO contractor during the detailed design phase in consultation with the stakeholders in Didwana town and reuse modalities firmed up. Subproject includes following components as part of the STP to facilitate reuse: disinfection of treated wastewater, Treated effluent storage reservoir (TESR), effluent pumping station and a treated effluent elevated reservoir (TEER). Following needs to be considered in the preparation of reuse plan:

- (i) As part of the plan, identify potential reuse application in Didwana Town and establish quality criteria for each of the use.
- (ii) 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;
- (iii) Prepare a reuse plan for agriculture/ horticulture, 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.
- (iv) Plan should include awareness and training provisions and responsibilities; these can be conducted by concerned department (e.g., Agricultural Department, District Collectorate)
- (v) Carryout regular / online monitoring of critical quality parameters of treated wastewater to ensure that they meet the preset standards established for reuse

121. Use of treated wastewater for irrigation. Use of wastewater for irrigation is associated with some health risks – from germs in wastewater, which may contaminate food and spread disease, health risk to farm workers from worms (helminths) and nematodes and chemical risk is associated if industrial wastewater enter the sewers. If the wastewater with bacteriological contaminants are used for food crops like lettuce, tomato, which are eaten without peeling or cooking, it will present a greater health risk if precaution such as such washing with chlorinated water or storing for adequate time in normal temperature before use (at least 10 days). According to the WHO, effluent which is used to irrigate trees, industrial/commercial (not food, like cotton)

and fodder crops, fruit trees, and pasture should have less than one viable nematode egg per liter. Effluent used for the irrigation of food crops, sports fields, public parks, should have and less than one viable nematode egg per liter and less than 1000 fecal coliforms per 100 milliliters. These shall be considered in the Reuse Plan that will be prepared during the detailed design and complied accordingly.

122. Disposal of treated wastewater. Proposed STP sites are located close dry water channels (drains) and the excess / surplus / unused treated wastewater will be discharge into low lying depression near the STP site. No natural drains exist near the STP site. As the wastewater is treated to stringent disposal standards, no notable impacts envisaged. No sensitive receptor/habitation is located near disposal site. The disposal of treated wastewater meeting the set quality standards, in fact, will improve the quality of water by dilution. There are no water intakes or abstraction points in the downstream proximity. STP sites are surrounded mostly by agricultural and barren lands. Considering the existing status of drains, and the degree of treatment, no significant impacts envisaged. Proper systems should be put in place at the proposed STP to ensure that treated wastewater always meet the stipulated standards prior to its disposal into low lying area/depression. Any change / lowering of treatment efficiency during operation may lead to poor quality of wastewater and may further pollute the water body. It is therefore critical that STP treats the sewage as designed. Operation and maintenance of STP and change in incoming sewage quality will have impact on the treatment efficiency. This therefore requires monitoring:

- (i) Obtain of consent of RSPCB for discharge of treated wastewater into nearby drains.
- (ii) Regularly monitor the treated wastewater quality at STP and ensure that it meets the discharge standards
- (iii) Monitor water quality periodically during operation phase as per the Environmental Monitoring Plan.

123. Sludge treatment and disposal. Sewage sludge generally consists of organic matter, pathogens, metals and micro pollutants. The concentration of parameters such as metals can be influenced by input to the sewers system from industry. Since no industrial wastewater is allowed into sewers, it is unlikely that sludge contains heavy metals. Heavy metal concentration may not be ruled out completely as the chemicals used in treatment may potentially contains heavy metals, which will then leach into the sludge.

124. Subproject includes sludge management infrastructure in STP, including system for sludge collection, thickening, solar drying, and disposal at landfill/identified site. This includes a Sludge Sump to collect sludge from SBR basins; returning arrangement for supernatant from the sump to inlet/equalization tank for treatment; pumping sludge to sludge thickener and pumping thickened to mechanical sludge dewatering system (such as centrifuge). It also requires contractor to establish a shed where the dewatered sludge cake can be further air dried for 15 days. This is indicative sludge management system, and DBO contractor will design the system meeting these requirements. Bid indicates that "the sludge produced from the treatment process would be processed so it may be used as fertilizer and soil conditioner" and it requires DBO contractor "to conform to the regulations of public health and environment protection norms". This follows the Sewerage and Wastewater Policy, 2016, which suggests "use of sludge produced from the treatment as fertilizer and soil conditioner after processing".

125. The treatment and drying processes kill enteric bacteria and pathogens, and because of its high content of nitrates, phosphates and other plant nutrients the sludge is an excellent organic

fertilizer for application to the land. Adequate drying is however necessary to ensure maximum kill of enteric bacteria. To achieve adequate drying minimum drying period (15 days) shall be ensured. The drying period, which will be varying depending on the season will be determined during operation and be followed. A sludge management plan will be developed by the DBO contractor during the detailed design phase. Proper sludge handling methods should be employed. Personal Protection Equipment should be provided to the workers.

126. Contractor will propose the sludge management plan with best methods for reuse of sludge as per guidelines of CPHEEO (guidelines are attached as Appendix 6) and best international practices in consultation with PMU and Nagar Palika. Properly dried sludge can be used as soil conditioner. Periodic testing of dried sludge will be conducted to ensure that it does not contain heavy metals that make it unsuitable for food crops. Tests shall be conducted to confirm the concentrations below the following standards. As there are no specific standards notified for sludge reuse, the compost quality standards notified under the Solid Waste Management Rules, 2016 have been adopted here. Rules stipulate that "In order to ensure safe application of compost, the following specifications for compost quality shall be met".

Table 2: Standards for Sludge Reuse as Manure

| Standards for Composting. As there are no specific standards notified for sludge reuse, the compost quality standards notified under the Solid Waste Management Rules, 2016 (Schedule II A, Standards for Composting) have been adopted here. According to the standards "In order to ensure safe application of compost, the following specifications for compost quality shall be met, namely: | | | |
|--|-------------------|--|--|
| Parameters | Units | Organic Compost (FCO 2009) | Phosphate Rich Organic Manure (FCO 2013) |
| Arsenic | mg/kg | 10 | 10 |
| Cadmium | mg/ | 5 | 5 |
| Chromium | mg/kg | 50 | 50 |
| Copper | mg/kg | 300 | 300 |
| Lead | mg/kg | 100 | 100 |
| Mercury | mg/kg | 0.15 | 0.15 |
| Nickel | mg/kg | 50 | 50 |
| Zinc | mg/kg | 1000 | 1000 |
| C/N ratio | - | <20 | <20:1 |
| pH | - | 6.5 – 7.5 | (1:5 solution) maximum 6.7 |
| Moisture, percent by weight, maximum | | 15.0 – 25.0 | 25.0 |
| Bulk density | g/cm ³ | <1 | Less than 1.6 |
| Total Organic Carbon, percent by weight, minimum | percent by weight | 12 | 7.9 |
| Total Nitrogen (as N), percent by weight, minimum | percent by weight | 0.8 | 0.4 |
| Total Phosphate (as P ₂ O ₅) percent by weight, minimum | percent by weight | 0.4 | 10.4 |
| Total Potassium (as K ₂ O), percent by weight, minimum | percent by weight | 0.4 | - |
| Odour | | Absence of foul Odor | |
| Particle size | | minimum 90% material should pass through 4.0 mm is sieve | minimum 90% material should pass through 4.0 mm is sieve |

| | | | |
|-----------------------------|-------|---|-----|
| Conductivity, not more than | dsm-1 | 4 | 8.2 |
|-----------------------------|-------|---|-----|

* Compost (final product) exceeding the above stated concentration limits shall not be used for food crops. however, it may be utilized for purposes other than growing food crops.

FCO = Fertilizer Control Order, Department of Agriculture, Government of India

127. Design of Sewer system-collection & conveyance. The sewerage system is designed as a separate system of sewage collection (i.e. caters only to domestic wastewater). There is considerable length of existing surface drains in the project area that can be used for disposal of storm runoff. The underground gravity sewers will carry sewage from households to trunk sewers and further to STPs. To maximize the benefits as intended, Didwana Nagar Palika should ensure that all existing septic tanks are phased out by bypassing the inlet and connecting the toilet discharge from each house directly to sewerage system.

128. Accumulation of silt in sewers in low areas over time, overflows, blockages, power outages, harmful working conditions for the workers cleaning sewers etc. are some of the issues that needs to be critically looked into during the sewer system design. A properly designed system is a must for system sustainability.

129. Measures such as the following shall be included in sewer system design to ensure that the system provides the benefits as intended:

- (i) Limit the sewer depth where possible
- (ii) Sewers shall be laid away from water supply lines and drains (at least 1m, wherever possible);
- (iii) In all cases, the sewer line should be laid deeper than the water pipeline (the difference between top of the sewer and bottom of water pipeline should be at least 300mm).
- (iv) If unavoidable, where sewers are to be laid close to storm water drains, appropriate pipe material shall be selected (stoneware pipes shall be avoided)
- (v) For shallower sewers and especially in narrow roads, use small inspection chambers in lieu of manholes;
- (vi) Design manhole covers to withstand anticipated loads & ensure that the covers can be readily replaced, if broken, to minimize silt/garbage entry
- (vii) Ensure sufficient hydraulic capacity to accommodate peak flows & adequate slope in gravity mains to prevent buildup of solids and hydrogen sulfide generation.
- (viii) Equip pumping stations with a backup power supply, such as a diesel generator, to ensure uninterrupted operation during power outages, and conduct regular maintenance to minimize service interruptions. Consider redundant pump capacity in critical areas.

130. **Design of SPS.** As explained earlier, SPS are proposed at RSEB Powerhouse on Ladnu Road and another is at Degana Road. Care should be taken while designing for this SPS to avoid impacts during construction and operation phases. Design engineers should take following mitigation measures to reduce impacts due to proposes SPS:

- (i) Incorporate in design pumps of low noise
- (ii) Provide dedicated power supply to SPS, if possible, otherwise DG set to be used during power failure, should be soundproof and having acoustic enclosures with

- low/permitted air emission standards
- (iii) Firm barricades should be provided during construction works all around the SPS site
- (iv) Boundary wall of sufficient height with barbed wire fencing should be provided during operation phase so that no children/residents can enter in the SPS premises
- (v) Odour control system should be provided in SPS
- (vi) Plantations should be provided if space available to reduce foul smell of sewer during operation
- (vii) No workers camps should be allowed during construction works at SPS site
- (viii) Entry should be restricted through provision of gate and guard during operation of SPS
- (ix) SPS proposed at Degana road is near to salt lake where salt production is being done. Therefore, care should be taken in design phase to avoid any pollution to salt lake. Highest Flood Level (HFL) should be used as a basis while deciding on the SPS dimensions. Also, all the prevention methods including buffer capacity secondary tank and alternative power arrangements should be implemented so that sewage does not either leak during power outages or percolate into ground and pollute ground water or mix with salt lake.

131. Fecal Sludge and Septage Management (FSSM). The proposed FSSM will help the ULB to cover entire population with safe disposal of human excreta by serving areas which are not feasible to be provided with a sewerage system. Under the FSSM, fecal sludge / septage will be collected from the household level septic tanks using truck mounted mobile desludging equipment and transported to Sewage Treatment Plant (STP) for treatment. At this stage, the quantity of septage generated from this area is not available. This will be estimated during the detailed design phase, and number of mobile tankers required to collect the transport the septage to STP, frequency of collection depending on the size of septic tanks etc., will be worked out accordingly. IEE needs to be updated during the detailed design phase to reflect the final project design. Although handling, transportation and disposal into STP is completely mechanized, the system will however be operated by the workers, therefore proper precautions as workers will be dealing with highly harmful septage. Accessibility of septic tanks to mobile suction tankers to collect septage is critical for success of the septage management system. At STP, the septage will be mixed with the sewage and will be co-treated in the STP. Septage will be in concentrated and partially degraded form, and disposal of the same into STP inlet stream may upset the sewage treatment process, may generate bad odours, and may ultimately affect the quality of treated wastewater. Treatment process needs to be properly designed. Following measures are suggested for implementation:

Conduct detailed survey of the households to be covered with FSSM to design the system to suit the local conditions, such as type of septic tanks and their location in the houses

Create awareness program on the FSSM from collection to treatment system that will be adopted

Design the sewage treatment process duly considering mixing of septage

Ensure that the FSSM system is completely mechanized no human touch, even accidentally, from collection at household to discharge into STP, and in periodic cleaning of tankers

Demarcate a proper area for cleaning of mobile tankers in STP premises, and ensure that the wastewater shall be discharged into STP

Provide proper training to the workers, and staff in safe handling of FSSM tasks, provide all necessary personal protection equipment, eliminate any risks to the workers and the

communities by providing proper training and necessary PPEs to workers. Safeguards induction prior to start of works will include detailed instructions handling, managing and protection from diseases and other biological hazards

Ensure proper facilities for workers including showers, wash areas, toilets, drinking water, eating and resting places

Conduct regular health checks

Prepare Health and Safety Plan for FSSM

D. Pre- Construction Impacts

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

133. **Social and Cultural Resources.** Any work involving ground disturbance can uncover and damage archaeological and historical remains. For this project, excavation will occur in project sites, so it could make medium risk of such impacts if the site contains any archeological and historical remains. Nevertheless, PIU will:

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

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

135. **Mitigation measures at SPS:** SPS are proposed near near habitation areas and salt lake at Didwana. Therefore, care should be taken during pre-construction phase, for this SPS to avoid impacts during construction and operation phases. Contractor should take following mitigation measures to reduce impacts due to proposed SPS:

- (i) Construction and workers camps should not be established at SPS site
- (ii) Workers should be made aware about the inconvenience caused to nearby school and habitations and mitigation measures and good practices to minimize/avoid these impacts

- (iii) Planning should be done to finish the works quickly at SPS site to avoid prolonged disturbance to school and residents near the SPS site
- (iv) No night works should be conducted at SPS site
- (v) Only soundproof equipment should be used during construction such as DG sets etc should be having acoustic enclosures and maintained such that the operational norms on exhaust are adhered to at all times. No disturbance in respect of noise and air pollution should be caused to nearby school and habitants.

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

E. Construction Impacts

137. The civil works for the subproject include earth work excavation for sewer trenches, sewer laying, construction manholes, shifting of public utilities and providing house service connections. Earth work excavation will be undertaken by machine (backhoe excavator) and include danger lighting and using sight rails and barricades at every 100 m., while sewer laying works will include laying sewer at required gradient, fixing collars, elbows, tees, bends and other fittings including conveying the material to work spot and testing for water tightness.

138. **Laying of Sewer Networks:** To facilitate connection of house sewers to branch sewers and provide protection to sewers from external loads, the minimum depth of cover on any proposed sewers will be 1.0m. However, in some starting laterals, cover is restricted to 0.80 m to avoid uneconomical depth of cut in subsequent reaches and where no vehicular traffic load is envisaged. As the traffic over this header area is limited and tonnage is less, this will not cause any problem in system operation. The maximum depth of sewer is 3.5m for open excavation. After 3.5m depth, sewer shall be laid by the trenchless method only. Trenchless method may also be used even where depth is less than 3.5m for important roads in the city where traffic density is more, and in the streets where traffic diversion is not feasible etc. For open areas where even depth is more than 3.5m, sewer may be laid through open excavation as per availability of RoW. Sufficient care will be taken while laying so that existing utilities and cables are not damaged and pipes are not thrown into the trenches or dragged, but carefully laid in the trenches. Trenches deeper than 2 m will be protected by bracings to avoid collapse of trenches, and also to avoid any risk to surrounding buildings. Once they are laid, pipes will be joined as per specification and then tested for any cracks or leakages. The minimum working hours will be 8 hours daily, the total duration of each stage depends on the soil condition and other local features. The excess excavated soil shall be used for filling low lying area or stored/ dumped in approved debris disposal sites. The Contractor shall provide to the PIU, the details methodology that shall be adopted for laying of sewers in a particular stretch prior to initiating work on that stretch.

139. Although construction of these project components involves quite simple techniques of civil work, the invasive nature of excavation and the project locations in the built-up areas of the town where there are a variety of human activities, will result in impacts to the environment and sensitive receptors such as residents, businesses, and the community in general. The anticipated impacts are temporary and for short duration.

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

141. Construction of STP (3.0 MLD) and SPS. STP (3.0 MLD) are proposed in existing STP campus near Mela Maidan with one treated effluent storage reservoir (TESR) of 300KL, Treated effluent elevated reservoir (TEER) of 150KL Capacity (22 mtr Staging) for reuse of treated effluent. Additionally, 2 nos of SPS-SPS-1 at Degana road (1.7MLD) and SPS-2 near RSEB Powerhouse on Ladnu Road (1.3MLD) are proposed on government lands which are under ownership of Nagar Palika. Construction impacts are the common impacts of any construction works like site clearance, excavation, erection of building/structures, health and safety of workers and nearby residents etc. which can be mitigated as per the best practices prevailing in the country which includes but not limited to health and safety arrangements for workers and nearby habitants, operation and maintenance of construction equipment, protection of air, water and noise pollution due to construction works etc. Contractor is required to adopt all the measures as per best national practice and standards. Major points are highlighted in EMP tables.

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

143. **Demolition works.** In the initial stage of project planning it is assessed that there is no requirement of demolition of structures. If any demolition works are required, proper work plan and Mitigation measures will be required for demolition works. Structures to be demolished should be wetted through water sprinkling to reduce dust emission. Appropriate site for storage and disposal of demolished materials should be selected prior to start of demolition activities with prior permission/approval of PIU/ULB. All the safety measures should be adopted during demolition activities.

144. **Storage and Disposal of excavated earth.** A large quantity of soil will be excavated for pipe laying, construction of STP and SPS. Some part of this excavated soil will be reused for backfilling and/or surface leveling; rest of the soil will be needed to be disposed in other locations. Proper storage and disposal plan from contractor is required before start of the work. Prior

permission from land owner/concerned authority for storage and disposal of excess earth is required. Prior to the commencement of works, Contractor will follow all the prescribed rules¹⁵ and if necessary, shall identify a debris disposal site in consultation with the PIU/ULB and adhering to following criteria:

- (i) The site shall be selected preferably from barren, infertile lands. In case agricultural land needs to be selected, top-soil stripping, stacking and preservation should be undertaken prior to initiation of any activities.
- (ii) Debris disposal site shall be at least 200 m away from any surface water body.
- (iii) No residential areas shall be located within 200 m downwind side of the site.
- (iv) The site is minimum 250 m. away from sensitive locations like hospitals, religious places, ponds/lakes or other water bodies.
- (v) The local governing body and community shall be consulted while selecting the site.
- (vi) The approval should be obtained from the local governing body for the selected site prior to commencement of disposal activities;
- (vii) Soil storage site should be properly demarcated by fencing and information board should be placed at entrance
- (viii) At soil storage site, soil should be covered by tarpaulin or regular water sprinkling should be done to reduce dust emission
- (ix) At soil disposal site, the disposed soil should be leveled on daily basis and no heap or mound should be left at end of the day
- (x) Post-Disposal monitoring of the groundwater quality should be carried out by the Contractor / PIU annually in the appropriate season for at least 3 years.

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

- (i) Use material sources permitted by government;¹⁶
- (ii) Verify suitability of all material sources and obtain approval of PIU; and
- (i) Submit to PIU on a monthly basis documentation of sources of materials. . If contractor is purchasing ready mix concrete, asphalt/macadam and aggregates from third party, contractor will assure that all the parties/ suppliers are having CTE/CTO from RPCB and will collect the copy of these certificates and submit to PIU/consultants

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

- (i) Consult with PIU/on the designated areas for stockpiling of soils, gravel, and other construction materials;

¹⁵ Construction and Demolition Waste Management Rules 2016 and Solid Waste Management Rules (refer appendix 8)/ Table 4

¹⁶CTE and CTO will be required for batching plant, hot mix plant, crushers, DG set etc. if specifically established for this project. If contractor is purchasing raw material or ready mix concrete, asphalt/macadam and aggregates from third party, he has to be assured that third party is having CTE/CTO from RPCB and should collect the copy of these and submit to PIU/consultants. Quarry sites should also have the desired permissions.

- (ii) Damp down exposed soil and any stockpiled material on site by water sprinkling
- (iii) Use tarpaulins to cover sand and other loose material when transported by trucks;
- (iv) Clean wheels and undercarriage of haul trucks prior to leaving construction site
- (v) Don't allow access in the work area except workers to limit soil disturbance and prevent access by barricading and security personnel
- (vi) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly, DGs should have proper stake height as per norms;
- (vii) Ensure all the vehicles and equipment operate under valid Pollution Control (PUC) certificates
- (viii) Do regular water sprinkling in dusty areas to reduce dust emission during works
- (ix) Damp down the structures before demolishing to reduce dust emission
- (x) Damp down on regular basis all the access ways
- (xi) Maintain all the equipment and vehicles to reduce emission of smoke and keep pollution under control and keep records of periodic maintenance
- (xii) Conduct ambient air quality monitoring periodically as per EMP:

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

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

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

- (i) Plan activities in consultation with PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;

- (ii) Use road cutters instead of breaker/hammer for cutting the road before excavation for pipe laying on roads
- (iii) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
- (iv) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimize sound impact to surrounding sensitive receptor;
- (v) DGs being used at site should have sound reducing enclosures, preferably silent DGs should be used at site;
- (vi) Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s and equipment;
- (vii) Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
- (viii) Consult the custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals;
- (ix) Provide all workers appropriate PPEs like ear plug/muff, working in high noise conditions;
- (x) Keep all vehicles and equipment in good conditions to avoid excessive noise generation;
- (xi) Provide noise barriers near sensitive receptors like schools, hospitals, temples, courts etc and consult in advance with sensitive receptors about the working hours (specially schools, hospitals, offices, courts etc.), and avoid noisy works in those hours;
- (xii) Avoid noisy works in nights in inhabited areas to avoid any disturbance to habitants; and
- (xiii) Consult in advance with habitants and inform them about the nature and duration of works
- (xiv) Conduct noise monitoring according to the EMP.

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

- (i) Night works should be avoided at construction sites specially in residential areas and should be performed only when day works are not possible due to excessive traffic/public/pedestrian movement, site of cultural or religious importance, where there is huge crowd during day hours or any other unavoidable circumstances.
- (ii) Contractor should plan for night works only after directions from PMU/PIU/CMSC/PMCBC
- (iii) Contractor should submit plan for night works for approval from PIU.
- (iv) PIU should ensure that prior written information should be given to local authorities such as district administration, Police/traffic police, line agencies concerned, residents welfare association/business association/ vyapar mandal of the affected areas and their consents/permissions should be taken prior to start of night works.
- (v) PIU/DSC engineers should check and ensure that all the preparation as per management plan is done by contractor and contractor is having all the necessary equipment and materials for night works.
- (vi) Contractor is required to have following equipment/arrangements for night works-
- (vii) Contractors should have hand held noise level meter for measurement of noise during night hours

- (viii) Contractors should have hand held lux meter for the measurement of illumination during night hours
- (ix) Preferably electrical connections is available for running equipment otherwise sound proof/super silent Diesel Generator set should be available
- (x) Sound level should not increase as per following-

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

- (xi) Illumination should be as follows-

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

- (xii) As far as possible ready mix concrete from batching plant to be used, otherwise the concrete should be prepared away from residential areas and brought to the site
- (xiii) All the noise activity like hammering, cutting, crushing, running of heavy equipment should be done in day time and avoided in night time
- (xiv) Workers engaged in night works should have adequate rest/sleep in day time before start of night works
- (xv) Worker engaged for night works should have previous experience of night works and should be physically fit for such works including clear vision in night
- (xvi) All the necessary provisions of traffic aids such as traffic signals, road signage, barricades, cautions boards, traffic diversion boards etc. should be available with fluorescent/retro-reflective arrangements
- (xvii) Workers should be trained before start of night works about risks and hazards of night works and their mitigation measures and should be provided all the protective aids (PPEs) including fluorescent/retro-reflective vests
- (xviii) The workers should refrain from using horns until it is an emergency situation;
- (xix) Workers should not shout and create noise
- (xx) First aid and emergency vehicles should be available at site
- (xxi) Emergency preparedness plan should be operative during night works
- (xxii) Old persons and pregnant women and women having small kids should not work in night time

- (xxiii) All the vehicles and equipment being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise
- (xxiv) All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works
- (xxv) PIU/DSC site engineers and contractors safety personnel should closely monitor the safety of works continuously and noise and illumination levels on hourly basis and maintain photographic and videographic records as well as register the observations
- (xxvi) Night works should be stopped early in the morning at least one hour before start of pedestrian/traffic movement
- (xxvii) After completion of night works all the site should be cleaned and maintained obstruction free for day time movement of vehicles and pedestrians
- (xxviii) Drivers and workers should be alert and responsive during night works
- (xxix) All the wages to workers working in night hours should be as per the applicable labour acts
- (xxx) Avoid any nuisance which may create problems to nearby habitants and work peacefully during night hours
- (xxxi) Night works should not be conducted near hospitals and during peak seasons such as peak tourist season, students' exam times etc.

150. **Landscape and Aesthetics.** The construction works does not envisage any cutting of trees, but it will produce excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. Haphazard disposal of these will have negative impacts on landscape and overall aesthetics. These impacts are negative but are of short-term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Prepare and implement spoils management plan;
- (ii) Avoid stockpiling of excess excavated soils;
- (iii) Coordinate with ULB for beneficial uses of excess excavated soils or immediately dispose to designated areas;
- (iv) Recover used oil and lubricants and reuse or remove from the sites;
- (v) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- (vi) Remove all wreckage, rubbish, or temporary structures that are not required;
- (vii) Request PIU to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.
- (viii) Minimize removal of vegetation and disallow cutting of trees;
- (ix) If tree-removal will be required, obtain tree-cutting permit from the Revenue Department; and
- (x) Plant three native trees for every one that is removed.

151. **Groundwater Quality.** Another physical impact that is often associated with excavation is the effect on drainage and the local water table if groundwater and surface water collect in the voids. Although, groundwater is much deeper than the proposed trenching depth, and rains are scarce and limited to very short duration during monsoon, to ensure that water will not pond in pits and voids near project location, the construction contractor will be required to conduct excavation works in non-monsoon season to the maximum extent possible. These potential impacts are temporary and short-term duration only. However, to ensure that these are mitigated, construction contractor will be required to:

- (i) Prepare and implement a spoils management plan (Appendix-10);
- (ii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
- (iii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with PIU on designated disposal areas;
- (iv) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- (v) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
- (vi) Dispose any wastes generated by construction activities in designated sites; and
- (vii) Conduct periodical surface quality water quality and ground water quality monitoring according to the EMP.

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

- (i) Prepare and implement a Traffic Management Plan (Appendix-11)
- (ii) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;
- (iii) Schedule transport and hauling activities during non-peak hours;
- (iv) Locate entry and exit points in areas where there is low potential for traffic congestion;
- (v) Keep the site free from all unnecessary obstructions;
- (vi) Drive vehicles in a considerate manner;
- (vii) Coordinate with Traffic Police for temporary road diversions and for provision of traffic aids if transportation activities cannot be avoided during peak hours; and
- (viii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

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

- (i) Inform the affected local population 1-week in advance about the work schedule
- (ii) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum.
- (iii) Provide pedestrian access in all the locations until normalcy is restored. Provide wooden/metal planks over the open trenches at each house to maintain the access.

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

- (i) Prepare and implement spoils management plan (Appendix-10);
- (ii) Leave spaces for access between mounds of soil;
- (iii) Provide walkways and metal sheets where required to maintain access across for people and vehicles;
- (iv) Increase workforce in the areas with predominantly institutions, place of worship, business establishment, hospitals, and schools;

- (v) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and
- (vi) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.
- (vii) Notify community/ water users in advance about likely interruptions in water supply.
- (viii) Provide alternate sources of clean water until water supply is restored.
- (ix) Provide all mitigation measures as given in resettlement plan (RP) prepared for the project to mitigate impacts on vendors and shopkeepers

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

- (i) In the labour force, employ, to the maximum extent possible local persons within the 2-km immediate area if manpower is available; and
- (ii) Secure construction materials from local market.

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

- (i) Comply with all national, state and local labor laws (see Appendix-9);
- (ii) Following best practice health and safety guidelines: IFC's General EHS Guidelines, WHO Interim Guidance (and its updates) on Water, Sanitation, Hygiene and Waste management for the COVID19 virus (Appendix 28), and Sector Specific (Water and Sanitation) Guidelines ;
- (iii) Develop and implement site-specific occupational health and safety (OHS) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment; (c) OHS Training¹⁷ for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;
- (iv) Ensure that qualified first-aid is provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
- (v) Provide medical insurance coverage for workers;
- (vi) Secure all installations from unauthorized intrusion and accident risks;
- (vii) The project area experiences extreme temperature during summer months of April and May, which may affect the health of workers engaged in construction work. Contractor should take necessary measures during summers including the following:
 - a. Work schedule should be adjusted to avoid peak temperature hours (12 -3 PM)

¹⁷ Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

- b. Provide appropriate shade near the work place; allow periodic resting and provide adequate water
- c. Provide necessary medicine and facilities to take care of dehydration related health issues
- (viii) Provide supplies of potable drinking water;
- (ix) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;
- (x) Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;
- (xi) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;
- (xii) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- (xiii) Ensure moving equipment is outfitted with audible back-up alarms;
- (xiv) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and
- (xv) Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.

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

- (i) Plan routes to avoid times of peak-pedestrian activities.
- (ii) Liaise with PIU in identifying risk areas on route cards/maps.
- (iii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.
- (iv) Provide road signs and flag persons to warn of on-going trenching activities.

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

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

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

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

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

- (i) Strictly follow the protocol for chance finds in any excavation work;
- (ii) Request PIU or any authorized person with archaeological/historical knowledge and experience, to observe excavation;
- (iii) Stop work immediately to allow further investigation if any finds are suspected;
- (iv) Inform PIU/ACM if a find is suspected, and take any action they require ensuring its removal or protection in situ.
- (v) Adjacent to religious/historic sites, undertake excavation and construction work in such a way that no structural damage is caused to the building.

161. **Debris disposal.** Prior to the commencement of works, contractor shall identify a debris disposal site in consultation with the PIU and Consultant. Contractor will follow all the prescribed rules¹⁸ during construction and adhering to following criteria (including but not limited to)-

- (i) The site shall be selected preferably from barren, infertile lands. In case agricultural land needs to be selected, top-soil stripping, stacking and preservation should be undertaken prior to initiation of any activities.
- (ii) The local governing body and community shall be consulted while selecting the site.

¹⁸Construction and Demolition Waste Management Rules 2016 (refer annexure 8)

- (iii) Contractor shall prepare a construction and demolition waste management plan in pre-construction phase for safe disposal of construction and demolition wastes as per applicable rules and submit to Municipality through PIU for approval;
- (iv) The approval should be obtained from the local governing body for the selected site prior to commencement of disposal activities;
- (v) Debris disposal site shall be at least 200 m away from surface water bodies¹⁹.
- (vi) No residential areas shall be located within 100 m downwind side of the site.
- (vii) The site is minimum 250m. away from sensitive locations like hospitals, religious places, ponds/lakes or other water bodies;
- (viii) Post-Disposal monitoring of the groundwater quality should be carried out by the Contractor / PIU annually in the appropriate season for at least 3 years.

162. Traffic diversion and/or road closure- If traffic diversion and/or road closure is required for the proposed works, prior consent from traffic department will be required and prior information to affected areas and public should be disseminated through consultations by CAPC. Proper road signage and traffic aids should be provided at site. Excavation along the roads, hauling of construction materials and operation of equipment on-site can cause traffic problems. Potential impact is negative but short term and reversible by mitigation measures. The construction contractor will be required to:

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

163. Wherever road width is minimal, there will be temporary loss of access to pedestrians and vehicular traffic including two wheelers during the laying of pipes. Under those circumstances, contractor shall adopt following measures:

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

¹⁹ In the absence of site meeting the stipulated criteria, an alternate site can be selected specifying the reasons. In such a case, the construction camp management plan should incorporate additional measures specific to the site as suggested by the Construction Manager.

- wooden/metal planks over the open trenches at each house to maintain the access
- (iv) Excavate only that stretch in a day that could be finished in the same day by laying of pipes and backfilling

F. Operation and Maintenance Impacts

164. Operation and Maintenance of the sewerage system will be carried out by DBO contractor for 10 years and then directly by Didwana Nagar Palika. The system shall have a design life of 30 years, during which time, the system shall not require major repairs or refurbishments and should operate with little maintenance beyond routine actions required to keep the equipment in working order. The stability and integrity of the system will be monitored periodically to detect any problems and allow remedial action, if required. Any repairs will be small-scale involving manual, temporary, and short-term works involving regular checking and recording of performance for signs of deterioration, servicing and replacement of parts.

165. It has to be ensured that the Contractor obtains the relevant consents from RPCB for operation of STP. Also, the treated effluent should meet the parameters as set by CPCB/RPCB. Contractor will also ensure compliances to all the conditions as mentioned in the CTO.

166. **Safe disposal of treated effluent and sludge from STP:** In conventional treatment process, risks from STP operation are mainly hazards of disposal of treated effluent and sludge in unscientific manner and risk of infection due to these. Under proposed project, treated effluent from STP will be reused in beneficial purposes and a plan shall be developed by Contractor in consultation with RUIDP and Municipality for beneficial uses of treated effluent. Treated effluent shall meet the minimum criteria set by RPCB/CPCB/MOEF&CC and disinfected treated effluent shall be stored in one treated effluent storage reservoir (TESR) of 300KL capacity, one Treated effluent elevated reservoir (TEER) of 150KL Capacity (22 m Staging) for further reuse of treated effluent. While certain civil structures are proposed for the treated effluents generated from the new STP, the treated effluents from the existing STP are being discharged onto the low-lying land adjacent to the STP. The land had been previously used by the towns' folk for local festivals and fairs and called the Mela Maidan. Hence, during consultations, the residents proposed that appropriate measures should be taken up by the Project authorities to ensure that the land is reverted back to its original use. Towards aiding the Municipality finalize an appropriate approach for treated effluent reuse, the project shall carry out a capacity building activity to enable the Municipality engineers develop appropriate knowledge and skills on the matter. Digested and disinfected sludge can be used as manure (as quality of sludge from SBR process can be used in agriculture practices after testing of sludge for toxicity and heavy metals), keeping in mind that there are vast agricultural practices nearby the STP site. While sludge reuse can be promoted under the project, so far no designs or plan of action has been proposed. Hence, along with the capacity building activity for the Municipality engineers on the treated wastewater reuse, appropriate knowledge and skills on sludge management and reuse shall also be provided. Such training shall enable the Municipality engineers to participate in the decision-making process. Guidelines for reuse of treated effluent and its safe handling and disposal are given in Appendix-6.

167. Contractor will propose the plan with best methods for reuse of treated effluent and sludge as per guidelines of CPHEEO (guidelines are attached as Appendix-6) and best international practices in consultation with RUIDP and Municipality and submit it in RUIDP for approval.

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

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

169. There are also certain environmental risks from the operation of the sewer system, most notably from leaking sewer pipes as untreated fecal material can damage human health and contaminate both soil and groundwater. It will be imperative therefore that the operating agency establishes a procedure to routinely check the operation and integrity of the sewers, and to implement rapid and effective repairs where necessary. There is an occupation health risk to workers engaged in sewer maintenance activities. Following measures should be followed:

- (i) 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);
- (ii) 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;
- (iii) 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.
- (iv) 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
- (v) Develop an Emergency Response System for the sewerage system leaks, burst and overflows, etc.
- (vi) Provide necessary health & safety training to the staff in sewer cleaning &

maintenance

- (vii) Provide all necessary personnel protection equipment
- (viii) For personnel cleaning underground sewers there is a risk due to oxygen deficiency and harmful gaseous emissions (hydrogen sulphide, carbon monoxide, methane, etc.); and hence need to be provided adequate equipment (including oxygen masks) for emergency use.

170. It has to be ensured that the Contractor obtains the relevant consents from RPCB for operation of STP and treated effluent should meet the parameters as set by CPCB/RPCB. Contractor will also ensure compliances to all the conditions as mentioned in the CTO. Latest standards for discharge of effluent are given in Appendix-4. Municipality should have responsible supervision of the effluent discharge standards during operation phase.

171. There is an occupation health risk to workers engaged in sewer maintenance activities. During cleaning/clearing of manholes and sewer lines great precautions should be taken for the safety of workers conducting such works. Therefore O&M contractor will be required to-

- (i) As far as possible, use CCTV mechanism to detect the problems in pipelines and do not engage persons for this purpose
- (ii) As far as possible use mechanized cleaning of manholes and pipelines by using modern techniques and machines and do not engage persons for this purpose and engage persons only if mechanized cleaning is not possible in any way
- (iii) Ensure that employees and line management understand the risks through proper instruction, training and supervision.
- (iv) Use gas detector before entering any person inside manhole to detect any hazardous or inflammable gas present inside the manhole.
- (v) 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.
- (vi) Provide adequate welfare facilities, including clean water, soap, nail brushes, disposable paper towels, and where heavy contamination is foreseeable, showers.
- (vii) For remote locations portable welfare facilities should be provided.
- (viii) Areas for storage of clean and contaminated equipment should be segregated and separate from eating facilities.
- (ix) Provide adequate first-aid equipment, including clean water or sterile wipes for cleansing wounds, and a supply of sterile, waterproof, adhesive dressings.
- (x) Make effective arrangements for monitoring the health of staff.
- (xi) Keep emergency preparedness plan ready before start of the work on sewage system cleaning

172. Biological hazards are among the environmental risks that may adversely impact the health and wellness of the workers and the community. Breakouts of diseases such as diarrhea, flu or pandemics such as the COVID-19 shall be avoided. Designs and implementation of treatment systems shall ensure that disease-causing pathogens or viruses are disinfected and will not cause any health issues. The World Health Organization has released an interim guidance on Water, Sanitation, Hygiene and Waste Management for the COVID-19 virus (see Appendix 28). Measures on managing wastewater and fecal waste and keeping water supplies safe is critical to avoid the start or spread of any disease.

173. A number of households within the Didwana City would be connected to the sewerage network under the Project. However, the existing septic tank system that is being used by the residents should be closed appropriately. This is to prevent the contamination of groundwater or surface water or land resulting from improperly closed septic tank system or septic tank failure. Effective and proper closure of septic tanks can be achieved when the sillage present in the system is emptied into a larger mobile tank which is later sent to the treatment plant for effective treatment. Later, the walls of the septic walls should be removed and disposed as construction debris appropriately. Subsequently, the empty septic tank pit should be filled with stone, coarse and fine sand material to complete the septic tank closure. Towards this, the ULB should establish a mechanism by which the household owners can hire recognized service providers to perform effective septic tank closures and the ULB can issue a closure permit after inspection.

174. The citizens of the Didwana will be the major beneficiaries of the improved sewerage system, as the sewage shall be collected from individual soon upon its generation avoiding its discharge into open drains. In addition to improved environmental conditions, the project will improve the over-all health condition of the town as diseases arising out of poor sanitation will decrease. Hence, people shall spend less on healthcare and lose fewer working days due to illness, thereby improving their economic status, as well.

VII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Overview

175. The active participation of stakeholders including local community, NGOs/CBOs, and the media in all stages of project preparation and implementations essential for successful implementation as well as operation of the project. It will ensure that the subprojects are designed, constructed, and operated with utmost consideration to local needs, ensures community acceptance, and will bring maximum benefits to the people. Public consultation and information disclosure are a must as per the ADB SPS 2009.

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

B. Public Consultation

177. The public consultation and disclosure program are a continuous process throughout the project implementation, including project planning, design and construction. Consultation was conducted on January 2, 2019 at certain locations where critical project components are located. The details of the consultations are provided in Appendix-12. Additionally, socio impact assessment (SIA) was conducted in August, 2018. Informal consultations at sites were also conducted during SIA in Didwana.

1. Consultation during Project Preparation

178. Institutional consultations were conducted with the Governmental Departments such as Local Self Government Department, Public Works Department, Pollution Control Board, Public Health Engineering Department, Didwana Nagar Parishad, etc. The project proposals are formulated in consultation with PHED and Didwana Nagar Parishad and the proposals will be finalized only after certification of Commissioner Didwana Nagar Parishad that the proposals suit the requirements of the ULB. Institutional consultations were conducted with the Government Departments such as Local Self Government Department, Public Works Department, Pollution Control Board, Public Health Engineering Department, Didwana Nagar Palika, etc. The project proposals are formulated in consultation with Didwana Nagar Palika and the proposals will be finalized only after certification of Nagar Palika that the proposals suit the requirements of the ULB.

179. Focus-group discussions with residents and other stakeholders were conducted to learn their views and concerns. A SIA has been conducted in the town, covering sample households and nearby vendors to understand the basic characteristics of town, health status, and the infrastructure service levels, and also the demand for infrastructure services. General public and the vendors along the project activity areas (roads) were also consulted during visits to the project sites (refer Appendix-12 for more details).

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

181. A town-level City Level Committee (CLC) has been formed in Didwana City by Government orders. City Level Committee meeting was organized during the detailed design stage to which representatives of primary and secondary stakeholders were invited. City stakeholder committee meeting was organized in Didwana on Dtd. 21.03.2018 to discuss the matter of proposed sewerage works in Didwana under the chairmanship of District Collector, Nagaur in presence of consultants, RUIDP officials, PHED/ Municipal officials and other invitee members. Proposed scope of works and technology was discussed in the meeting and it was agreed that treated effluent will be reused by Municipality in beneficial uses. The feedback and concerns of the stakeholders was taken into consideration for finalization of design and scope of works. The project was agreed by the committee for further course of action of RUIDP. Details of CLC meeting, minutes and photographs are attached in Appendix-13.

182. At the consultation meeting conducted on 02.01.2019, the participants while appreciating the construction and operation of the existing 3MLD STP, expressed concern over two key aspects. The first one involved the fact that the existing Mela Maidan is being utilized as a discharge point for the treated wastewaters, thereby rendering the Mela Maidan useless for the residents. The Mela Maidan was earlier used for hosting local fairs. Another concern expressed by the residents was on the indecision by the ULB for providing the treated wastewaters for use by the nearby farmers even though written request has been provided to the ULB.

183. In order to address the discharge of the treated wastewaters on to the Mela Maidan, the Project has proposed the installation of effluent discharge pipe of sufficient diameter to accommodate the effluent flow from both the existing and the proposed STP and discharge the treated wastewaters at a discharge point about 800m from the STP and allow for flows along the natural drainage channels.

184. In order to address the use of treated wastewaters by the local farmers, the Project proposes to build the capacity amongst the ULB staff to develop and implement a plan to reuse treated wastewaters for beneficial purposes as per the State Sewerage and Wastewater Policy of the Government of Rajasthan.

2. Consultation during Construction

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

186. A constant communication will be established with the affected communities to redress the environmental issues likely to surface during construction and operational phases and also regarding the grievance redress mechanism. Nagar Palika/PIU with the help of Community Awareness and Participation Consultant (CAPC) will organize public meetings and will appraise the communities about the progress on the implementation of EMP. Meeting will also be organized at the potential hotspots/sensitive locations before and during the construction.

C. Information Disclosure

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

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

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

190. 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.

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

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

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

- (i) Final IEE;
- (ii) A new or updated IEE and corrective action plan prepared during project implementation, if any; and
- (iii) Environmental monitoring reports.

VIII. GRIEVANCE REDRESS MECHANISM

A. Project Specific Grievance Redress Mechanism

193. A project-specific, three-tier grievance redress mechanism (GRM) covers both environment and social issues. The GRM will be established to receive, evaluate, and facilitate the resolution of affected persons' concerns, complaints, and grievances about the social and environmental performance at project level. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns related to the project. Assessment of the GRM designed and implemented for Rajasthan Urban Sector Development Program (RUSDP)³⁰ the system was effective in timely resolution of grievances in a transparent manner.³¹ 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.³²

194. **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.

195. 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.

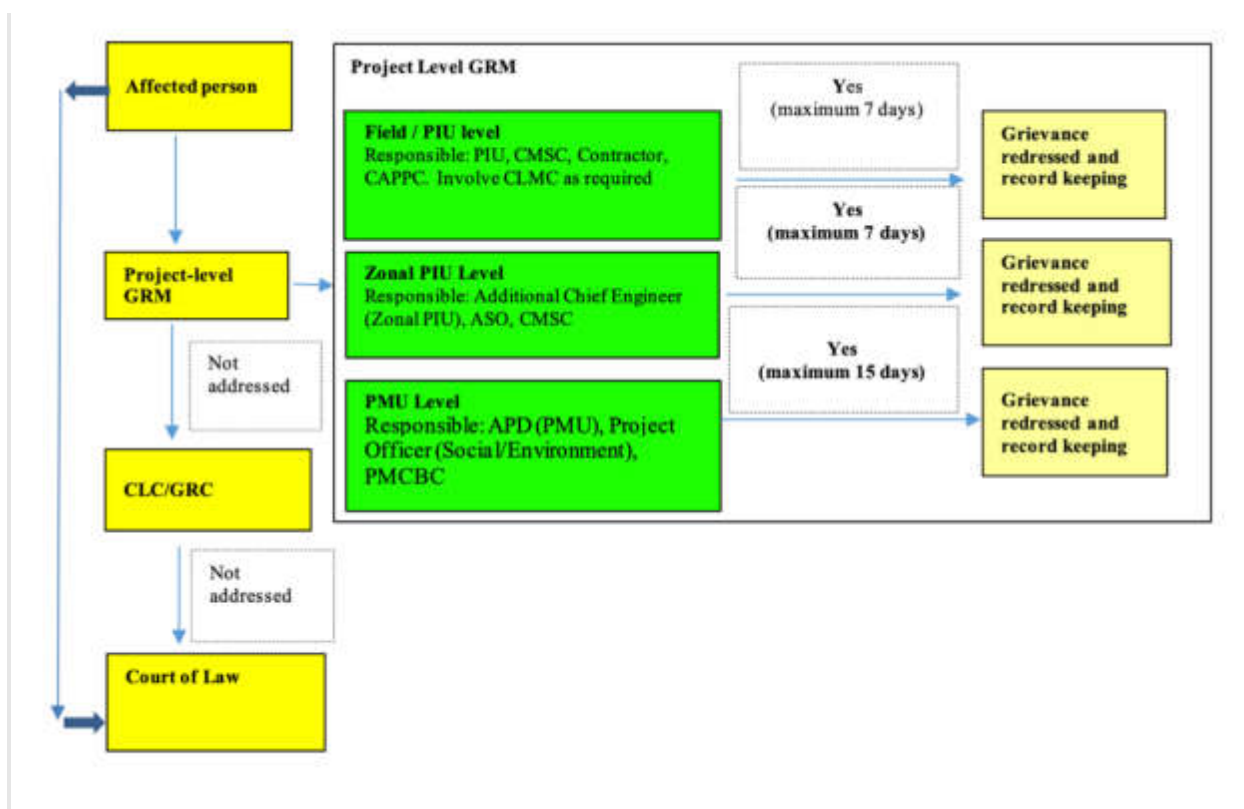
196. Affected persons will have the flexibility of conveying grievances/suggestions by dropping grievance redress/suggestion forms in complaint/suggestion boxes that will be installed by project PIUs or by e-mail, by post, or by writing in a complaints register in ULB offices/complaints register at contractor's work site³³ or by sending a WhatsApp message to the PIU³⁴ or by dialling the phone number of town level PIU/CAPPC or by dialling a toll-free number.³⁵ 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.³⁶ Careful documentation of the name of the complainant, date of receipt of the complaint, address/contact details of the person, location of the problem area, and how the problem was resolved will be undertaken and feedback provided to the complainant on action/decision taken. The Safeguard and Safety Officer of town/city level PIU will have the overall responsibility for timely grievance redressal on environmental and social safeguards issues and for registration of grievances, related disclosure, with the assistance of project consultants. In case of grievances that are immediate and urgent in the perception of the complainant, the contractor, and officials of PIU with assistance from construction management and supervision consultants (CMSC) and CAPPC on-site will provide the most easily accessible or first level of contact for quick resolution of grievances. Contact numbers and names of the concerned PIU safeguard and safety officer, contractors, CAPPC, and CMSC personal will be posted at all construction sites at visible locations.

- (i) **1st level grievance.** The contractors, PIU Executive Engineer (EE)/Assistant Engineer (AE) designated as safeguard and safety officer (social and environment), CMSC (safeguard staff) and CAPPC can immediately resolve issues on-site, in consultation with each other and will be required to do so within 7 days of receipt of a complaint/grievance. If required, city level monitoring committee (CLMC)³⁷ will be involved in resolution of grievances at the 1st level.
- (ii) **2nd level grievance.** All grievances that cannot be redressed within 7 days at field/PIU level will be brought to the notice of Zonal PIU headed by Additional Chief Engineer (ACE). The ACE at zonal PIU will resolve the grievance within 7 days of receipt of complaint/grievance in discussion with the ASO, field level PIU, CMSC, CAPPC and the contractor.
- (iii) **3rd level grievance.** All the grievances that are not addressed by Zonal PIU within 7 days of receipt will be brought to the notice of the PMU. Depending on the nature of grievance, the Project Officer (Social/Environment) at PMU will resolve the grievance within 15 days of receipt of grievance with necessary coordination of Zonal PIU and CMSC and guidance/instruction of Additional Project Director (APD-PMU).
- (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.³⁸ In its role as a GRC, the CLC will meet whenever there is an urgent, pending grievance. Other grievances can be discussed during its regular meetings. Zonal

PIU will inform the CLC regarding any grievances required to be resolved urgently. The GRC will resolve the grievance within 15 days of receiving the complaint. In case of any indigenous peoples impacts in subprojects, the CLC/GRC must have representation of the affected indigenous people community, the chief of the tribe or a member of the tribal council as traditional arbitrator (to ensure that traditional grievance redress systems are integrated) and an NGO working with indigenous people groups.

- (v) The multi-tier GRM for the project is outlined below (Figure 16), 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 16: 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.

197. 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), 2013.³⁹

198. 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 Mechanism⁴⁰.

199. **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 18.

200. Office order creating the GRM is attached as Appendix 19.

201. **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.

202. **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.

XI. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management Plan

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

204. The purpose of the environmental management plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with.

205. A copy of the EMP must be kept at work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. The EMP will be made binding on all contractors operating on the site and will be included in the contractual

clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

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

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

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

Table 13: Design Stage Environmental Management Plan

| Field | Anticipated Impact | Mitigation Measures | Responsible for Implementation/ Monitoring | Cost and Source of Funds |
|------------------------------|---|--|---|---------------------------------|
| Sewage Treatment Plant (STP) | Odour nuisance and aesthetics | (i) Provide a green buffer zone of 10-20 m wide all around the STP, and 5-10 m around SPSs, 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. (ii) 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. | DBO Contractor / PIU | Project costs |
| All work sites | Tree cutting and site preparation | (i) Minimize removal of trees by adopting to site condition and with appropriate layout design of STP/SPS or any other site with trees (ii) Obtain prior permission for tree cutting at STP/SPS site or at any other site that may require tree cutting finalized during detailed design (iii) Plant and maintain 3 trees for each tree that is removed | DBO Contractor / PIU | Project costs |
| Site preparation | Removal of solid waste and other nuisance materials | (i) Ensure that the project sites are cleared of solid waste or other nuisance materials (ii) Dispose solid waste from existing sites and materials into designated locations (dumping in vacant lot is not allowed) – Appendix 8 provides the documentation for the Materials Recovery Facility and the Checklist for Solid Waste Management Transport | PIU | |
| Design sewerage system | Non-compliance or non-adherence with the environmental considerations proposed in preliminary designs during detailed design: | Ensure compliance with the following during the detailed design: (i) Locating components and facilities appropriately by avoiding sensitive locations like forests and protected areas (environmentally, socially, and archeologically). (iii) Treatment and reuse of sludge from treatment process; providing a covered shed of adequate space to air dry the processed sludge for at least 15 days at STPs (i) Designing the entire system to maintain optimal flow and terminal pressure, and optimising the overall energy usage (vi) Avoiding usage of asbestos containing materials (vii) Reducing the incidence of water borne diseases by providing 100% population including urban poor with potable water supplies (viii) Reuse of treated wastewater from STP for non-potable uses thereby reducing the load in freshwater resources (ix) Adopting a combined approach of sewerage system and faecal sludge and septage management to cover 100% population of the town with | DBO Contractor / PMU | Project costs |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Implementation/ Monitoring | Cost and Source of Funds |
|------------------------------|---|--|---|--------------------------|
| | | safe collection, conveyance and treatment of sewage generated in the town (x) Provision of appropriate personal protection equipment to the workers and staff | | |
| Seismic sensitivity | Damage to infrastructure and potential risks: project area in moderate earthquake risk zone (Zone II) | (i) Designs of project component structures shall comply with relevant codes of design such as Bureau of Indian Standard (BIS) specifications for earthquake resistant design (IS: 1893: Criteria for earthquake resistant design of structures). | DBO Contractor/PIU | Project costs |
| Sewage Treatment Plant (STP) | Hazardous / harmful chemicals | <ul style="list-style-type: none"> (i) Reduce the use of chemicals in the treatment process to the extent possible; provide non-chemical alternatives or easily recoverable and/or reusable chemicals or biocompatible alternatives. (ii) Establish proper handling / storage / application system according to the relevant standards, safety precautions and prevent accidental release / spill (iii) Provide leak/spill detection, collection / capture and safe disposal facilities such as chlorine absorption and neutralization facility (iv) Provide ventilation, lighting, entry and exit facilities; visible and audible alarm facilities to alert chemical/chlorine leak (v) Facility for isolation in the event of major leakages (vi) Eye wash and shower facility (vii) Personal protection and safety equipment for the operators (masks, oxygen cylinders, gloves, etc.,) (viii) Provide training to the staff in safe handling and application of chemicals, material safety, and standard operating procedures and emergency responses (ix) Develop emergency response procedures | DBO Contractor/PIU | Project costs |
| Sewage Treatment Plant (STP) | Inefficient sewage treatment, treated effluent characteristics not satisfying the CPCB/RPCB | <ul style="list-style-type: none"> (ii) Ensure that the selected process is appropriate for the town and meets discharge standards and facilitate reuse (ii) Treated effluent should meet the criteria set by RSPCB/CPCB or the following bid specified parameters, whichever are stringent: | DBO Contractor / PIU | Project costs |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Implementation/ Monitoring | Cost and Source of Funds | | | | | | | | | | | | | | |
|------------------------------|--|--|---|--------------------------|------------|-----|-----------|-----|-----------|-----|-------------|-----|----------------------|-----|----------------------------|-------|--|--|
| | standards | <table border="1"> <tr> <td data-bbox="615 289 877 321">pH</td> <td data-bbox="877 289 1045 321">6.5 – 9.0</td> </tr> <tr> <td data-bbox="615 321 877 362">BOD5, mg/l</td> <td data-bbox="877 321 1045 362">≤10</td> </tr> <tr> <td data-bbox="615 362 877 402">COD, mg/l</td> <td data-bbox="877 362 1045 402">≤50</td> </tr> <tr> <td data-bbox="615 402 877 443">TSS, mg/l</td> <td data-bbox="877 402 1045 443">≤20</td> </tr> <tr> <td data-bbox="615 443 877 483">NH4-N, mg/l</td> <td data-bbox="877 443 1045 483"><25</td> </tr> <tr> <td data-bbox="615 483 877 524">Total nitrogen, mg/l</td> <td data-bbox="877 483 1045 524"><10</td> </tr> <tr> <td data-bbox="615 524 877 589">Fecal Coliform, MPN/100 ml</td> <td data-bbox="877 524 1045 589"><1000</td> </tr> </table> | pH | 6.5 – 9.0 | BOD5, mg/l | ≤10 | COD, mg/l | ≤50 | TSS, mg/l | ≤20 | NH4-N, mg/l | <25 | Total nitrogen, mg/l | <10 | Fecal Coliform, MPN/100 ml | <1000 | | |
| pH | 6.5 – 9.0 | | | | | | | | | | | | | | | | | |
| BOD5, mg/l | ≤10 | | | | | | | | | | | | | | | | | |
| COD, mg/l | ≤50 | | | | | | | | | | | | | | | | | |
| TSS, mg/l | ≤20 | | | | | | | | | | | | | | | | | |
| NH4-N, mg/l | <25 | | | | | | | | | | | | | | | | | |
| Total nitrogen, mg/l | <10 | | | | | | | | | | | | | | | | | |
| Fecal Coliform, MPN/100 ml | <1000 | | | | | | | | | | | | | | | | | |
| Change in raw sewage quality | Mixing of industrial effluent with sewage | <ul style="list-style-type: none"> (i) No industrial wastewater shall be allowed to dispose into municipal sewers (ii) As there is a risk of potential mixing of industrial waste, no domestic wastewater from industrial units shall be allowed into municipal sewers (iii) Ensure that there is no illegal discharge through manholes or inspection chambers (iv) Conduct public awareness programs; in coordination with RSPCB and CLC. (v) Conduct regular wastewater quality monitoring (at inlet and at outlet of STP) to ensure that the treated wastewater quality complies with the effluent standards | DBO Contractor and PIU / PMU | Project Costs | | | | | | | | | | | | | | |
| Sewage Treatment Plant (STP) | Use of treated wastewater for reuse applications | <p>Develop wastewater reuse plan for Didwana Town in consultation with CLC as per the Sewerage and Wastewater Policy, 2016. The Reuse Plan shall inter alia include the following:</p> <ul style="list-style-type: none"> (i) Identify potential reuse application in Didwana, and establish quality criteria for each of the use (ii) 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; (iii) Prepare a reuse plan for agriculture, if that is the priority use or one of the applications as per the CLC in Didwana, 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. (iv) Plan should include awareness and training provisions and responsibilities; these can be conducted by concerned department (e.g., Agricultural Department, District Collectorate) | DBO Contractor / PIU | Project costs | | | | | | | | | | | | | | |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Implementation/ Monitoring | Cost and Source of Funds |
|-------------------------|--|---|---|--------------------------|
| | | (v) Carryout regular / online monitoring of critical quality parameters of treated wastewater to ensure that they meet the preset standards established for reuse | | |
| STP | Sludge management and reuse | <ul style="list-style-type: none"> (i) Prepare a sludge management plan (ii) Prepare a dried Sludge utilization plan for Didwana within the help of Agriculture Department / CLC; plan should also include if any additional processing is required for sludge to use as soil conditioner (iii) Plan should clearly various potential uses and demand in Didwana and surroundings (iv) 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. (v) Identify a landfill / suitable site for disposal of surplus dried sludge (vi) Monitor sludge quality during operation phase as per the Environmental Monitoring Plan, ensure that it meets the quality parameters established by FCO (vii) 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) | DBO Contractor/PIU | Project costs |
| Sewage pumping stations | Handling and disposal of accumulated waste at identified SPS sites | <ul style="list-style-type: none"> (i) Prepare a waste handling and management plan for the work, considering handling, disposal and occupational and public health safety (ii) Assess the working conditions, develop appropriate working method, and work shall be only conducted under continuous supervision of EHS supervisor (iii) Waste shall not be handled manually; use appropriate equipment (iv) All workers shall be provided with necessary personal protection equipment, including gloves, boots, face / gas masks and oxygen cylinders in handy for emergency use etc.; if gas emission is suspected at any point of time, workers shall use gas masks with oxygen cylinders (v) Inform surrounding public about the work (vi) Fire control and safety equipment shall be provided at the work site (vii) Waste shall be properly covered during transport (viii) Manage the solid waste as per the Solid Waste Management Rules, 2016 | DBO Contractor/PIU | Project costs |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Implementation/ Monitoring | Cost and Source of Funds |
|---|---|---|---|--------------------------|
| Sewage pumping stations | Noise and odour generation from sewage pumping operations, and public and occupational safety | <ul style="list-style-type: none"> (i) Provide low noise, efficient pumping systems (ii) Provide dedicated power supply to SPS, if possible, otherwise DG set to be used during power failure, should be soundproof and having acoustic enclosures with low/permitted air emission standards (iii) Design SPS with appropriate retention time, so as not to retain the sewage in the sump for long time to avoid generation of odourous gases (iv) Firm barricades should be provided all round during construction of SPS; (v) Boundary wall of sufficient height should be provided during operation phase so that no children/residents can enter in the SPS premises (vi) Plantations should be provided if space available to reduce foul smell of sewer during operation (vii) No workers camps should be allowed during construction works at SPS site (viii) Entry should be restricted through provision of gate and guard during SPS operation. (ix) Highest Flood Level (HFL) should be used as a basis while deciding on the SPS dimensions. Also, all the prevention methods including buffer capacity secondary tank and alternative power arrangements should be implemented so that sewage does not either leak during power outages or percolate into ground and pollute water. | DBO Contractor/PIU | Project costs |
| Sewer network – collection and conveyance | Poor design leading to overflows, blockages, and creating nuisance, pollution | <ul style="list-style-type: none"> (i) Limit the sewer depth where possible (ii) Sewers shall be laid away from water supply lines and drains (at least 1 m, wherever possible); (iii) In all cases, the sewer line should be laid deeper than the water pipeline (the difference between top of the sewer and bottom of water pipeline should be at least 300 mm) (iv) In unavoidable, where sewers are to be laid close to storm water drains, appropriate pipe material shall be selected (stoneware pipes shall be avoided) (v) For shallower sewers and especially in narrow roads, use small inspection chambers in lieu of manholes; (vi) Design manhole covers to withstand anticipated loads and ensure that the covers can be readily replaced if broken to minimize silt/garbage entry (vii) Ensure sufficient hydraulic capacity to accommodate peak flows and adequate slope and gas vents in gravity mains to prevent buildup of solids | DBO Contractor/PIU | Project costs |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Implementation/ Monitoring | Cost and Source of Funds |
|---|--|---|---|--------------------------|
| | | and hydrogen sulfide generation (viii) Take necessary precautionary measures to protect sewer network, and to avoid disposal of solid wastes, debris, wastewater into newly laid sewers from the time it is constructed to the start of operation phase | | |
| FSSM | Occupational health and safety issues, and impact on STP process | (i) Conduct detailed survey of the households to be covered with FSSM to design the system to suit the local conditions, such as type of septic tanks and their location in the houses (ii) Create awareness program on the FSSM from collection to treatment system that will be adopted (iii) Design the sewage treatment process duly considering mixing of septage (iv) Ensure that the FSSM system is completely mechanized no human touch, even accidentally, from collection at household to discharge into STP, and in periodic cleaning of tankers (v) Demarcate a proper area for cleaning of mobile tankers in STP premises, and ensure that the wastewater shall be discharged into STP (vi) Provide proper training to the workers, and staff in safe handling of FSSM tasks, provide all necessary personal protection equipment (vii) Ensure proper facilities for workers including showers, wash areas, toilets, drinking water, eating and resting places (viii) Conduct regular health checks (ix) Prepare Health and Safety Plan for FSSM | DBO Contractor/PIU | Project costs |
| Asbestos cement (AC) pipes in existing water supply system: clearing, transfer and disposal; work in narrow streets, and interventions in existing AC | Health impacts due to air borne asbestos if handled unsafely, cut, drilled or broken into pieces | (i) Develop ACM Management Plan (AMP) that includes identification of hazards, the use of proper safety gear and disposal methods. (ii) Conduct awareness program on safety during the construction work (iii) Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day (iv) Provide barricades, and deploy security personnel to ensure safe movement of people and also to prevent unnecessary entry and to avoid accidental fall into open trenches (v) Identify risk of intervention with existing AC pipes. If there is significant risk, implement the AMP strictly that includes identification of hazards, the use of proper safety gear and disposal methods. (vi) Maintain records of AC pipes as per the AMP (vii) Refer to the instructions of the Asbestos Expert | DBO Contractor/PMU | Project costs |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Implementation/ Monitoring | Cost and Source of Funds |
|------------------------------------|--------------------|---|---|--------------------------|
| pipelines | | | | |
| Preparation of plans and protocols | Various impacts | (i) Preparation of waste handling and management plan for SPS sites (ii) Prepare traffic management plan (iii) Prepare occupational health and safety plan (iv) Prepare spoils management plan | DBO Contractor and PMCBC (for ACM plan) | Approval of plans by PIU |

Table 14: Environmental Management Plan of Anticipated Impacts during Pre-Construction

| Field | Anticipated Impact | Mitigation Measures | Responsible for Implementation | Monitoring of Mitigation | Cost and Source of Funds |
|---|--|---|---|--------------------------|--|
| Compliance with environmental subproject selection criteria | Environmental impacts due to subproject | Compliance with environmental subproject selection criteria | DBO Contractor, PIU and Didwana Nagar Palika | PMU | No costs required |
| Environmental monitoring of baseline conditions of air, noise, water and soil | To establish base line environmental conditions | Environmental monitoring through NABL accredited laboratory | Construction contractor | Consultants/PIU | Contractor |
| Legal compliance | Environmental legal noncompliance may attract legal actions Failure to obtain necessary consents Permits, NOCs etc. can result to design revisions | (i) Obtain all consents, clearances (CTE/CTO from RSPCB), permits NOCs etc. before start of construction works Ensure that all necessary approvals for construction to be obtained by contractor are in place before start of construction (ii) Following consents are required- Tree cutting-local authority Storage, handling and transport of hazardous materials- RSPCB Sand mining, quarries, borrow areas- Department of mines and Geology Traffic diversion/road cutting- local authority, | PIU/Consultants in coordination of Nagar Palika | PMU | Cost of obtaining all consents, permits, clearance, NOCs etc. prior to start of civil works responsibility of PIU. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Implementation | Monitoring of Mitigation | Cost and Source of Funds |
|-------------------------------|---|---|---|---|---|
| | and /or stoppage of works | traffic police (iii) Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs etc. (iv) Include in detailed design drawings and documents all conditions and provisions; if necessary | | | |
| Utilities | Telephone lines, electric poles and wires, water lines within proposed project area | (i) Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; and (ii) Require construction contractors to prepare a contingency plan to include actions to be taken in case of unintentional interruption of services. (iii) Require contractors to prepare spoils management plan (Appendix 10) and traffic management plan (Appendix 11) | DBO Contractor in collaboration with PIU and with approval of PMU | (i) List of affected utilities and operators; (ii) Bid document to include requirement for a contingency plan for service interruptions (example provision of water if disruption is more than 24 hours), spoil management plan (Appendix 10), and traffic management plan (Appendix 11) | No cost required. Mitigation measures are part of TOR of PMU, PIU and Consultant |
| Social and Cultural Resources | Ground disturbance can uncover and damage archaeological and historical remains | Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognized, and measures are taken to ensure they are protected and conserved. | DBO Contractor and PIU | Chance Finds Protocol | No cost required. Mitigation measures are part of TOR of PIU and Consultant |
| Construction work camps, | Disruption to traffic flow and | (i) Prioritize areas within or nearest possible vacant space in the project location; | Contractor to finalize locations in | (i) List of selected sites for | No cost required. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Implementation | Monitoring of Mitigation | Cost and Source of Funds |
|---|--|---|---|--|--|
| hot mix plants, stockpile areas, storage areas, and disposal areas. | sensitive receptors | <p>(ii) If it is deemed necessary to locate elsewhere, consider sites that will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems;</p> <p>(iii) Do not consider residential areas;</p> <p>(iv) Take extreme care in selecting sites to avoid direct disposal to water body which will inconvenience the community.</p> <p>(v) For excess spoil disposal, ensure</p> <p>(a) site shall be selected preferably from barren, infertile lands. In case agricultural land needs to be selected, written consent from landowners (not lessees) will be obtained;</p> <p>(b) debris disposal site shall be at least 200 m away from surface water bodies; (c) no residential areas shall be located within 50 m downwind side of the site; and (d) site is minimum 250 m away from sensitive locations like settlements, ponds/lakes or other water bodies.</p> | consultation and approval of PIU | <p>construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.</p> <p>(ii) Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land</p> | Mitigation measures are part of TOR of PIU and Consultant and also part of contractual terms |
| Sources of Materials | Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution. | <p>(i) Prioritize sites already permitted by the Department of Mines and Geology</p> <p>(ii) If other sites are necessary, inform construction contractor that it is their responsibility to verify the suitability of all material sources and to obtain the approval of PMU and</p> <p>(iii) If additional quarries will be required after construction is started, inform construction contractor to obtain a written approval from PIU.</p> | DBO Contractor to prepare list of approved quarry sites and sources of materials with the approval of PIU | <p>(i) List of approved quarry sites and sources of materials;</p> <p>(ii) Bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary.</p> | <p>No cost required.</p> <p>Mitigation measures are part of TOR of PIU and Consultant and also part of contractual terms</p> |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Implementation | Monitoring of Mitigation | Cost and Source of Funds |
|---|---|--|---------------------------------------|---|---|
| Consents, permits, clearances, NOCs, etc. | Failure to obtain necessary consents, permits, NOCs, etc. can result to design revisions and/or stoppage of works | (i) Obtain all necessary consents (including CTE for STP from RSPCB), permits, clearance, NOCs, etc. prior to award of civil works. Following consents are required- Tree cutting- local authority Storage, handling and transport of hazardous materials- RPCB Sand mining, quarries, borrow areas- Department of mines and Geology Traffic diversion/road cutting- local authority, traffic police (ii) Ensure that all necessary approvals for construction to be obtained by contractor are in place before start of construction (iii) Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. (iv) Include in detailed design drawings and documents all conditions and provisions if necessary | DBO Contractor and PIU and Consultant | Incorporated in final design and communicated to contractors. | No cost required. Cost of obtaining all consents, permits, clearance, NOCs, etc. prior to start of civil works responsibility of PIU. Mitigation measures are part of TOR of PIU and Consultant |

Table 15: Environmental Management Plan of Anticipated Impacts during Construction

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|--------------------|--|---|----------------------------|--|--|
| EMP Implementation | Irreversible impact to the environment, workers, and community | (i) Contractor is required to depute a qualified and experienced EHS officer/supervisor for monitoring of EMP implementation measures (ii) Project manager and all key workers will be required to undergo EMP implementation including spoils management, Standard operating procedures (SOP) for construction works; occupational health and safety (OH and S), core labor laws, | Construction Contractor | (i) Certificate of Completion (Safeguards Compliance Orientation) (ii) Posting of Certification of Completion at worksites (iii) Posting of EMP at worksites | Cost of EMP Implementation Orientation Training to contractor is responsibility of PMU. Other costs responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|-------------|--|---|----------------------------|--|--|
| | | applicable environmental laws, etc. | | | |
| Air Quality | Emissions from construction vehicles, equipment, and machinery used for installation of pipelines resulting to dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons. | <p>(i) Plan the work sites properly, and demarcate the sites for stockpiling of, soils, gravel, and other construction materials away from the traffic, vehicle, general worker movement to avoid disturbance of loose materials</p> <p>(ii) Damp down exposed soil and any stockpiled material on site by water sprinkling;</p> <p>(iii) Use tarpaulins to cover sand and other loose material when transported by trucks;</p> <p>(iv) Clean wheels and undercarriage of haul trucks prior to leaving construction site</p> <p>(v) Don't allow access in the work area except workers to limit soil disturbance and prevent access by barricading and security personnel</p> <p>(vi) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly contractor's vehicles and equipment should compulsorily have PUC and submit to PIU before deployment at site</p> <p>(vii) Obtain, CTE and CTO for batching plant, hot mix plant, crushers and DG set etc. if specifically established for this project.</p> <p>(viii) If contractor procures any material (such as ready mix</p> | Construction Contractor | <p>(i) Location of stockpiles;</p> <p>(ii) Complaints from sensitive receptors;</p> <p>(iii) Heavy equipment and machinery with air pollution control devices;</p> <p>(iv) Certification that vehicles are compliant with Air Act</p> <p>(v) Reports of air quality monitoring</p> | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|-----------------------|---|---|----------------------------|---|--|
| | | concrete, asphalt/macadam, aggregates etc.) from third party agencies, contractor shall ensure that such agencies have all necessary clearances / permissions as required under the law; these include CTE/CTO from RSPCB, environmental clearance, etc.; contractor shall collect the copy of these certificates and submit to PIU; PIU will approve the source only after all the certificates are submitted (ix) Conduct air quality monitoring according to the Environmental Management Plan (EMP). | | | |
| Surface water quality | Works in rains/ Mobilization of settled silt materials, and chemical contamination from fuels and lubricants during installation of pipelines can contaminate nearby surface water quality. | (i) Prepare and implement a spoils management plan (ii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets; (iii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with PIU on designated disposal areas; (iv) Inspect all the drainage at construction site/construction camp/labor camp etc. and clear all the drainage lines so that no water stagnation/flooding may occur during heavy rainfall (v) As for a possible avoid trench works and excavation works (pipe laying) during monsoon season to avoid any | Construction Contractor | (i) Areas for stockpiles, storage of fuels and lubricants and waste materials; (ii) Number of silt traps installed along trenches leading to water bodies; (iii) Records of surface water quality inspection; (iv) Effectiveness of water management measures; (v) No visible degradation to nearby drainages, nallahs or water bodies due to civil works | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|--------------|--|--|----------------------------|--|--|
| | | <p>water logging and accident due to it</p> <p>(vi) If open trenches are not avoidable during monsoon, keep ready all the mitigations measures to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades etc.</p> <p>(vii) Inspect and verify all the emergency measures and emergency control system before start of monsoon, keep the emergency response committee on high alert during monsoon/heavy rain fall</p> <p>(ix) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;</p> <p>(x) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;</p> <p>(xi) Dispose any wastes generated by construction activities in designated sites; and</p> <p>(xii) Conduct surface quality inspection according to the Environmental Management Plan (EMP).</p> | | | |
| Noise Levels | Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, | (i) Plan activities in consultation with PIU/Consultant so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; | Construction Contractor | (i) Complaints from sensitive receptors; (ii) Use of silencers in noise-producing equipment and sound barriers; (iii) Equivalent day | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|--------------------------|---|---|----------------------------|--|--|
| | materials, and people | (ii) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach; (iii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; and (iv) Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s. (v) Periodical monitoring of noise quality as per EMP | | and nighttime noise levels (see Appendix 3 of this IEE) | |
| Landscape and aesthetics | Impacts due to excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. | (i) Prepare and implement spoils management plan (Appendix 10); (ii) Avoid stockpiling of excess excavated soils; (iii) Coordinate with ULB/PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas; (iv) Recover used oil and lubricants and reuse or remove from the sites; (v) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; (vi) Remove all wreckage, rubbish, or temporary structures which are no longer required; and (vii) Request PIU to report in | Construction Contractor | (i) Complaints from sensitive receptors; (ii) Worksite clear of hazardous wastes such as oil/fuel (iii) Worksite clear of any excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|--|---|--|----------------------------|--|--|
| | | writing that the necessary environmental restoration work has been adequately performed before acceptance of work. | | | |
| Existing Infrastructure and Facilities | Disruption of service and damage to existing infrastructure at specified project location | (i) Obtain from PIU the list of affected utilities and operators if any; (ii) Prepare a contingency plan to include actions to be done in case of unintentional interruption of service | Construction Contractor | Existing Utilities Contingency Plan | Cost for implementation of mitigation measures responsibility of contractor. |
| Ecological Resources – Terrestrial | Loss of vegetation and tree cover | (i) Minimize removal of vegetation and disallow cutting of trees; (ii) If tree-removal will be required, obtain tree-cutting permit from the concerned department; and (iii) Plant 3 native trees for every one that is removed | Construction Contractor | PIU to report in writing the no of trees cut and planted. | Cost for implementation of mitigation measures responsibility of contractor. |
| Land use | Environmental Issues due to land use change | The impact due to change in land use will be negligible due to this project. | Not applicable | Not applicable | Not applicable |
| Accessibility | Traffic problems and conflicts near project locations and haul road | i) Plan sewer line works to minimize traffic disturbance / blockades; as the sewer lines are to be laid in all the roads and streets in the town, work planning is crucial to minimize the inconvenience to public . (ii) Prepare and implement a Traffic Management Plan (Appendix 14) (ii) Duly consider and select sections for trenchless method of pipelaying based on traffic conditions (iii) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the | Construction Contractor | (i) Traffic route during construction works including number of permanent signage, barricades and flagmen on worksite; (ii) Complaints from sensitive receptors; (iii) Number of signage placed at project location. | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|--------------------------|--|--|----------------------------|--|--|
| | | <p>immediate vicinity of delivery sites;</p> <p>(iv) Schedule transport and hauling activities during non-peak hours;</p> <p>(v) Locate entry and exit points in areas where there is low potential for traffic congestion;</p> <p>(vi) Keep the site free from all unnecessary obstructions;</p> <p>(vii) Drive vehicles in a considerate manner;</p> <p>(viii) Coordinate with Traffic Police for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours;</p> <p>(ix) Notify affected sensitive receptors 1-week in advance by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.</p> <p>(x) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum.</p> <p>(xi) Provide pedestrian access in all the locations until normalcy is restored. Provide wooden/metal planks over the open trenches at each house to maintain the access.</p> | | | |
| Socio-Economic – Income. | Impede the access of residents and customers to nearby shops | <p>(i) Prepare and implement spoils management plan (Appendix 10). Contractor to Implement RP and to follow mitigation measures prescribed</p> <p>(ii) Leave spaces for access</p> | Construction Contractor | <p>(i) Complaints from sensitive receptors;</p> <p>(ii) Spoils management plan</p> <p>(iii) Number of walkways, signage,</p> | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|--------------------------------|--|--|----------------------------|---|--|
| | | <p>between mounds of soil;</p> <p>(ii) Provide walkways and metal sheets where required for people;</p> <p>(iii) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools;</p> <p>(iv) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and</p> <p>(v) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.</p> | | and metal sheets placed at project location. | |
| Socio-Economic - Employment | Generation of temporary employment and increase in local revenue | <p>(i) Employ local labour force, or to the maximum extent possible</p> <p>(ii) Comply with labor laws</p> | Construction Contractor | <p>(i) Employment records;</p> <p>(ii) Records of sources of materials</p> <p>(iii) Compliance to labor laws (see Appendix 8 of this IEE)</p> | Cost for implementation of mitigation measures responsibility of contractor. |
| Occupational Health and Safety | Occupational hazards which can arise during work | <p>(i) Comply with all national, state and local core labor laws (see Appendix 9 of this IEE); Following best practice health and safety guidelines: IFC's General EHS Guidelines²⁰ and Sector Specific (Sanitation) Guidelines²¹</p> <p>(ii) Develop and implement site-</p> | Construction Contractor | <p>(i) Site-specific OH and S Plan;</p> <p>(ii) Equipped first-aid stations;</p> <p>(iii) Medical insurance coverage for workers;</p> <p>(iv) Number of</p> | Cost for implementation of mitigation measures responsibility of contractor. |

²⁰<https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

²¹ <https://www.ifc.org/wps/wcm/connect/e22c050048855ae0875cd76a6515bb18/Final%2B-%2BWater%2Band%2BSanitation.pdf?MOD=AJPERES>

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|-------|--------------------|---|----------------------------|--|--------------------------|
| | | <p>specific occupational health and safety (OH and S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment like helmet, gumboot, safety belt, gloves, nose musk and ear plugs; (c) OH and S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;</p> <p>(iii) Conduct work in confine spaces, trenches, and at height with suitable precautions and using standards and safe construction methods; do not adopt adhoc methods; all trenches deeper than 1.5 m shall be provided with safety shoring/braces; and avoid open cutting method for trenches deeper than 3.5 m by adopting trenchless technology</p> <p>(iv) Develop site specific OHS plan for sewage pumping stations works; SPS sites are located in low lying areas with accumulated waste and harmful working conditions</p> <p>(iv) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;</p> <p>(v) Provide medical insurance</p> | | <p>accidents;</p> <p>(v) Supplies of potable drinking water;</p> <p>(vi) Clean eating areas where workers are not exposed to hazardous or noxious substances;</p> <p>(vii) record of H and S orientation trainings</p> <p>(viii) personal protective equipment;</p> <p>(ix) % of moving equipment outfitted with audible back-up alarms;</p> <p>(xi) permanent sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal.</p> <p>(xii) Compliance to core labor laws (see Appendix 9 of this IEE)</p> | |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|-------|--------------------|--|----------------------------|--------------------------|--------------------------|
| | | <p>coverage for workers;</p> <p>(vi) Secure all installations from unauthorized intrusion and accident risks;</p> <p>(vii) The project area experiences extreme temperature during summer months of April and May, which may affect the health of workers engaged in construction work. Contractor should take necessary measures during summers including the following:</p> <p>(a) work schedule should be adjusted to avoid peak temperature hours (12 – 3 PM);</p> <p>(b) provide appropriate shade near the workplace; allow periodic resting and provide adequate water, and (c) provide necessary medicine and facilities to take care of dehydration related health issues</p> <p>(viii) Provide supplies of potable drinking water;</p> <p>(vi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;</p> <p>(ix) Provide H and S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;</p> <p>(x) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be</p> | | | |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|-------|--------------------|---|----------------------------|--------------------------|--------------------------|
| | | <p>present. Ensure also that visitor/s do not enter hazard areas unescorted;</p> <p>(xi) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;</p> <p>(xii) Ensure moving equipment is outfitted with audible back-up alarms;</p> <p>(xiii) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate;</p> <p>(xiv) Disallow worker exposure to noise level greater than 85dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.</p> <p>(xv) Conduct regular health check-ups for workers</p> <p>(xvi) Provide periodical awareness camps and special trainings for workers for health issues and risks in construction sites</p> <p>(xviii) Provide proper solid and liquid waste management system</p> | | | |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|------------------------------|---|---|----------------------------|---|--|
| | | in workers' campsite, separate from spoils and debris disposal, as their presence can add to existing waste volume at the project sites. | | | |
| Community Health and Safety. | Traffic accidents and vehicle collision with pedestrians during material and waste transportation | <p>(i) Trench excavation and pipeline works shall be conducted in a safe manner; if the allowing public movement along the work sites (pedestrians or vehicles as the case may be) is likely to cause safety risks, movement should be blocked temporarily and work shall be conducted; in such areas, conducting night work or working in small stretches to avoid blockage of traffic/movement no more than few hours in due consultation with the local community and ULB shall be planned</p> <p>(ii) All trenches deeper than 1.5 m shall be provided with safety shoring/braces; and avoid open cutting method for trenches deeper than 3.5 m by adopting trenchless technology</p> <p>(iii) Survey the surrounding vulnerable buildings for likely issues in structural stability / differential settlement during the excavation works</p> <p>(iv) Provide prior information to the local people about the</p> <p>(v) Plan routes to avoid times of peak-pedestrian activities.</p> <p>(vi) Liaise with PIU/ULB in identifying high-risk areas on route cards/maps.</p> | Construction Contractor | <p>(i) Traffic Management Plan;</p> <p>(ii) Complaints from sensitive receptors</p> | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|--|---|--|----------------------------|--|--|
| | | (vii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. (viii) Provide road signs and flag persons to warn of on-going trenching activities. | | | |
| Safety of sensitive groups (children, elders etc.) and other pedestrians in narrow streets | Trench excavation in narrow streets will pose high risk to children and elders in the locality | (i) Provide prior information to the local people about the nature and duration of work (ii) Conduct awareness program on safety during the construction work (iii) Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day (iv) Provide barricades, and deploy security personnel to ensure safe movement of people and also to prevent unnecessary entry and to avoid accidental fall into open trenches | Construction Contractor | Complaints from neighbourhood and monitoring of accidents | Cost for implementation of mitigation measures responsibility of contractor. |
| Night Works | Public inconvenience due to traffic diversion, disturbance due to excessive noise and access loss, occupational health and safety issues etc. | Prepare a night work protocol and obtain prior approval from PIU, and strictly implement and report on implementation of protocol during the workers; Contractors should have handheld noise level meter for measurement of noise during night hours Contractors should have handheld lux meter for the measurement of illumination during night hours | Contractor | Night work plan/ protocol submitted by contractor and approved by PIU/Consultant | Contractor |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|-------|--------------------|---|----------------------------|--------------------------|--------------------------|
| | | <p>Preferably electrical connection is available for running equipment otherwise soundproof/super silent Diesel Generator set should be available</p> <p>Sound level should not increase as prescribe by CPCB</p> <p>Illumination should be as prescribed in protocol</p> <p>As far as possible ready-mix concrete from batching plant to be used, otherwise the concrete should be prepared away from residential areas and brought to the site</p> <p>All the noisy activities like hammering, cutting, crushing, running of heavy equipment should be done in daytime and avoided in nighttime</p> <p>Workers engaged in night works should have adequate rest/sleep in daytime before start of night works</p> <p>Worker engaged for night works should have previous experience of night works and should be physically fit for such works including clear vision in night</p> <p>All the necessary provisions of traffic aids such as traffic signals, road signage, barricades, cautions boards, traffic diversion boards etc. should be available with fluorescent/retro-reflective arrangements</p> <p>Workers should be trained before start of night works about risks</p> | | | |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|-------|--------------------|---|----------------------------|--------------------------|--------------------------|
| | | <p>and hazards of night works and their mitigation measures and should be provided all the protective aids (PPEs) including fluorescent/retro-reflective vests Horns should not be permitted by equipment and vehicles Workers should not shout and create noise First aid and emergency vehicles should be available at site Emergency preparedness plan should be operative during night works Old persons and pregnant women and women having small kids should not work in night-time All the vehicles and equipment being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works PIU/DSC site engineers and contractor's safety personnel should closely monitor the safety of works continuously and noise and illumination levels on hourly basis and maintain photographic and video graphic records as well as register the observations. Night works should be stopped early in the morning at least one hour before start of pedestrian/traffic movement</p> | | | |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|------------------------|--|--|----------------------------|--------------------------|-------------------------------|
| | | <p>After completion of night works all the site should be cleaned and maintained obstruction free for daytime movement of vehicles and pedestrians</p> <p>Drivers and workers should be alert and responsive during night works</p> <p>All the wages to workers working in night hours should be as per the applicable labour acts</p> <p>Avoid any nuisance which may create problems to nearby habitants and work peacefully during night hours</p> <p>Night works should not be conducted near hospitals and during peak seasons such as peak tourist season, students' exam times etc.</p> | | | |
| Work in narrow streets | will pose high risk to children and elders in the locality | <p>(i) Conduct awareness program on safety during the construction work</p> <p>(ii) Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day</p> <p>(iii) Provide barricades, and deploy security personnel to ensure safe movement of people and also to prevent unnecessary entry and to avoid accidental fall into open trenches</p> <p>(iv) Trench excavation and pipeline works shall be conducted in a safe manner; if the allowing public movement along the work</p> | | | responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|--|---|--|----------------------------|--|--|
| | | sites (pedestrians or vehicles as the case may be) is likely to cause safety risks, movement should be blocked temporarily and work shall be conducted; in such areas, conducting night work or working in small stretches to avoid blockage of traffic/movement no more than few hours in due consultation with the local community and ULB shall be planned | | | |
| Construction camps and worker facilities | <p>Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants</p> <p>Unsanitary and poor living conditions for workers</p> | <p>(i) Consult with PIU before locating project offices, sheds, and construction plants;</p> <p>(ii) Minimize removal of vegetation and disallow cutting of trees;</p> <p>(iii) Provide drinking water, water for other uses, and sanitation facilities for employees;</p> <p>(iv) Provided temporary rest and eating area at all work sites</p> <p>(v) Ensure conditions of livability at work camps are always maintained at the highest standards possible; living quarters and construction camps shall be provided with standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation); thatched huts, and facilities constructed with materials like GI sheets, tarpaulins, etc., shall not be used as accommodation for workers; accommodation shall meet the IFC standards for workers accommodation which include:</p> | Construction Contractor | <p>(i) Complaints from sensitive receptors;</p> <p>(ii) Drinking water and sanitation facilities for employees</p> | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|-------------------------------|-------------------------------------|--|----------------------------|--------------------------|--|
| | | <p>provision of safe housing, availability of electricity, plumbing, water and sanitation, adequate fire protection and dormitory/room facilities; accommodation shall be in the range from 10 to 12.5 cubic meters (volume) or 4 to 5.5 square meters (surface) per worker, a minimum ceiling height of 2.10 meters; a reasonable number of workers are allowed to share the same room – (standards range from 2 to 8 workers); workers with accompanying families shall be provided with a proper and safe accommodation (IFC benchmark standards for workers accommodation is provided in (Appendix 14)</p> <p>(vi) Train employees in the storage and handling of materials which can potentially cause soil contamination;</p> <p>(vii) Recover used oil and lubricants and reuse or remove from the site;</p> <p>(viii) Manage solid waste according to the preference hierarchy: reuse, recycling and disposal to designated areas;</p> <p>(ix) Ensure unauthorized persons specially children are not allowed in any worksite at any given time.</p> | | | |
| Social and Cultural Resources | Risk of archaeological chance finds | <p>(i) Strictly follow the protocol for chance finds in any excavation work;</p> <p>(ii) Create awareness among the workers, supervisors and</p> | Construction Contractor | Records of chance finds | Cost for implementation of mitigation measures responsibility of |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|---|---|---|----------------------------|---|--|
| | | engineers about the chance finds during excavation work (iii) Stop work immediately to allow further investigation if any finds are suspected; (iv) Inform local Archeological Department if a find is suspected and take any action, they require to ensure its removal or protection in situ | | | contractor. |
| Monsoon preparedness | Disruption of utilities and water logging in trenches | (i) As for a possible avoid trench works and excavation works (pipe laying) during monsoon season to avoid any water logging and accident due to it (ii) if open trenches are not avoidable during monsoon, keep ready all the mitigations measures to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades etc. (iii) keep emergency response system ready before monsoon/heavy rain fall | Construction Contractor | Monsoon preparedness plan | Cost for implementation of mitigation measures responsibility of contractor. |
| Submission of EMP implementation report | Unsatisfactory compliance to EMP | (i) Appointment of supervisor to ensure EMP implementation (ii) Timely submission of monitoring reports including pictures | Construction contractor | Availability and competency of appointed supervisor Monthly report | Cost for implementation of mitigation measures responsibility of contractor. |
| Post-construction clean-up | Damage due to debris, spoils, excess construction materials | (i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and (ii) All excavated roads shall be reinstated to original condition. | Construction Contractor | PIU/Consultant report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored to pre- | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|-------|--------------------|---|----------------------------|--|--------------------------|
| | | (iii) All disrupted utilities restored (iv) All affected structures rehabilitated/compensated (v) The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. (vi) All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be top soiled and re-grassed using the guidelines set out in the re-vegetation specification that forms part of this document. (vii) The contractor must arrange the cancellation of all temporary services. (viii) Request PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work. | | project conditions; (iii) all construction related structures not relevant to O and M are removed; and (iv) worksite clean-up is satisfactory. | |

Table 16: Environmental Management Plan of Anticipated Impacts during Operation

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and Source of Funds |
|---|--|--|---|--------------------------|----------------------------|
| Sewerage system operation: treatment discharge of treated wastewater, | Environmental and health issues due to operation | (i) 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 | O and M contractor for 10 years and then Nagar Palika | Nagar Palika, Didwana | O and M cost of contractor |

| | | | | | |
|--------|--|--|--|--|--|
| sludge | | <p>standards;</p> <p>(ii) Ensure implementation of Reuse Plan, and ensure intended quality for each direct reuse</p> <p>(iv) 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</p> <p>(v) 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.</p> <p>(vi) Ensure valid consent to operate (CTO) from RSPCB for operation of STP</p> <p>(vii) Ensure that all conditions/standards prescribed by RPCB are complied duly</p> <p>(viii) Ensure that chlorinator facility is operated only by trained staff and as per the standard operating procedures; in case of any accident and/or maintenance activity, ensure that the staff follows documented procedures only</p> <p>(ix) Implement Emergency Response System (ERS) for the chlorine leakage; Guidelines and Emergency plan for handling and storing chlorine is attached as Appendix 15</p> | | | |
|--------|--|--|--|--|--|

| | | | | | |
|--|--|--|--|--|--|
| | | <p>(x) Ensure proper knowledge transfer, hands-on training to municipal staff engaged in STP operation has been provided by contractor prior to handover of facility;</p> <p>(xi) Operate and maintain the facility following standard operating procedures of operational manual;</p> <p>(xii) Undertake preventive and periodic maintenance activities as required;</p> <p>(xiii) 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;</p> <p>(xiv) 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 RPCB:</p> <p>(xv) Conventional and centralized water treatment that use filtration and disinfection that inactivates disease-causing vectors</p> <p>(xvi) Final disinfection step considered if treatment plant technologies are not able to destroy pathogens and remove viruses</p> <p>(xvii) Workers should wear appropriate PPE which includes protective outerwear, gloves, boots,</p> | | | |
|--|--|--|--|--|--|

| | | | | | |
|--|---|--|---|-----------------------|----------------------------|
| | | goggles or a face shield and a mask (xviii) Perform hand hygiene frequently, avoid touching eyes, nose, mouth with unwashed hands | | | |
| Sewerage system operation: collection and conveyance | Environmental and health issues due to operation of sewer network | <p>(i) Establish regular maintenance program, including:</p> <ul style="list-style-type: none"> ▪ 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); <p>(ii) 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</p> | O and M contractor for 10 years and then Nagar Palika | Nagar Palika, Didwana | O and M cost of contractor |

| | | | | | |
|--|--|---|--|--|--|
| | | <p>as needed;</p> <p>(iii) 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.</p> <p>(iv) 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</p> <p>(v) Develop an Emergency Response System for the sewerage system leaks, burst and overflows, etc.</p> <p>(vi) Provide necessary health and safety training to the staff</p> <p>(vii) Provide all necessary personnel protection equipment</p> <p>(viii) During cleaning/clearing of manholes and sewer lines great precautions should be taken for the safety of workers conducting such works.</p> <ul style="list-style-type: none"> ▪ 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 | | | |
|--|--|---|--|--|--|

| | | | | | |
|------------|----------------|---|---------------------------|--------------|---------|
| | | <ul style="list-style-type: none"> ▪ 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 | | | |
| Repair and | All work sites | Implementation of dust control, noise | O and M contractor for 10 | Nagar Palika | O and M |

| | | | | | |
|---|--|---|---|---------------|----------------------------|
| maintenance activities of sewerage Construction disturbances, nuisances, public and worker safety, | | control, traffic management, and safety measures. Site inspection checklist to review implementation is appended at Appendix 17. | years and then Nagar Palika, | | cost of contractor |
| Asset management | Reduction in NRW Increased efficiency of the system | Preparation and implementation of O and M Manual | O and M contractor for 10 years and then Nagar Palika | Nagar Palika, | O and M cost of contractor |

Table 17: Environmental Monitoring Plan for Construction Stage

| Monitoring field | Monitoring location | Monitoring parameters | Frequency | Responsibility | Cost & Source of Funds |
|--|---|--|--|---|--|
| Construction disturbances, nuisances, public & worker safety | All work sites | Implementation of dust control, noise control, traffic management, & safety measures. Site inspection checklist to review implementation is appended at Appendix-17. | Weekly during construction | Supervising staff, EHS officer and safeguards specialists | No costs required |
| Tree Cutting | STP, SPS and Pipe Laying sites | Obtain permission from concerned authority for any tree cutting and plant trees in the ratio of 1:3 as per RUDSICO-EAP Circular | Weekly during construction | Supervising staff and safeguards specialist | Contractors cost |
| Ambient air quality | 5 locations (STP site, 02 SPS site, pipe laying sites and workers camp during construction) | PM ₁₀ , PM _{2.5} , NO ₂ , SO ₂ , CO | Once before start of construction and quarterly (yearly 4-times) during construction except Monsoon period | Contractor | Cost for implementation of monitoring measures responsibility of contractor (ref table 22 and Appendix 22) |
| Ambient noise | 5 locations (STP site, SPS site, pipe laying sites and workers camp during construction) | Day time and night time noise levels | Once before start of construction and quarterly (yearly 4-times) during construction | Contractor | Cost for implementation of monitoring measures responsibility of contractor (Ref. table 22 and Appendix 22). |
| Ground Water quality | 4 locations (STP, SPSs and construction camp) | pH, TDS, Total Hardness, Zn, Chloride, Iron, Copper, DO, Manganese, Sulphate, Nitrate, Fluoride, Hg, Cadmium, Cr ⁺⁶ , Arsenic, Lead, Total Alkalinity, Phosphate, Phenolic compound | Once before start of construction and quarterly (yearly 4-times) during construction | Contractor | Cost for implementation of monitoring measures responsibility of contractor (Ref. table-22 and Appendix-22) |
| Surface Water quality | Salt Lake (near SPS) | pH, Turbidity, Total Hardness, DO, BOD, | Once before start of | Contractor | Cost for implementation |

| Monitoring field | Monitoring location | Monitoring parameters | Frequency | Responsibility | Cost & Source of Funds |
|--|---|---|--|---|--|
| | Degana Road) | COD, Chloride, Hg, Iron, TDS, TSS, Calcium, Zn, Cr ⁺⁶ , Magnesium, Copper, Manganese, Sulphate, Cyanide, Nitrate, Sodium, Potassium, Fluoride, Cadmium, Arsenic, Lead, Boron, Selenium, Aluminium, Total residual Chlorine | construction and quarterly (yearly 4-times) during construction | | of monitoring measures responsibility of contractor (Ref. Table-22 and Appendix-22). |
| Soil quality | 5 locations (STP SPS and construction camp, pipe laying site) | pH, Elect. Conductivity (at 25°C), Moisture (at 105°C), Texture (silt, clay, sand), Calcium (as CaO), Magnesium (as Mg), Permeability, Nitrogen (as N), Sodium (as Na), Phosphate (as PO ₄), Potassium (as K), Organic Matter, oil and grease | Once before start of construction and quarterly (yearly 4-times) during construction | Contractor | Cost for implementation of monitoring measures responsibility of contractor (Ref. Table-22 and Appendix-22). |
| Construction, Labour Camp, storage yard Management | Construction, Labour Camp, storage yard Management | As per EMP | Weekly | EHS officer, Environment Specialist of consultant | contractor |
| Solid waste management | Construction, Labour Camp, storage yard Management | As per EMP | Weekly | EHS officer, Environment Specialist of consultant | contractor |
| Construction and demolition waste management | All construction site | As per EMP and applicable rules and regulations | Weekly | EHS officer, Environment Specialist of consultant | contractor |
| Consent to establish of STPs, batching plants, crusher, hot mix plants, DG sets etc. | STPs, batching plants, crusher, hot mix plants, DG set etc | Consents will taken as per table 4 & 5 | Periodically | EHS officer, Environment Specialist of consultant | No cost required for monitoring cost for obtaining CTE/CTO from PMU and for others from Contractor |

Table 18: Environmental Monitoring Plan of Anticipated Impacts during Operation

| Monitoring field | Monitoring location | Monitoring parameters | Frequency | Responsibility | Cost & Source of Funds |
|---|----------------------------|--|-------------------|---|-----------------------------------|
| Monitoring of raw sewage quality | Inlet of the STP | Suspended solids, pH, Temperature Oil and grease, Total residual chlorine, Ammonical nitrogen (as N), BOD, COD, Nitrate Nitrogen The values should be within the limit specified by CPCB to discharge into municipal sewers | Monthly once | O&M Contractor for 10 years and then Nagar Palika | O&M Contractor/Nagar Palika |
| Monitoring of treated effluent quality | Outlet of STP | pH, BOD, COD, TSS, NH ₄ -N, N-total, Fecal Coliform (as per Annexure-4) | Monthly Once | O&M Contractor for 10 years and then Nagar Palika | O& M Contractor/ Nagar Palika |
| Monitoring of plantations | Plantations locations | Nos. of tree survived | Monthly | O& M Contractor/Nagar Palika | O&M Contractor/ Nagar Palika |
| Sewer network to sustain operational efficiency and avoid clogging and early occurrence of leakages | Sewer network | to be included in the O&M plan prepared under the project | as per O & M plan | O&M Contractor /Nagar Palika | O&M Contractor /Nagar Palika |
| Consent to operate (CTO) from RPCB | STP | CTO should be renewed before expired | As per RSPCB | O and M contractor for 10 years and then Nagar Palika | O&M Contractor/ Nagar Palika |
| Sludge quality (STP) and suitability as manure | Dried sludge | Analysis for concentration of heavy metals and confirm that value are within the following limits (all units are in mg/kg dry basis except pH) Arsenic - 10.00 Cadmium - 5.00 Chromium - 50.00 Copper- 300.00 Lead - 100.00 Mercury- 0.15 Nickel - 50.00 Zinc- 1000.00 | Yearly twice | O and M contractor for 10 years and then Nagar Palika | O&M Contractor/ Nagar Palika |

| Monitoring field | Monitoring location | Monitoring parameters | Frequency | Responsibility | Cost & Source of Funds |
|--------------------------------|---------------------|----------------------------------|------------------|----------------|------------------------|
| | | PH - 5.5-8.5 | | | |
| Achieving Targeted Waste Water | STP | Volume of Waste water Reuse: | Monthly/Yearly | ULB | - |
| Reuse and Safe Sludge Disposal | STP | Quantity of safe sludge disposal | Monthly / Yearly | ULB | - |

B. Institutional Requirements

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

210. 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.

211. 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.

212. 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.

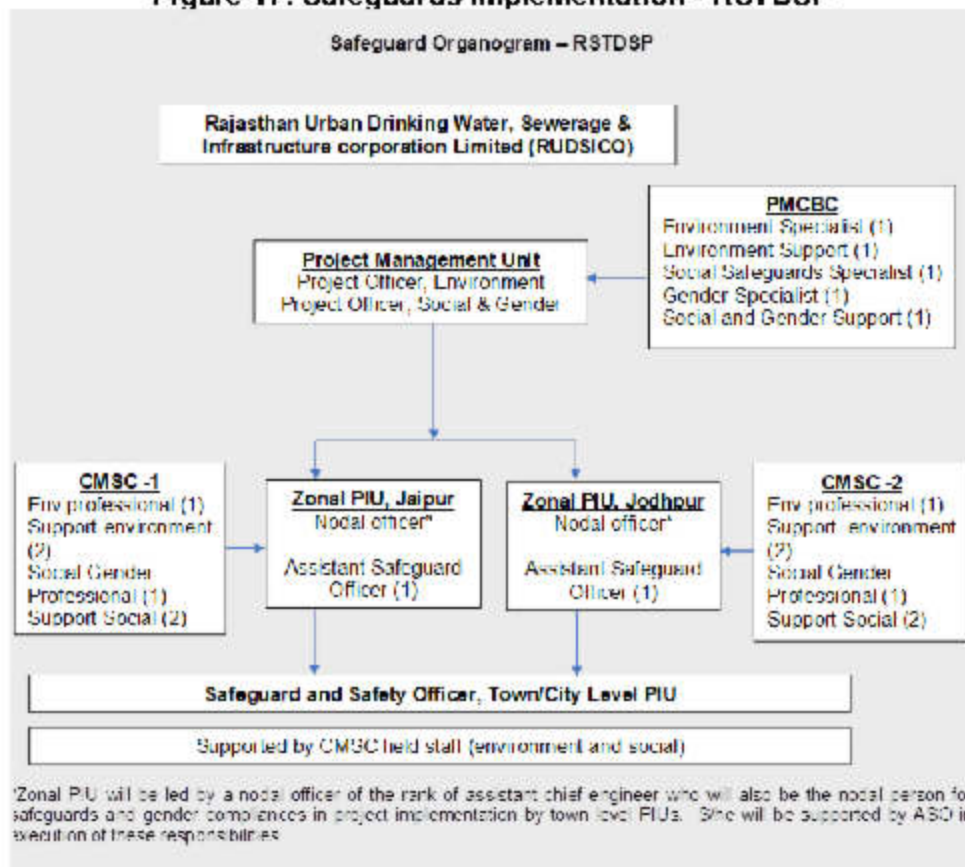
213. There will be two zonal PIUs and a PIU at every town. PIUs at the town-level shall be headed by a Superintending Engineer/ Executive Engineer, who shall work as Project Manager and shall sign the contract documents, manage the contract and disburse payments as Drawing and Disbursing Officer.

214. Construction Management and Supervision Consultants (CMSC) - 2 nos catering to Jaipur and Jodhpur units. They shall directly support PIUs in day to day contract management, construction supervision including quality management of ongoing works etc. This shall include work measurement, quantities, verification of bills of contractors etc. In compliance with the EMP, the CMSC shall develop a strategy to overcome the difficulties of construction/traffic management in narrow streets and also prepare detailed plans for detour of traffic during excavation for pipe laying. The CMSC will 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;

215. 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.

216. Table 19, Table 20 and Figure 17 summarize the institutional responsibility of environmental safeguards implementation at all stages of the project.

Figure 17: Safeguards Implementation - RSTDSP



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

- (i) Review REA checklists and assign categorization based on ADB SPS 2009 and EARF;
- (ii) Submit IEE to ADB for approval and disclosure in ADB website;
- (iii) Ensure approved IEEs are disclosed in RSTDSP/PMU websites and summary posted in public areas accessible and understandable by local people.;
- (iv) Ensure EMPs are included in the bid documents and contracts;
- (v) Organize an orientation workshop for PMU, PIU, ULB and all staff involved in the project implementation on (a) ADB SPS, (b) Government of India national, state, and local environmental laws and regulations, (c) core labor standards, (d) OH&S, (e) EMP implementation especially spoil management, working in congested areas, public relations and ongoing consultations, grievance redress, etc.;
- (vi) Assist in addressing any grievances brought about through the GRM;
- (vii) Organize an induction course for the training of contractors preparing them on EMP implementation, environmental monitoring requirements related to mitigation

- measures; and taking immediate actions to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation;
- (viii) Ensure compliance with all government rules and regulations regarding site and environmental clearances as well as any other environmental requirements;
 - (ix) Assist PMU, PIUs, and project consultants to document and develop good practice construction guidelines to assist the contractors in implementing the provisions of IEE and EMP;
 - (x) Assist in the review of the contractors' implementation plans to ensure compliance with the IEE;
 - (xi) Review monthly monitoring reports submitted by PIUs, and prepare and submit to ADB semi-annual monitoring reports;
 - (xii) If necessary, prepare Corrective Action Plan and ensure implementation of corrective actions to ensure no environmental impacts;
 - (xiii) Review and submit Corrective Action Plans to ADB;
 - (xiv) Coordinate with national and state level government agencies; 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.

218. 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.

219. **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.

220. 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.

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

- (i) Prepare REA Checklists, No Mitigation Checklists, baseline environmental surveys to support screening and categorization per EARF;
- (ii) Submit 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.

222. **Contractors.** The contractor will be required to update the IEE and will be responsible for providing final design (including pipe alignments) to the supervision consultant for finalization/updating of resettlement plan. The contractor shall appoint an Environment, Health and Safety (EHS) Engineer who will be responsible on a day-to-day basis for (i) ensuring

implementation of EMP, (ii) coordinating with the Town-level PIUs and environment specialists of project consultant teams; (iii) community liaison,⁴³ consultations with interested/affected people, (iv) field-level grievance redress; and (iv) reporting.

223. 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.

224. 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.

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

Table 19: Safeguards Management Roles and Responsibilities

| Implementation Arrangements | Roles and Responsibilities |
|---|---|
| <p>Executing Agency: LSGD through RUDSICO</p> | <ul style="list-style-type: none"> • 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. |
| <p>RUDSICO Board (like SLEC) Chairman: Minister of Urban Development Department, GOR Members:</p> <ul style="list-style-type: none"> • Hon'ble Minister, LSGD • Secretary, LSGD – Vice Chairman • Principal Secretary, PHED -Director • Principal Secretary, PWD -Director • Secretary, Finance (Budget) Department -Director | <ul style="list-style-type: none"> • 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) |

| Implementation Arrangements | Roles and Responsibilities |
|--|---|
| <ul style="list-style-type: none"> • Director, Department of Local Bodies • Executive Director, RUDSICO • Project Director, RUDSICO • Independent Director • Independent Director | |
| RUDSICO (with approval of RUDSICO board, as needed) | <ul style="list-style-type: none"> • Required support to review and monitor the physical and financial progress of the subprojects. • Provide additional technical support from RUDSICO Office (along with PMCBC) to PIUs for speedy resolution of implementation related issues such as variations, deviations, time and cost control, among others. • Provide backup technical support for review and finalization of DPRs, bid documents, bidding and award of contracts. • Review, appraise and put up matters to RUDSICO Board for approval, as described under "Delegation of Powers" • Overall Liaison, Monitoring and Reporting to DEA and ADB as per agreed requirements • Pursue GoR, through LSGD for approval of Policy, Rules, Guidelines, Government Orders for use in the state |
| <p>Program Management Unit</p> <ul style="list-style-type: none"> • Program Director: Project Director, RUDSICO • Additional Project Director, RUDSICO <p><u>PMU Staff</u></p> <ul style="list-style-type: none"> • 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 | <p>Program and Financial Management</p> <ul style="list-style-type: none"> • Overall responsibility of the investment program and financial management and administering program procedures and guidelines. • Oversee design of all projects (in individual tranches as needed). • Finalize the DPRs for ULBs/implementing agencies and obtain approval from ADB and government. • Establish project management and monitoring systems (Command and Control Center) • Undertake project appraisals based on technical, financial, economic and safeguards compliance as agreed by GoR/RUDSICO and ADB. • Provide overall technical and implementation guidance to the PIUs as required. • Facilitate approval of various implementation related requests from the Project Implementation management and Field Units • Sign key documents including withdrawal applications and audit reports. • Timely submission of any withdrawal applications. • Act as focal point for communication with the ADB. • Ensure compliance with loan covenants, ADB's guidelines, procedures and policies. • Facilitate ADB program review missions. |

| Implementation Arrangements | Roles and Responsibilities |
|---|---|
| <ul style="list-style-type: none"> • Senior Accounts Officer at RUDSICO, Jaipur HQ <p>PMU at HO supported by:</p> <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • Represent the program at Tripartite Review Meetings. <p>Safeguards compliance</p> <ul style="list-style-type: none"> • 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 <p>Capacity Building and Institutional</p> <ul style="list-style-type: none"> • Allocate funds for capacity building and arrange required disbursements • Approve and Monitor Capacity Building Plan • Pursue reforms with GoR • Supervise and Monitor PMCB Consultants and approve their invoices |
| <p>Project Implementation Units</p> <ul style="list-style-type: none"> • 2 zonal PIUs (1 in Jaipur, 1 in Jodhpur) <p>A. <u>PIU Staff</u></p> <ul style="list-style-type: none"> • Project Manager (SE level) • Executive Engineer / Assistant Engineer (2 or 3) at each town for monitoring and supervision support • Assistant Accounts Officer • Computer Operator • Support Staff <p>Supported by</p> <ul style="list-style-type: none"> • 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 | <p>Project Management</p> <ul style="list-style-type: none"> • Responsible for implementation management of sub-projects. • Responsible for day-to-day implementation, monitoring and reporting. <p>Safeguards Compliance (with CAPPC)</p> <ul style="list-style-type: none"> • Ensure compliance with safeguard frameworks and plans • Facilitate consultation with stakeholders and disclose program information in consultation with PMU. • Address grievances (may be through Grievance Redressal Mechanism) Coordinate land acquisition actions, if required. • Submit quarterly safeguard monitoring reports to PMU. <p>Advance Project Preparation</p> <ul style="list-style-type: none"> • Prepare/supervise and monitor preparation of DPRs and bidding documents for future tranches. |

| Implementation Arrangements | Roles and Responsibilities |
|--|---|
| consultancy) besides required consultancy professionals reporting to EE) | |
| ULBs | <ul style="list-style-type: none"> • 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 CAPPCC in awareness creation, connection modalities to household consumers etc. |
| Asian Development Bank | <ul style="list-style-type: none"> • Approve and monitor safeguards documents and implementation compliance. • Field review missions. • Facilitate knowledge sharing. • Provide training in program management and ADB procurement procedures to PMU/PIU staff. • Support LS GD, RUDSICO, PIUs etc. through various capacity building activities. |

Table 20: Institutional Roles and Responsibilities for Environmental Safeguards Implementation

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

| | | | |
|----------------------------------|--|---|---|
| | <p>congested areas, public relations and ongoing consultations, grievance redress, etc.</p> <p>(vii) Assist in addressing any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs</p> <p>(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.</p> <p>(ix) Ensure compliance with all government rules and regulations regarding site and environmental clearances as well as any other environmental requirements</p> <p>(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.</p> <p>(xi) Assist in the review of the contractors' implementation plans to ensure compliance with the IEE.</p> | <p>(vi) Assist in addressing any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs</p> <p>(ix) Coordinate PIUs, consultants and contractors on mitigation measures involving the community and affected persons and ensure that environmental concerns and suggestions are incorporated and implemented</p> | |
| PIU, Assistant Safeguard Officer | <p>(i) Ensure IEE is included in bid documents and contract agreements. Ensure cost of EMP implementation is provided.</p> <p>(iv) Disclose of approved EIAs/IEEs.</p> <p>(v) Obtain all necessary clearances, permits, consents, NOCs, etc. Ensure compliance to the provisions and conditions.</p> <p>(vi) EMP implementation regarding sites for disposal of wastes, camps, storage areas, quarry sites, etc.</p> | <p>(i) oversee day-to-day implementation of EMPs by contractors, including compliance with all government rules and regulations.</p> <p>(ii) take necessary action for obtaining rights of way;</p> <p>(iii) oversee implementation of EMPs, including environmental monitoring by contractors;</p> <p>(iv) take corrective actions when necessary to</p> | <p>(i) Conducting environmental monitoring, as specified in the EMP.</p> <p>(ii) Issuance of clearance for contractor's post-construction activities as specified in the EMP.</p> |

| | | | |
|--|--|---|--|
| | (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. | 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 | |
| Consultant – 1.PMCBC- Environmental Safeguard Specialist – 1 no. Asbestos Expert – 1no. Heritage Expert – 1no. Biodiversity Expert – 1no. | (i) Review IEE/EMP submitted by CMSC and revise report to submit to PMU (ii) Assist PMU and PIU in obtaining all necessary clearances, permits, consents, NOCs, etc. Ensure provisions and conditions are incorporated in the IEE and detailed design documents. (iii) Assist in ensuring IEE is included in bid documents and contract agreements. (iv) Assist in determining adequacy of cost for EMP implementation. (v) Assist in addressing any concern related to IEE and EMP. (vi). Conduct specific assessment requirements | (i) Monitor EMP implementation (ii) Assist in addressing any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs. | |
| 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. 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 | (i) Implement EMP. (ii) Implement corrective actions if necessary. (iii) Prepare and submit monitoring reports including pictures to PIU | (i) Ensure EMP post-construction requirements are satisfactorily complied (ii) Request certification from PIU |

| | | | |
|--|---|---|--|
| | <p>(ii) Prepare EHS plan and take approval from CMSC/PIU and Ensure EMP implementation cost is included in the methodology.</p> <p>(iii) Undergo EMP implementation orientation by ESS of supervision consultant prior to start of works</p> <p>(iv) Provide EMP implementation orientation to all workers prior to deployment to worksites</p> <p>(v) Seek approval for camp sites and sources of materials.</p> <p>(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.</p> | <p>(iv) Comply with all applicable legislation, is conversant with the requirements of the EMP;</p> <p>(v) Brief his staff, employees, and laborer about the requirements of the EMP and provide environmental awareness training to staff, employees, and laborers;</p> <p>(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;</p> <p>(vii) Bear the costs of any damages/compensation resulting from non-adherence to the EMP or written site instructions;</p> <p>(viii) Ensure that PIU and ACM/SO are timely informed of any foreseeable activities related to EMP implementation.</p> | |
|--|---|---|--|

C. Capacity Building and Development

226. 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.

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

228. 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 21.

Table 21: 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 |
| 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 |

D. Monitoring and Reporting

229. 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 SO and ESS of PMCBC will review the report and thereafter PMU will allow commencement of works.

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

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

232. Based on monthly and quarterly reports and measurements, PMCBC will draft semi-annual report and submit to PMU for their review and further submission to ADB (Appendix 22). Once concurrence from ADB is received, the report will be disclosed in the Project website. 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.

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

E. EMP Implementation Cost

234. Most of the mitigation measures require the contractors to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance. Regardless of this, any costs of mitigation by the construction contractors or consultants are included in the budgets for the civil works and do not need to be estimated separately here. Mitigation that is the responsibility of PIU/ULB will be provided as part of their management of the project, so this also does not need to be duplicated here. Cost for the capacity building program is included as part of the project. Cost estimate to implement the EMP is given in Table 22:

Table 22: Cost Estimates to Implement the EMP

| | Particulars | Stages | Unit | Total Number# | Rate (INR) | Cost (INR) | Costs Covered By |
|-----------|--|----------------------------------|------------|---------------|------------|-----------------|----------------------|
| A. | Mitigation Measures | | | | | | |
| 1 | Compensatory plantation measures | Construction | Ha. | 0.26 | 137200 | 35672 | Civil works contract |
| | Subtotal (A) | | | | | 35672 | |
| B. | Monitoring Measures | | | | | | |
| 1 | Air quality monitoring | Pre – Construction /construction | Per sample | 45 | 4920 | 221400 | Civil works contract |
| 2 | Noise levels monitoring | Pre – Construction /construction | Per sample | 45 | 1980 | 89100 | Civil works contract |
| 3 | Ground Water | Pre – Construction /construction | Per sample | 36 | 6720 | 241920 | Civil works contract |
| 4 | Surface Water | Pre – Construction /construction | Per sample | 09 | 6720 | 60480 | Civil works contract |
| 5 | Soil Testing | Pre – Construction /construction | Per sample | 45 | 5880 | 264600 | Civil works contract |
| | Subtotal (B) | | | | | 877500 | |
| C. | Capacity Building | | | | | | |
| 1. | Introduction and sensitization to environment issues | Pre-construction | lump sum | | | 100000 | PMU Cost |
| 2 | Treated Effluent Reuse | Pre-Construction | Lump sum | | | 100000 | PMU Cost |
| 3 | Sludge Reuse and Disposal | Pre-Construction | Lump sum | | | 100000 | PMU Cost |
| 3 | EMP implementation | Construction | lump sum | | | 50000 | PMU Cost |
| 4. | Plans and Protocols | Construction | lump sum | | | 25000 | PMU Cost |
| | | | lump sum | | | 25000 | Civil works contract |
| 5. | Experiences and best practices sharing | Construction /Post-Construction | lump sum | | | 100000 | PMU Cost |
| 6. | Contractors Orientation to Workers on EMP implementation | Prior to dispatch to worksite | Lump sum | | | 25000 | Civil works contract |
| | Subtotal (C) | | | | | 5,25,000 | |
| D. | Civil Works | | | | | | |
| 1 | Barricading with GI Sheet | Construction | Sqm | 112901 | 101 | 11403001 | Civil works contract |
| | Barricading using 40mm dia M.S. pipe ("B" class) | Construction | Mtr | 152411 | 38.50 | 5867824 | Civil works contract |

| | Particulars | Stages | Unit | Total Number# | Rate (INR) | Cost (INR) | Costs Covered By |
|---|--|--------------|------|---------------|------------|-----------------|----------------------|
| | and fixing suitably two rows of 100mm wide PVC Tape | | | | | | |
| | Barricading using 40mm dia M.S. pipe ("B" class) and fixing suitably with nuts and bolts | Construction | Mtr. | 236647 | 50 | 11832350 | Civil works contract |
| 3 | Rain Water Harvesting for STP | Construction | Nos. | 1 | 1000000 | 1000000 | Civil works contract |
| | Sub Total (D) | | | | | 30103175 | |
| 4 | Grievance Redressal Mechanism Resolutions | Construction | | | 350000 | 350000 | Civil works contract |
| | Sub Total € | | | | | 350000 | |
| | Total (A+B+C+D +E) | | | | INR | 31891347 | |

* STP, SPS, Proposed Pipelines location, labor camp/construction camp/storage yard

** STP, SPS, Pipelines/working locations, Labour Camp, Construction Camps on quarterly basis

*** In preliminary design 25 trees are required to be cut, being DBO contract, contractor will be required to revise it. Compensatory plantation measures to be followed by contractor.

Computation of total number of samples for environmental monitoring as per Appendix-22.

Summary of EMP Cost incurred by Institution:

| | |
|-----------------|---------------------------|
| Contractor Cost | - INR 29855194/- |
| PMU Cost | - INR 475,000/- |
| Total | - INR 318,91,347/- |

In Words: (Three Crore Eighteen Lakhs Ninety One Thousand three Hundred Forty seven Only)

X. CONCLUSION AND RECOMMENDATION

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

236. Didwana Town is located in the semi-arid region of the state where the average temperature during winter season ranges between 10°C and 17°C and the summer season temperature range 32°C to 36°C. Also, Nagaur District where Didwana Town is located, has seen an average rainfall of 363.1mm in the period 1901 – 1970 which has increased at an average of 35% during the period 2012-2016.

237. However, in general, it should be noted that the air quality as reported under the National Air Monitoring Program covering 21 monitoring stations located across Rajasthan revealed that the air quality in the urban areas is between "moderate" to "poor" category and suggests a link between air quality and vehicular emissions, uncontrolled burning of wastes and construction activities carried out without any mitigation measures. Groundwater levels in Nagaur District where Didwana Town is located has seen a fall in 68% of the wells analysed during the decadal period May 2006 – May 2015. In terms of Groundwater Quality, Nagaur District has seen a high nitrate concentration in its wells. Noise levels are at permissible levels in the town.

238. However, it should be noted in Didwana Town, environmental monitoring is not carried out regularly by state or central-level agencies. Hence, as part of the Contractor's pre-construction activities, it has been suggested that the Contractor determine the baseline environmental data during the Service Improvement Plan (SIP) period.

239. Subproject components including sewerage :- (i) Construction of 1 Nos of STP (3 MLD) near Mela Maidan (Existing STP Campus) with one treated effluent storage reservoir (TESR) of 300KL, Treated effluent elevated reservoir (TEER) of 150 KL Capacity (22 mtr Staging) for reuse of treated effluent (ii) 2 nos. of SPS: SPS-1 at Degana road (1.7MLD) and SPS-2 near RSEB Powerhouse on Ladnu Road (1.30MLD) (iii) laying sewer lines of the length of 61km of new sewers (including 10 km trenchless) (iv) construct 3.70 km of pumping mains (150mm and 200mm diameter of DI material) (v) House service connection-3800 Nos. (vi) Electrical and Mechanical works (vii) One nos of consumer relation management centre (CRMC) in the proposed SPS campus Rajasthan State Electricity Board (RSEB) campus (viii) Operation and Maintenance of sewerage system-10 years.(ix) Faecal sludge and septage management (FSSM) to provide low costs sanitation where sewer network is not an immediate requirement for population on outskirts and scattered habitation till laying of sewer line. Nagar Palika has issued a NOC for the proposed STP. Treated Effluent reservoir and Effluent Pumping Station will be undertaken in the unused land within existing STP campus. There are no protected areas, wetlands, mangroves, or estuaries in or near the project locations.

240. A portion of Didwana town has an organized sewerage system where wastewater is collected and treated in the existing 5 MLD Sewage Treatment Plant. The treated wastewaters from the existing STP is being discharged onto a low lying area adjacent to the plant from where it is pumped on to natural drains on vacant government lands about 800m away from the STP site. However, a large water body of treated wastewaters exist next to the STP, thereby affecting productive use of the land by the Didwana residents.

241. This project involves covering a larger portion of the town with the sewerage network where wastewater shall be collected and treated at the proposed 3 MLD Sewage Treatment Plant. The 3 MLD shall be located at the same site at the existing STP. Presently, in the uncovered areas of Didwana town, the waste water from kitchens & bathrooms is discharged into storm water drains culminating finally to the Nallah or on ground, which pollutes the environment and contaminates the ground water. Open defecation is not uncommon. Most of the residential and commercial buildings and educational institutions in the uncovered areas have on-site septic

tanks and soak pits. Though septic tanks is an accepted onsite treatment, as the septic tanks are not designed and maintained properly, the effluent does not confirm to the standards. The effluent from the septic tanks is directly let into the open drains. In the absence of safe disposal system of sewage as mentioned above, the people of Didwana are facing unhealthy and unhygienic environment therefore public representatives are also demanding facilities of sewerage system on priority basis. The town requires increased sewerage coverage.

242. Few habitations exists more than 400 mts from proposed STP site . Some trees and shrubs that have been recently planted are present at the proposed STP site. No wild fauna is found in these locations. STP will be constructed on available vacant government land where an existing STP is already operating. The treated wastewaters from the proposed STP shall be discharged onto natural drains on vacant government land about 800m from the STP location. It is also proposed to include the existing treated wastewater volume while designing the treated wastewater discharge system for the new STP.

243. Mitigation measures to avoid smell and visual pollution shall be taken in consideration during design in Service Improvement Plan preparation period by DBO contractor. Dense plantation in the periphery of STP campus shall be done to avoid adverse impacts on aesthetics and reduce any foul odour.

244. It is proposed to reuse the treated effluent for use of agriculture, horticulture, development of urban forestry etc. and remaining treated effluent is proposed to be discharged in to a nearby rivers/drains. In order to safeguard the interest of downstream users it is proposed to apply technology/process to achieve very low BOD (BOD 10) and suspended solids in the treated effluent. Sequential batch reactor (SBR) technology has been adopted in RUIDP, Phase-IV Treated effluent shall be mostly reused for beneficial purposes for which proposal of construction of Treated Effluent Elevated Reservoir (TEER), Treated Effluent Storage Reservoir (TESR) and Effluent Pumping Station (EPS) has been taken. Contractor will propose the best methods of reuse of treated effluent and sludge as per guidelines of CPHEEO and best international practices in consultation with RUIDP and Nagar Palika and submit a plan in RUIDP for approval.

245. Anticipated impacts of Didwana sewerage system during operation and maintenance will be related to repair of blocks, overflows and leakages in sewers. Sewers are not 100% watertight and leaks can occur at joints. Faulty section will be exposed and repaired following the same basic procedure as when the sewer was built. Also, sewer pipes require regular maintenance as silt inevitably collects in areas of low flow over time. Necessary equipment for cleaning and removal of blockages in the sewers are included in the project.

246. At STP, incoming sewage will be treated to meet standards and reused for agriculture and other gainful purposes by Nagar Palika otherwise disposed into nearby drain. Anticipated impacts during operation of STP will be related to drop in treatment efficiency. This may result from - change in incoming sewage quality, power supply outage or malfunction of units. These are, however, likely to be minimal, as sewer system will receive only domestic wastewater, there will be a backup power facility, and maintenance will be as per the standard procedures.

247. At the STP, sewage sludge will be removed continuously from reactors, and solidified using decanter, and stored in sludge drying beds for a period of seven days. The treatment and drying processes kill enteric bacteria and pathogens. Because of its high content of nitrates, phosphates and other plant nutrients the sludge can be used as organic fertilizer.

248. Contractor will propose the plan with best methods for reuse of treated effluent and sludge as per guidelines of CPHEEO and best international practices in consultation with RUIDP and Nagar Palika and submit it in RUIDP for approval. In order to aid preparation of a viable treated wastewater reuse and sludge reuse plan, an institutional and capacity building component shall be incorporated in the Project to enable the ULB staff to develop an understanding of the relevant issues.

249. In the project, in a large portion of the project town areas, the septic tank system in individual households is replaced with direct connections to the new sewerage network. The non-use of the existing septic tanks may result in its failure thereby contaminating the surface and groundwater in the region. Hence, an action plan comprising of pumping the sullage, treating it at the STP and closing the septic tank pit with stones, coarse and fine aggregates shall be developed and implemented during the Operation Phase.

250. Certain new initiatives have been taken in the project viz., promoting wastewater reuse, sludge reuse and contractor to work on private properties to provide sewerage connections. Hence, appropriate guidelines for these measures should be provided for these new initiatives. These could include viz., Guidelines for the ULBs for promoting wastewater reuse; Guidelines for the ULBs for sludge reuse; and Guidelines for the Contractors to work within the private properties.

251. The public participation processes undertaken during project design ensured stakeholders are engaged during the preparation of the IEE. The planned information disclosure measures and process for carrying out consultation with affected people will facilitate their participation during implementation. The project's grievance redress mechanism will provide the citizens with a platform for redress of their grievances, and describes the channels, timeframe, and mechanisms for resolving complaints about environmental performance.

252. The Environmental Management Plan proposed in the project includes mitigation measures for identified impacts, training and capacity building activities, a monitoring plan to ensure that the environmental standards are maintained throughout the project construction period and a reporting plan to ensure that the project is implemented as per environmentally sound engineering and construction practices. The total estimated cost for implementing the EMP is approximately INR 318,91,347/- (Three Crore Eighteen Lakhs Ninety one Thousand three Hundred Forty seven Only)

253. The EMP will assist the PMU, PIU, Consultants and contractors in mitigating the environmental impacts, and guide them in the environmentally sound execution of the proposed project. The EMP will also ensure efficient lines of communication between PIU/ULB, PMU, consultants and contractor. A copy of the EMP shall be kept on-site during the construction period at all times. The EMP shall be made binding on all contractors operating on the site, and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.

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

255. Therefore, as per ADB SPS, the project is classified as environmental category B and does not require further environmental impact assessment. However, to conform to government

guidelines STPs requires consent to establishment (CTE) and consent to operate (CTO) from Rajasthan State Pollution Control Board. CTE will be obtained prior to construction, as the detailed designs will be undertaken by contractor.

256. This IEE shall be updated by PMU during the detailed design phase to reflect any changes, amendments and will be reviewed and approved by ADB.

257. **Recommendations.** The following are recommendations applicable to the subproject to ensure no significant impacts:

- (i) Obtain all statutory clearances at the earliest time possible and ensure conditions/provisions are incorporated in the detailed design;
- (ii) Include this IEE in bid and contract documents;
- (iii) Ensure that the project sites are cleared of solid waste and other nuisance materials disposed in designated disposal sites per Solid Waste Management Rules 2000 and its amendment;
- (iv) Ensure that sludge management protocols are compliant with environmental regulations (Solid Waste Management Rules 2000 and its amendment) and solid waste disposal should have a designated site (dumping on vacant lot is not allowed);
- (v) Update the asbestos management plan per site-specific conditions;
- (vi) Update/revise this IEE based on detailed design and/or if there are unanticipated impacts, change in scope, alignment, or location;
- (vii) Conduct safeguards induction to the contractor upon award of contract;
- (viii) Strictly supervise EMP implementation;
- (ix) Ensure contractor appointed qualified EHS officers prior to start of works;
- (x) Documentation and reporting on a regular basis as indicated in the IEE;
- (xi) Continuous consultations with stakeholders;
- (xii) Timely disclosure of information and establishment of grievance redressal mechanism (GRM);
- (xiii) Involvement of contractors, including subcontractors, in first-level GRM;
- (xiv) Commitment from PMU, PIUs, project consultants, and contractors to protect the environment and the people from any impact during project implementation.

Appendix 1: REA Checklist

Sewerage Treatment

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: India/ Rajasthan Secondary Towns Development Sector Project (RSTDSP)/ Didwana Wastewater Project, Rajasthan

Sector Division: Urban Development (Sewerage)

| SCREENING QUESTIONS | Yes | No | REMARKS |
|---|-----|----|--|
| A. Project Siting Is the project area... | | | |
| Densely populated? | | √ | Subproject activities are confined to partial town excluding the densely populated areas. |
| Heavy with development activities? | √ | | Didwana is a developing town with continuous urban expansion, there are no major industries and mostly business and service are the common occupations |
| Adjacent to or within any environmentally sensitive areas? | | √ | Salt Pan is situated in Didwana, where natural salt is produced. SPS site (Degana road) is proposed near to this lake (at a distance more than 500 m) |
| Cultural heritage site | | √ | There are no cultural heritage site listed under state archeology department or ASI |
| Protected Area | | √ | |
| Wetland | | √ | |
| Mangrove | | √ | |
| Estuarine | | √ | |
| Buffer zone of protected area | | √ | |
| Special area for protecting biodiversity | | √ | |
| Bay | | √ | |
| Potential Environmental Impacts Will the Project cause... | | | |
| Impairment of historical/cultural monuments/areas and loss/damage to these sites? | | √ | Not applicable. |

| SCREENING QUESTIONS | Yes | No | REMARKS |
|--|-----|----|---|
| Interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.? | √ | | Anticipated during construction and operations but can be avoided and mitigated. Sewage treatment plants' design include considerations to minimize, if not reduce, the nuisance to the nearby communities and comply with noise and odor standards. During construction, sewers will be laid underground and may interfere temporarily with access and other utilities. Coordination with the concerned agencies will be conducted in finalizing alignment and shifting of utilities, if necessary. |
| Dislocation or involuntary resettlement of people | | √ | Not anticipated. Project does not involve any land acquisition. A Resettlement Plan will be prepared if there are any involuntary resettlement. |
| Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups? | | √ | Not anticipated. Contractors shall prioritize hiring local labor force. Some of the skilled workers may be brought from outside but numbers should not be so large to have impacts on social services. |
| Impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage? | | √ | Not anticipated. Treated effluents from the STP will be utilized in agriculture or similar uses and comply with the State's Reuse policy. |
| Overflows and flooding of neighboring properties with raw sewage? | | √ | Not anticipated. Risks, climate change factors and forecasted demands are considered in the design and capacity of the sewerage systems. |
| Environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers? | √ | | Not anticipated. Designs include sludge collection, handling, treatment and disposal. Standards are provided for the use of sludge as manure. Sewerage system design ensure no industrial effluent will be allowed into the network. |
| Noise and vibration due to blasting and other civil works? | | √ | Anticipated but temporary, site-specific and can be mitigated. Blasting for underground works is prohibited in RUDSICO. Nuisance or disturbance due to noise may be experienced but minimized with mitigation measures specified in the EMPs. Scheduling of works and prior information with the affected people will be conducted. |
| risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during project construction and operation? | √ | | Anticipated but temporary, site-specific and can be mitigated. EMPs and contract provisions include requirements for an Occupational Health and Safety (OHS) plan. The contractor's OHS plan shall be reviewed and cleared by the PIUs prior to commencement of works. |

| SCREENING QUESTIONS | Yes | No | REMARKS |
|---|-----|----|---|
| Discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers? | | √ | Not anticipated. Sewerage system only caters to domestic waters, no industrial wastewater is allowed into the system. |
| Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities? | | √ | Not anticipated. STPs will be isolated through boundary walls and dense plantations to avoid/minimize nuisance. |
| Road blocking and temporary flooding due to land excavation during the rainy season? | √ | | Anticipated during construction but temporary, site-specific and can be mitigated. Road blocking for pipe laying works may be required and mitigation measures are required as per IEE/EMP. Underground construction works (sewer laying, foundations) should be carried out in non-monsoon period to avoid flooding. |
| Noise and dust from construction activities? | √ | | Anticipated during construction but temporary, site-specific and can be mitigated. No major noise-generating activities like rock blasting is anticipated. As the sewers will be laid on the road surface, cutting open of road surface using pneumatic drills will produce noise and dust. Temporary nuisance/disturbance due to noise and dust may be experienced by sensitive receptors. These impacts will be minimized with mitigation measures specified in the EMPs. During operations, noise may be experienced by sensitive receptors due to STP operations. This impact will be avoided by including noise barriers and enclosure of noise-producing components. |
| traffic disturbances due to construction material transport and wastes? | √ | | Anticipated during construction but temporary, site-specific and can be mitigated. Linear activities like sewer laying along the roads is likely to disrupt traffic. Vehicle movement for construction purpose will increase the traffic. Identification of alternate routes, allowing limited - at least one-way traffic, prior information about the works and alternative arrangements, providing information/sign boards etc. will reduce the impact. |
| temporary silt runoff due to construction? | | √ | Anticipated during construction but temporary, site-specific and can be mitigated. EMPs and contract provisions include requirement for contractors to provide silt control measures. |

| SCREENING QUESTIONS | Yes | No | REMARKS |
|---|-----|----|---|
| hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system? | √ | | Not anticipated. Adequately trained staff and necessary equipment will be in place for regular operation and maintenance of the system. Proposed treatment system will be efficient and appropriate repair and maintenance procedure will be developed. Sufficient funds for operation will be ensured. Backup power supply system is part of project. |
| deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water? | √ | | Not anticipated. STP designs include sludge handling and treatment facilities to state policy standards. |
| contamination of surface and ground waters due to sludge disposal on land? | | √ | Not anticipated. STP designs include sludge handling and treatment facilities to state policy standards. O&M manual includes testing procedures and acceptable parameters for disposal on land. |
| Health and safety hazards to workers from toxic gases and hazardous materials which may be contained in sewage flow and exposure to pathogens in sewage and sludge? | | √ | Anticipated during operation but temporary, site-specific and can be mitigated. Workers may be exposed during cleaning of blockages in sewerage network. However, O&M Manuals will include standard operating procedures. All necessary health and safety training and personal protection equipment will be given to workers and staff during operation of sewerage system. Implementation of contractors' H&S will be strictly enforced by the PIUs. |
| large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)? | | √ | Not anticipated. Most of the unskilled workers will be hired from local labor force. Some skilled workers may be brought from outside, but numbers will not be so large to have impacts on social infrastructure. |
| Social conflicts between construction workers from other areas and community workers? | | √ | Not anticipated. Most of the unskilled workers will be hired from local labor force. Some skilled workers may be brought from outside, but numbers will not be so large to have impacts on social infrastructure. No conflicts envisaged. |

| SCREENING QUESTIONS | Yes | No | REMARKS |
|---|-----|----|---|
| 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? | | √ | Anticipated but temporary, site-specific and can be mitigated. Construction will not involve use of explosives and chemicals. During operations, chemicals such as pH adjusters, flocculants, or coagulants may be used. The complete list of chemicals, quantities, and requirements for safe use and storage will be included in the final IEE for the STPs (these are design-build-operate packages). The EMPs in the current IEEs already include measures and monitoring requirements conforming with IFC EHS Guidelines. O&M Manuals will include health and safety requirements for managing 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 throughout project construction, operation and decommissioning? | √ | | Anticipated but temporary, site-specific and can be mitigated. Work area will be clearly demarcated with security access for the workers and project-concerned members only. Community health and safety risks are present during construction such as risks from excavations for pipe laying, equipment and vehicle operations which should be identified and implemented in the site-specific EMPs. |

A Checklist for Preliminary Climate Risk Screening

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

| Screening Questions | | Score | Remarks ²² |
|--------------------------------|--|-------|---|
| Location and Design of project | Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides? | 0 | No such issue may affect the project |
| | Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)? | 0 | No such issue may affect the project |
| Materials and Maintenance | Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)? | 0 | No such issues may affect the project |
| | Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)? | 0 | No such issue may affect the project |
| Performance of project outputs | Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time? | 0 | No problem will envisaged in future which likely affect the performance of project output |

Options for answers and corresponding score are provided below:

| Response | Score |
|-------------|-------|
| Not Likely | 0 |
| Likely | 1 |
| Very Likely | 2 |

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

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

Other Comments: The proposed subproject activity involves construction of one new STP and the anticipated environmental impacts are very marginal and the construction activity does not impose any threat to the existing climatic conditions.

²² 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.

Appendix 2: Drinking Water Standards, Ambient Air Quality, Vehicle, Diesel Generator Emissions Standards

Table 1: Drinking Water Standards

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

| Group | National Standards for Drinking Water ^a | | | WHO Guidelines for Drinking-Water Quality, 4 th Edition, 2011 ^b | Applicable Per ADB SPS ^{c, d} |
|-------------------|--|-----------|---|---|---|
| | Parameter | Unit | Max. Concentration Limits ^d | | |
| Chemical | 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 |
| | 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 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. IS10500:2012 indicates these values in parenthesis may still be tolerated only if there are no other sources that could meet the base acceptable limit.

Table 2: Ambient Air Quality Standards

| Parameter | Location ^a | India Ambient Air Quality Standard ($\mu\text{g}/\text{m}^3$) ^b | WHO Air Quality Guidelines ($\mu\text{g}/\text{m}^3$) | | Applicable Per ADB SPS ^e ($\mu\text{g}/\text{m}^3$) |
|------------------|---|--|---|---------------------|--|
| | | | Global Update ^c 2005 | Second Edition 2000 | |
| PM ₁₀ | Industrial Residential, Rural and Other Areas | 60 (Annual) 100 (24-hr) | 20 (Annual) 50 (24-hr) | - | 20 (Annual) 50 (24-hr) |
| | Sensitive Area | 60 (Annual) 100 (24-hr) | 20 (Annual) 50 (24-hr) | - | 20 (Annual) 50 (24-hr) |
| PM ₂₅ | Industrial Residential, Rural and Other Areas | 40 (Annual) 60 (24-hr) | 10 (Annual) 25 (24-hr) | - | 10 (Annual) 25 (24-hr) |
| | Sensitive Area | 40 (Annual) 60 (24-hr) | 10 (Annual) 25 (24-hr) | - | 10 (Annual) 25 (24-hr) |
| SO ₂ | Industrial Residential, | 50 (Annual) 80 (24-hr) | 20 (24-hr) 500 (10-min) | - | 50 (Annual) 20 (24-hr) 500 (10-min) |

| Parameter | Location ^a | India Ambient Air Quality Standard ($\mu\text{g}/\text{m}^3$) ^b | WHO Air Quality Guidelines ($\mu\text{g}/\text{m}^3$) | | Applicable Per ADB SPS ^e ($\mu\text{g}/\text{m}^3$) |
|---|--|--|---|-----------------------------------|--|
| | | | Global Update ^c 2005 | Second Edition 2000 | |
| | Rural and Other Areas | | | | |
| | Sensitive Area | 20 (Annual) 80 (24-hr) | 20 (24-hr) 500 (10-min) | - | 20 (Annual) 20 (24-hr) 500 (10-min) |
| NO ₂ | Industrial Residential, Rural and Other Areas | 40 (Annual) 80 (24-hr) | 40 (Annual) 200 (1-hr) | - | 40 (Annual) 80 (24-hr) 200 (1-hr) |
| | Sensitive Area | 30 (Annual) 80 (24-hr) | 40 (Annual) 200 (1-hr) | - | 30 (Annual) 80 (24-hr) 200 (1-hr) |
| CO | Industrial Residential, Rural and Other Areas | 2,000 (8-hr) 4,000 (1-hr) | - | 10,000 (8-hr) 100,000 (15-min) | 2,000 (8-hr) 4,000 (1-hr) 100,000 (15-min) |
| | Sensitive Area | 2,000 (8-hr) 4,000 (1-hr) | - | 10,000 (8-hr) 100,000 (15-min) | 2,000 (8-hr) 4,000 (1-hr) 100,000 (15-min) |
| Ozone (O ₃) | Industrial Residential, Rural and Other Areas | 100 (8-hr) 180 (1-hr) | 100 (8-hr) | | 100 (8-hr) 180 (1-hr) |
| | Sensitive Area | 100 (8-hr) 180 (1-hr) | 100 (8-hr) | | 100 (8-hr) 180 (1-hr) |
| Lead (Pb) | Industrial, Residential, 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 ₆ H 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, | 0.006 (Annual) | | | 0.006 (Annual) |

| Parameter | Location ^a | India Ambient Air Quality Standard ($\mu\text{g}/\text{m}^3$) ^b | WHO Air Quality Guidelines ($\mu\text{g}/\text{m}^3$) | | Applicable Per ADB SPS ^e ($\mu\text{g}/\text{m}^3$) |
|-------------|--|--|---|---------------------|--|
| | | | Global Update ^c 2005 | Second Edition 2000 | |
| | Rural and Other Areas | | | | |
| | Sensitive Area | 0.006 (Annual) | | | 0.006 (Annual) |
| Nickel (Ni) | Industrial, Residential, Rural and Other Areas | 0.02 (Annual) | | | 0.02 (Annual) |
| | Sensitive Area | 0.02 (Annual) | | | 0.02 (Annual) |

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

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

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

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

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

**Table 3: Emission limits for New DG sets up to 800 KW
(As per Environment (Protection) (Third Amendment) Rules, 2013)**

TABLE

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

Note:

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

Table 4: Stake Height Requirement of DG sets**DIESEL GENERATOR SETS : STACK HEIGHT**

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

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

H = Total height of stack in metre

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

KVA = Total generator capacity of the set in KVA

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

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

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

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

Table 5: Vehicle Exhaust Emission Norms**1. Passenger Cars**

| Norms | CO(g/km) | HC+ NOx(g/km) |
|--------------------------|------------|-----------------|
| 1991 Norms | 14.3-27.1 | 2.0(Only HC) |
| 1996 Norms | 8.68-12.40 | 3.00-4.36 |
| 1998 Norms | 4.34-6.20 | 1.50-2.18 |
| India stage 2000 norms | 2.72 | 0.97 |
| Bharat stage-II | 2.2 | 0.5 |
| Bharat Stage-III | 2.3 | 0.35 (combined) |
| Bharat Stage-IV | 1.0 | 0.18 (combined) |
| Bharat Stage-VI (Petrol) | 1.0 | 0.16 (Combined) |

2. Heavy Diesel Vehicles

| Norms | CO(g/kmhr) | HC (g/kmhr) | NOx (g/kmhr) | PM(g/kmhr) |
|--------------------------|-------------|---------------|--------------|------------|
| 1991 Norms | 14 | 3.5 | 18 | - |
| 1996 Norms | 11.2 | 2.4 | 14.4 | - |
| India stage 2000 norms | 4.5 | 1.1 | 8.0 | 0.36 |
| Bharat stage-II | 4.0 | 1.1 | 7.0 | 0.15 |
| Bharat Stage-III | 2.1 | 1.6 | 5.0 | 0.10 |
| Bharat Stage-IV | 1.5 | 0.96 | 3.5 | 0.02 |
| Bharat Stage-VI (Diesel) | 0.5 | 0.17 (HC+NOx) | | 0.0045 |

Source: Central Pollution Control Board

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

Appendix 3: Ambient Noise Standards and Noise limit for DG set

Table 1: Ambient Noise 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.

Table 2: Noise Limits for DG Set

(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.

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

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

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

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

3.1 Applicability

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

3.2 Requirement of Certification

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

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

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

Appendix 4: Effluent Discharge Standards for Sewage Treatment Plant by order of NGT dated 30 April 2019

| Sl. No. | Parameters | Parameters Limit |
|----------------|--|--|
| 1 | pH | 5.5-9.0 |
| 2 | BOD (mg/l) | Not more than 10 mg/l |
| 3 | COD (mg/l) | Not more than 50 mg/l |
| 4 | TSS (mg/l) | Not more than 20 mg/l |
| 5 | P-Total (mg/l)- for discharge into ponds/lakes | Not more than 1.0 mg/l |
| 6 | N-Total (mg/l) | Not more than 10 mg/l |
| 7 | Fecal Coliform (MPN/100ml) | Desirable- 100 MPN/100ml Permissible- 230 MPN/100ml |

Appendix-5: Pages from Rajasthan State Sewerage and Wastewater Policy for reuse of treated effluent and sludge

STATE SEWERAGE AND WASTE WATER POLICY- 2016

- 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.

STATE SEWERAGE AND WASTE WATER POLICY- 2016

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.

STATE SEWERAGE AND WASTE WATER POLICY- 2016

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 6: Guidelines for Reuse of Treated Effluent and Sludge from STP for Beneficial Purposes

(Source: Manual on Sewerage and Sewage Treatment Systems, CPHEEO, Ministry of Urban Development, Govt. of India)

Health Hazards during Sewage Operations

Labourers working on the sewage treatment and operations may suffer from a number of ailments directly attributed to handling of sewage. In view of this it is desirable to disinfect sewage and where feasible mechanize sewage operations.

The staff of sewage operations must be well educated in the sanitary rules on the utilization of sewage for irrigation as well as with personal hygiene. All persons working in sewage farms must undergo preventive vaccination against enteric infections and annual medical examination for helminthiases and be provided treatment if necessary.

Sewage treatment plants should be provided with adequate space for canteens with proper sanitation, wash-stands and lockers for irrigation implements and protective clothing. Safe drinking water must be provided for the workers and for population residing within the effective range of the sewage treatment plants.

All workers should be provided with gum boots and rubber gloves, which must compulsorily be worn while at work. They should be forced to observe personal hygiene such as washing after work as well as washing before taking food. The use of antiseptics in the water used for washing should be emphasized. The farm worker should be examined medically at regular intervals and necessary curative measures enforced.

Mitigation measures to avoid Health Hazards

Personal Hygiene against Pathogen

The worker should take precautions because a large number of coliform groups, various kinds of micro-organisms, and egg parasites exist in sewage. The workers should strive to maintain good health by taking care of the following points:

- Wear clean uniform, work boots, etc.
- After work and before having a meal, always wash hands and disinfect them.
- After work, take a shower if possible.
- Do not enter the offices and lounges wearing dirty clothes.
- If necessary, take vaccinations against tetanus, leptospirosis fever and so on

Maintaining Cleanliness The worker should maintain each facility in a clean and neat condition.

- The floors of workrooms, stairs and corridors should be cleaned at the appropriate frequency to maintain them in a clean condition
- Disinfection of relevant locations is to be carried out periodically.

Health Check Workers should receive health check once a year to maintain their health, and prevent illnesses or detect them at an early stage. The results of the health check should be maintained as records. Recommended items to be inspected during the health check are as given below.

- Examine medical history.
- Examine subjective symptoms and other objective symptoms.
- Check height, weight, vision and hearing ability.

- Chest X-ray examination.
- Blood pressure measurement.
- Check for anaemia.
- Check for liver functions.
- Check for lipids in blood.
- Check blood sugar level
- Urine analysis.
- Electrocardiogram analysis

Welfare Measures The Sanitation Workers (Regulation of Employment and Conditions of Service) Act 2012 proposes constitution of a Sanitation Workers State Welfare Board to exercise powers conferred on it and to perform welfare functions such as the following for sanitation workers:

- Provide immediate assistance to a beneficiary in case of an accident
- Sanction of loan and advances
- Medical expenses for treatment of major ailments
- Financial assistance for education of children
- Payment of maternity benefits
- Make provision and improvement of welfare measures and facilities as may be prescribed

Corrective Measures When a worker has symptoms of an illness listed above, the plant engineer should ensure that the worker is checked-up by a specialist doctor and receives proper treatment and care and should take the following actions considering the content of work done by the worker:

- Change the workplace if necessary
- Change the content of the work
- Shorten the working hours
- Perform relevant measurements of the working environment
- Maintain the facility or equipment

Risks in use of treated effluent and sludge in agriculture practices

Cultivation of crops that are eaten raw should be banned. Cultivation of paddy in bunded fields is likely to give rise to sanitation problems and hence is undesirable. Growing of non-edible commercial crops like cotton, jute, fodder, milling varieties of sugarcane and tobacco would be suitable. Cultivation of grasses and fodder legumes, medicinal and essential oil yielding plants like menthol and citronella may be allowed. Cultivation of cereals, pulses, potatoes and other crops that are cooked before consumption may be permitted, if sewage is treated and care is taken in handling the harvests to ensure that they are not contaminated. Cultivation of crop exclusively under seed multiplication programmes would be advantageous as these are not consumed. As an additional safeguard, sewage irrigation should be discontinued at least two months in advance of harvesting of fruits and berries, one month for all kinds of vegetables and a fortnight for all other crops. Direct grazing on sewage irrigated farms should be prohibited.

Risks of Nutrient Loading in Agriculture

Crops receiving excessive dosage of nitrogen show superfluous vegetative growth and decrease in grain or fruit yield. The phosphate deficit of sewage, therefore, should be made good by supplementing with phosphate fertilizers, the extent of phosphate fortification depending upon the nature of crop and its phosphate requirements. As the availability of phosphate is low in the irrigation water it would be desirable to apply the required quantity of phosphatic fertilizer at the

time or even (about a fortnight) before the sowing or planting of the crop. Even when sewage nutrients are balanced by fortification, irrigation with such sewage may supply excessive amount of nutrients resulting in waste or unbalanced growth of plants with adverse effects on yields. It may therefore be necessary to dilute the sewage. Dilution also helps in reducing the concentration of dissolved salts and decomposable organic matter in the sewage thus, decreasing hazards to the fertility of the soil. It is desirable to limit the BOD and total suspended solids of sewage to be disposed on land for irrigation, as per relevant standards. There is a need to take caution on describing nutrient supply capacity of sewage particularly in the case of availability of phosphorus because there is a possible conversion of available phosphorus in unavailable mode in the presence of heavy metals present in the sewerage. This happens commonly in high as well as low pH soils.

Alternative Arrangement during Non-irrigating Periods

During rainy and non-irrigating seasons, agricultural practices may not need any water for irrigation. Even during irrigating season, the water requirement fluctuates significantly. Hence, satisfactory alternative arrangements have to be made for the disposal of sewage on such occasions either by storing the excess sewage or discharging it elsewhere without creating environmental hazards. The following alternatives are generally considered: a) Provision of holding lagoons for off-season storage. They enable irrigation of a fixed area of land to varying rates of crop demand. They may also serve as treatment units such as aerated or stabilization lagoons, provided the minimum volume required for treatment is provided beyond the flow-balancing requirement. b) Provision of additional land where treated sewage is not required on the main plot of land c) Discharge of surplus treated sewage to river or into sea with or without additional treatment. Combining surface discharge facilities with irrigation system is quite common and often quite compatible. d) Resorting to artificial recharge in combination with an irrigation system where feasible.

Treated Sewage into Perennial Rivers

When sewage is treated and discharged into perennial flowing rivers and the blended river water is drawn downstream of the point of such blending as raw water for treatment in public water supply schemes. This is indirect potable use after blending. This is historical and ongoing all around. However, of late, the organic load due to the discharged treated, partially treated and non-point sewage becomes in excess of the self-purifying capacity of the river. Thus, the river water is not actually fresh water. The water quality of Yamuna river for Agra water supply scheme requires to be first treated in MBBR to purify the river water to a level as raw water for the downstream WTP. When it passes through flowing surface water it has the potential disadvantages of contamination by human and animal activities adding organic matter and waterborne pathogens unless the river stretch is protected from such activities. The guiding principle in such cases for the ULBs will be to at least intercept the sewage outfalls and provide adequate STPs and follow the recommended quality criteria for the treated sewage.

Treated Sewage into Non-Perennial / Dry River Courses

There are locations where the rivers are not perennial or almost dry throughout the year except some monsoon runoff. In this case the discharged treated sewage sinks into the aquifer zone and is extracted by infiltration wells or galleries. The advantage of direct dilution from surface water is lost, but the additional purification in the soil and dilution from the aquifer water are happening. An example is the case of the Palar river course in Tamilnadu. The surface water flow in this occurs only for about a week if the monsoon is normal and if the water spills beyond the upstream

impoundments. The aquifer however supports the public water supply of over 30 habitations along its dry tract of nearly 80 km before the sea. The partly treated sewage of the en-route habitations does reach this river course as intervals. So far, no epidemics have been met with. This may be due to the above said additional purification in the soil and dilution by aquifer water. However, if these are exceeded by the contamination load, there can be immediate health problems. The guiding principle in such cases for the ULBs will be (a) to keep a check on the raw water quality from the infiltration wells to detect sudden increase in contaminants and (b) at least intercept the sewage outfalls and provide adequate STPs.

Appendix 7: Compliance with Environmental Criteria for Subproject Selection

| Components | Criteria | Design Considerations (if criterion is not met) | Compliance |
|------------------------|--|---|---|
| All subprojects | | | |
| | Subproject will avoid potentially significant adverse impacts that are diverse, irreversible or unprecedented (ADB SPS Category A for environment). | | Being complied, the proposed components of subproject are proposed in already developed area and all impacts are predictable and mitigation measures are part of project design |
| | Comply with all requirements of ADB SPS 2009 and follow procedures set in this environmental assessment and review framework (EARF) | | Being complied |
| | Comply with relevant national, and local laws, rules and regulations regarding EIA, environmental protection, pollution prevention (water, air, noise, solid waste, etc.) wildlife protection, core labor standards, physical cultural resources, health and safety, and other laws in specific sectors as indicated below | | Being complied |
| | Does not include and/or involve any activities listed in ADB's Prohibited Investment Activities List ²³ | | Being complied |
| | Reflect inputs from public consultations | Refer to ADB SPS requirements on meaningful consultations ²⁴ | Being complied |

²³ADB SPS Appendix 5

²⁴Per ADB SPS, meaningful consultation is defined as "a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues"

| Components | Criteria | Design Considerations (if criterion is not met) | Compliance |
|-----------------------------|--|---|----------------|
| 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. | Being complied |
| | Avoid or minimize the cutting of trees | If tree is to be cut, consider 1:3 replacement | Being complied |
| Biodiversity | <p>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.</p> <p>Should not directly affect environmentally protected areas, core zones of biosphere reserves and highly valued habitat</p> | If criteria is not met, this is potential for Category A therefore alternate location should be considered. A Biodiversity Expert shall assess and confirm critical habitat qualification | Being complied |
| | If work is proposed with the aim of improving the conservation or management of designated subproject sites (e.g. improved drainage), this must only be undertaken: (i) after a comprehensive study and development of management plans and criteria; and (ii) with the direct involvement and approval of national and local bodies responsible for the subproject site. | | Being complied |
| Physical Cultural Resources | Should not result in the destruction/damage of or encroachment onto physical cultural resources (PCR) ²⁵ 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 location is within 300 m of notified protected monuments/sites and there is no alternative, permissions from the ASI or State Department of Archaeology to be obtained prior to finalization of detailed engineering design. If potential physical cultural resources are found within or adjacent to project sites, a | Being complied |

²⁵ Physical cultural resources as defined as "movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings and may be above or below ground or under water. Their cultural interest may be at the local, provincial, national, or international level."

| Components | Criteria | Design Considerations (if criterion is not met) | Compliance |
|--|---|---|----------------|
| | | Heritage Impact Assessment is required to be conducted by a competent expert. | |
| Existing Facilities to be rehabilitated or expanded | Conduct environmental audit of existing facilities ²⁶ per ADB SPS | For non-compliances, provide corrective action for each area of concern including cost and schedule to be included in the subproject EMP. | Being complied |
| Associated Facilities ²⁷ | Analyse environmental impacts and risks to be included in the IEE | | Being complied |
| Asbestos-containing materials (ACM) including, but not limited to, pipes, roofing, ceilings, insulation materials, excess pipes stored in PHED campuses, walls, etc. | Avoid handling or removing any ACM. Ensure asbestos concrete (AC) pipes facilities containing asbestos will not be disturbed and left in-situ. Appendix 4 provides asbestos management plan. | If ACM is suspected, asbestos verification by a competent expert is required and an asbestos management plan (AMP) prepared. RUDSICO-EAP shall include AMP in all contracts. Contractor should be certified to handle ACM. | Being complied |
| | When designing subproject infrastructure that involves excavation in urban areas the relevant authorities must be consulted to ascertain the location of any ACM prior to any subproject activity. Locations of new infrastructure must then be designed to avoid excavating or disturbing any ACM. | | Being complied |
| Right-of-way | Locate water supply pipelines within the right of way (ROW) of other linear structures (roads, irrigation canals) as far as possible, to reduce new land acquisition. | | Being complied |
| | Ensure that pipelines ROW do not require land acquisition from individual farmers that is a significant proportion of their total land holding (>10%). | | Being complied |
| Sewage System | | | |
| Location | Locate new Sewage Treatment Plants (STP) at least 500m away as far as possible from any inhabited areas, in locations where no | In case of non-availability of suitable sites due to land and | Being complied |

²⁶ ADB SPS Appendix 4 para 12 on Existing Facilities

²⁷ ADB SPS Appendix 1 para 6 defines associated facilities as "not funded as part of the project (funding may be provided separately by the borrower/client or by third parties), and whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project"

| Components | Criteria | Design Considerations (if criterion is not met) | Compliance |
|------------|--|---|-----------------------|
| | <p>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).</p> | <p>technical design constraints in already developed areas, where 500 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 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</p> | |
| | <p>Locate Sewage Pumping Stations (SPS) and wet wells as far as possible at least 100m away from any inhabited areas and from sites such as hospitals, schools, temples, etc. to minimize nuisance impacts from odor, rodents, etc.</p> | <p>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 order to finalize sites for implementation of</p> | <p>Being complied</p> |

| Components | Criteria | Design Considerations (if criterion is not met) | Compliance |
|--------------|--|---|----------------|
| | | 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 two to 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 function of the STP or present a risk of damage to the STP or the surrounding area | | Being complied |
| 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. | | Being complied |
| Design | 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) | | Being complied |
| | Include measures to ensure the safe disposal of sewage sludge and if possible, to promote its safe and beneficial use as an agricultural fertilizer ⁵ | | Being complied |
| Right-of-way | Locate sewage pipelines within the right of way (ROW) of other linear structures (e.g. roads) wherever feasible, to reduce new land acquisition. | | Being complied |

| Components | Criteria | Design Considerations (if criterion is not met) | Compliance |
|-------------------|---|--|-------------------|
| | 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%) | | Being complied |

Appendix 8: 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), dated the 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 devise 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 9: Salient Features of Major Laws Applicable to Contractor

- (i) Workmen Compensation Act, 1923 - The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- (ii) Payment of Gratuity Act, 1972 - Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more or on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.
- (iii) Employees' PF and Miscellaneous Provisions Act, 1952 - The Act provides for monthly contributions by the employer plus workers @10 % or 8.33 %.The benefits payable under the Act are: (a) Pension or family pension on retirement or death as the case may be; (b) deposit linked insurance on the death in harness of the worker; (c) payment of PF accumulation on retirement/death etc.
- (iv) Maternity Benefit Act, 1951 - The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.
- (v) Contract Labour (Regulation and Abolition) Act, 1970 - The Act provides for certain welfare measures to be provided by the Contractor to contract labor and in case the Contractor fails to provide, the same are required to be provided by the Principal Employer by Law.The principal employer is required to take Certificate of Registration and the Contractor is required to take a License from the designated Officer. The Act is applicable to the establishments or Contractor of principal employer if they employ 20 or more contract labor.
- (vi) Minimum Wages Act, 1948 - The employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employment.
- (vii) Payment of Wages Act, 1936 - It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
- (viii) Equal Remuneration Act, 1979 - The Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees in the matters of transfers, training and promotions etc.
- (vi) Payment of Bonus Act, 1965 - The Act is applicable to all establishments employing 20 or more workmen. The Act provides for payments of annual bonus subject to a minimum of 8.33 % of wages and maximum of 20 % of wages to employees drawing Rs. 3,500/- per month or less. The bonus to be paid to employees getting Rs. 2,500/- per month or above up to Rs.3,500/- per month shall be worked out by taking wages as Rs.2,500/- per month only. The Act does not apply to certain establishments. The newly set up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of the Act.
- (x) Industrial Disputes Act, 1947 - The Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

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

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

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

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

(xv) **Construction and Demolition Waste Management Rules, 2016-** This Rule stipulate that-

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

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

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

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

Employer shall-

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

For safety of workers employer shall provide-

- Safe access to site and work place
- Safety in demolition works
- Safety in use of explosives
- Safety in operation of transporting equipments and appoint competent person to drive or operate such vehicles and equipments
- Safety in lifting appliance, hoist and lifting gears
- Adequate and suitable lighting to every work place and approach
- Prevention of inhalation of dust, smoke, fumes, gases during construction works and provide adequate ventilation in work place and confined space
- Safety in material handling and stacking/un stacking
- Safeguarding the machinery with fly-wheel of moving parts
- Safe handling and use of plants operated by compressed air
- Fire safety
- Limit of weight to be lifted by workers individually
- Safety in electric wires, apparatus, tools and equipments
- Provide safety net, safety sheet, safety belts while working at height (more than 1.6 mtrs as per OSHA)

- Providing scaffolding, ladders and stairs, lifting appliances, chains and accessories where required
- Safety in pile works, concrete works, hot asphalt, tar, insulation, demolition works, excavation, underground construction and handling materials
- Provide and maintain medical facilities for workers
- Any other matters for the safety and health of workers

Appendix 10: Sample Outline Spoil Management Plan

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

I. Spoils information

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

II. Spoils management

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

III. Documentation

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

Appendix 11: Sample Outline Traffic Management Plan

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

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

- (i) the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
- (ii) protection of work crews from hazards associated with moving traffic;
- (iii) mitigation of the adverse impact on road capacity and delays to the road users;
- (iv) maintenance of access to adjoining properties; and
- (v) addressing issues that may delay the project.

B. Operating Policies for TMP

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

- (i) Make traffic safety and temporary traffic control an integral and high-priority element of project from planning through design, construction, and maintenance.
- (ii) Inhibit traffic movement as little as possible.
- (iii) Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.
- (iv) Inspect traffic control elements routinely, both day and night, and make modifications when necessary.
- (v) Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.
- (vi) Train all persons that select, place, and maintain temporary traffic control devices.
- (vii) Keep the public well informed.
- (viii) Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

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

C. Analyze the impact due to street closure

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

- (i) approval from the ULB/Public Works Department (PWD) to use the local streets as detours;
- (ii) consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
- (iii) determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
- (iv) determining if additional traffic control or temporary improvements are needed along the detour route;
- (v) considering how access will be provided to the worksite;

- (vi) contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
- (vii) developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

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

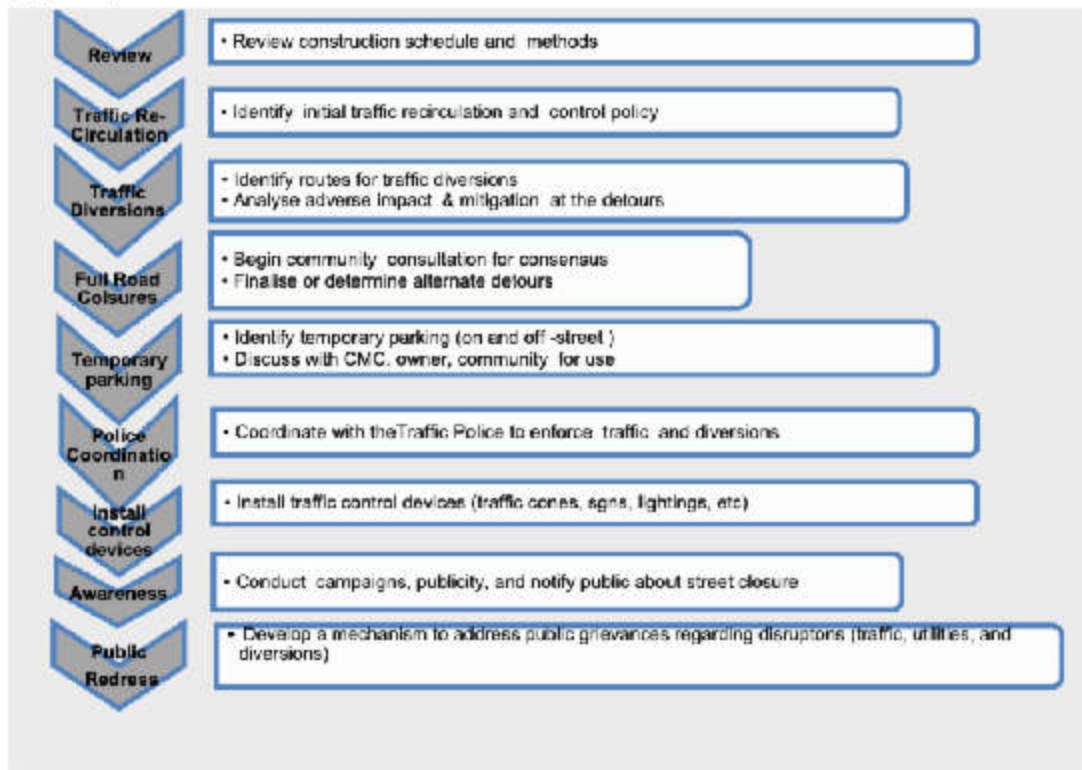


Figure A1: Policy Steps for the TMP

D. Public awareness and notifications

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

6. The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel

plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

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

- (i) traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
- (ii) defensive driving behaviour along the work zones; and
- (iii) reduced speeds enforced at the work zones and traffic diversions.

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

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

- (i) explain why the brochure was prepared, along with a brief description of the project;
- (ii) advise the public to expect the unexpected;
- (iii) educate the public about the various traffic control devices and safety measures adopted at the work zones;
- (iv) educate the public about the safe road user behaviour to emulate at the work zones;
- (v) tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
- (vi) indicate the office hours of relevant offices.

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

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

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

11. Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such,

the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary "STOP" and "GO").

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

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

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

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

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

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

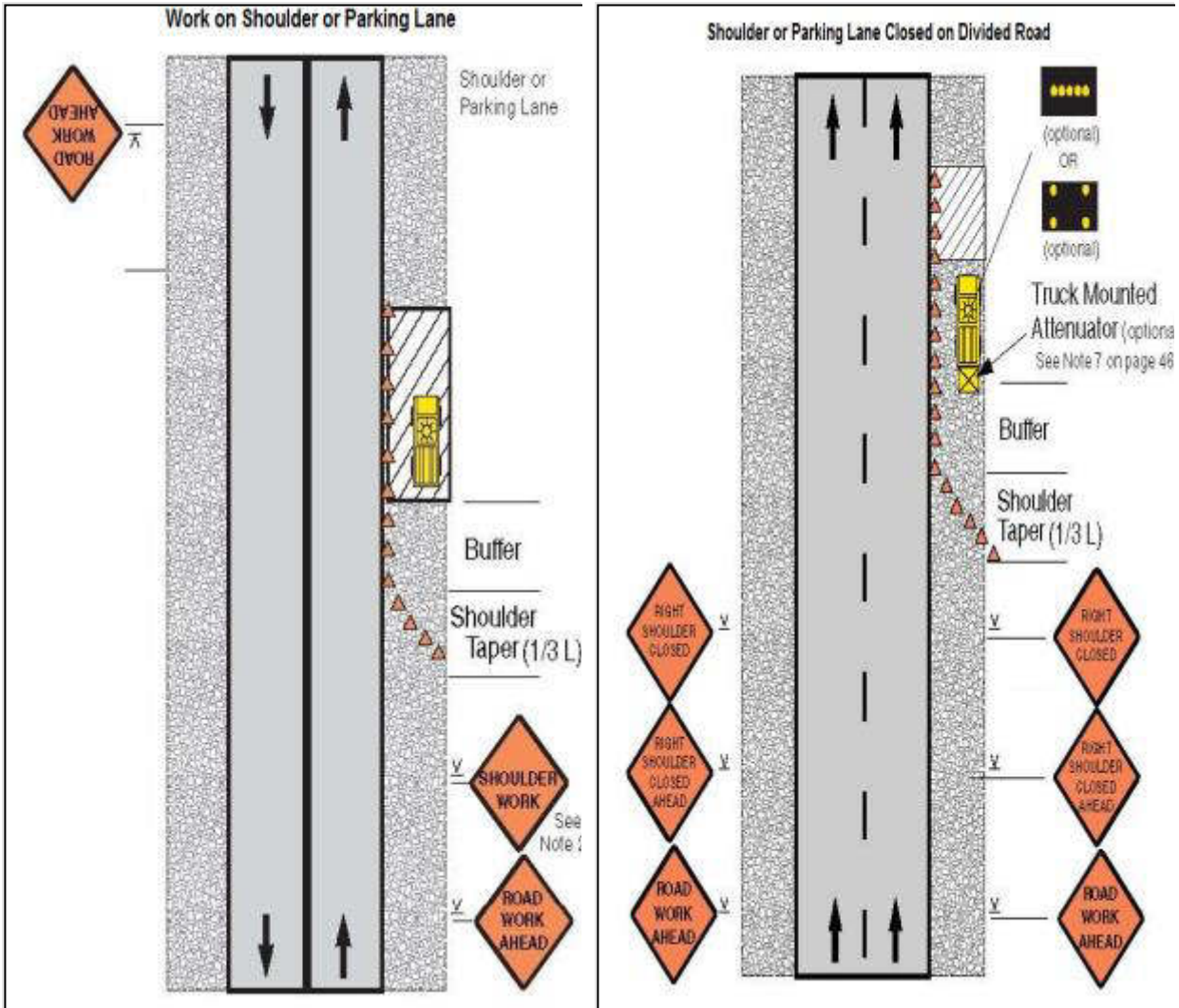


Figure A4 & A5: Work in Travel lane & Lane closure on road with low volume

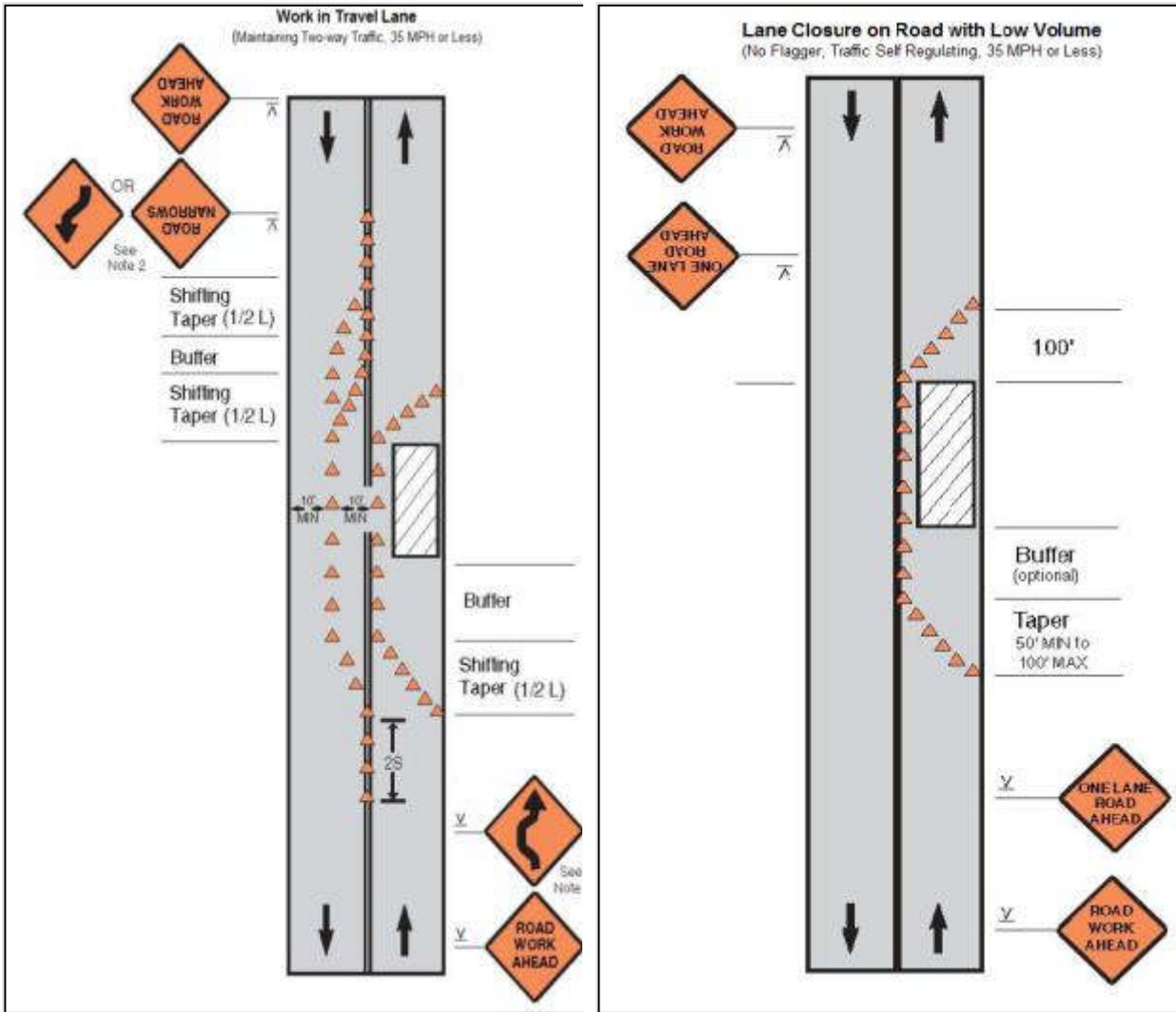


Figure A6 & A7: Lane closure on a two-lane road with low volume (with yield sign) & Lane closure on a two-lane road with low volume (one flagger operation)

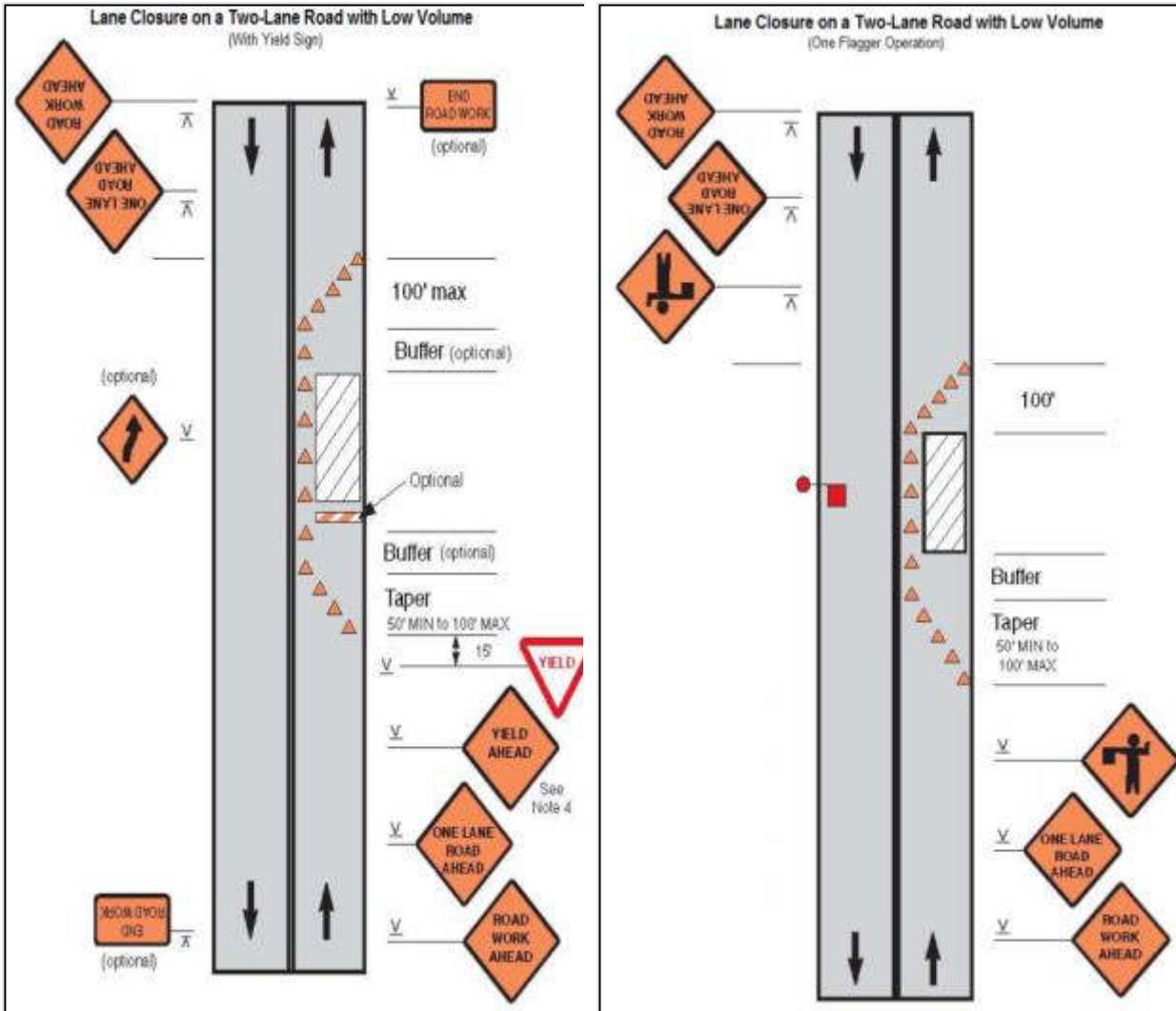


Figure A8 & A9: Lane Closure on a Two-Lane Road (Two Flagger Operation) & Lane Closure on a Four-Lane Undivided Road

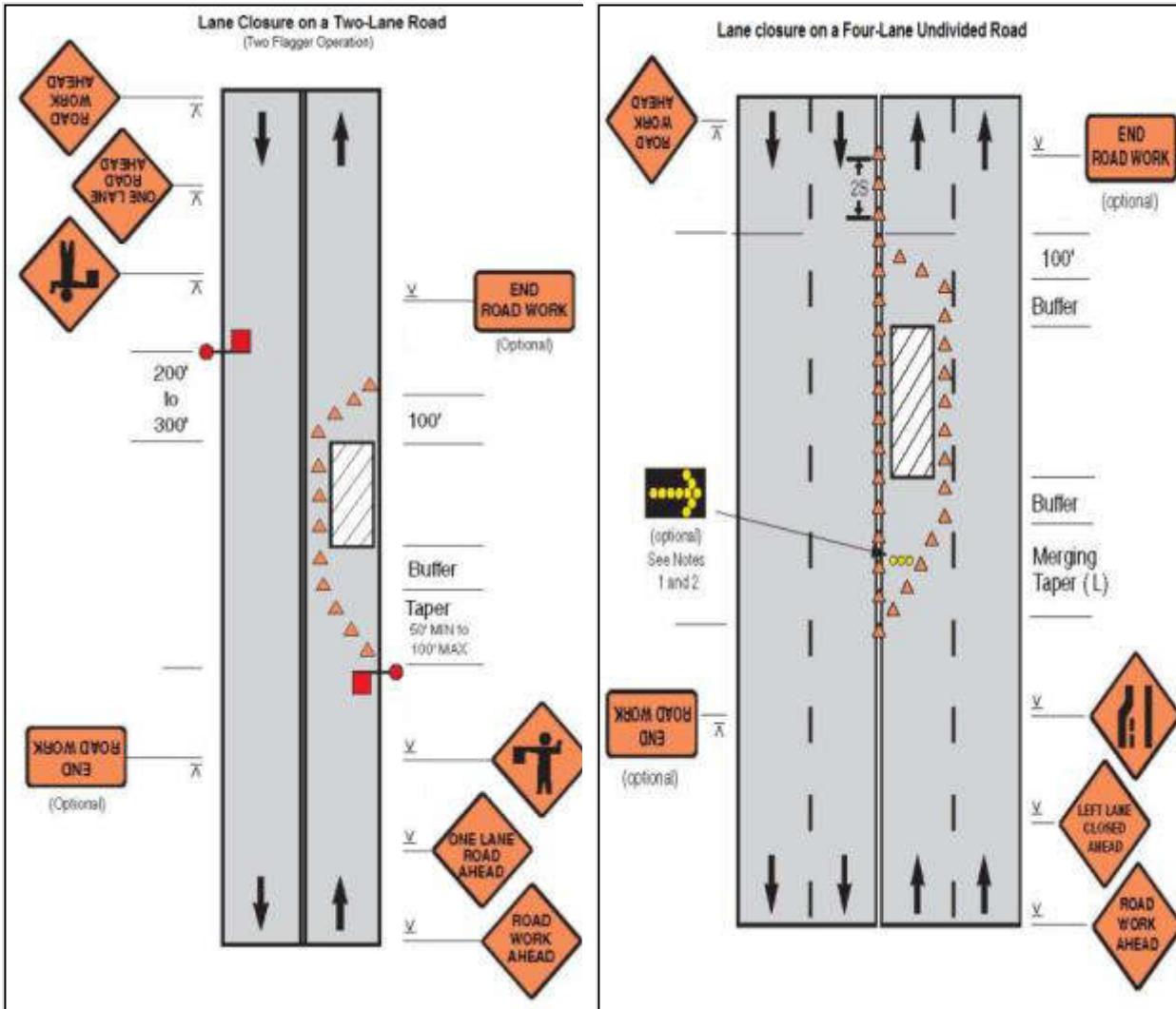


Figure A10 & A11: Lane Closure On Divided Roadway & Half Road Closure On Multi-Lane Roadway

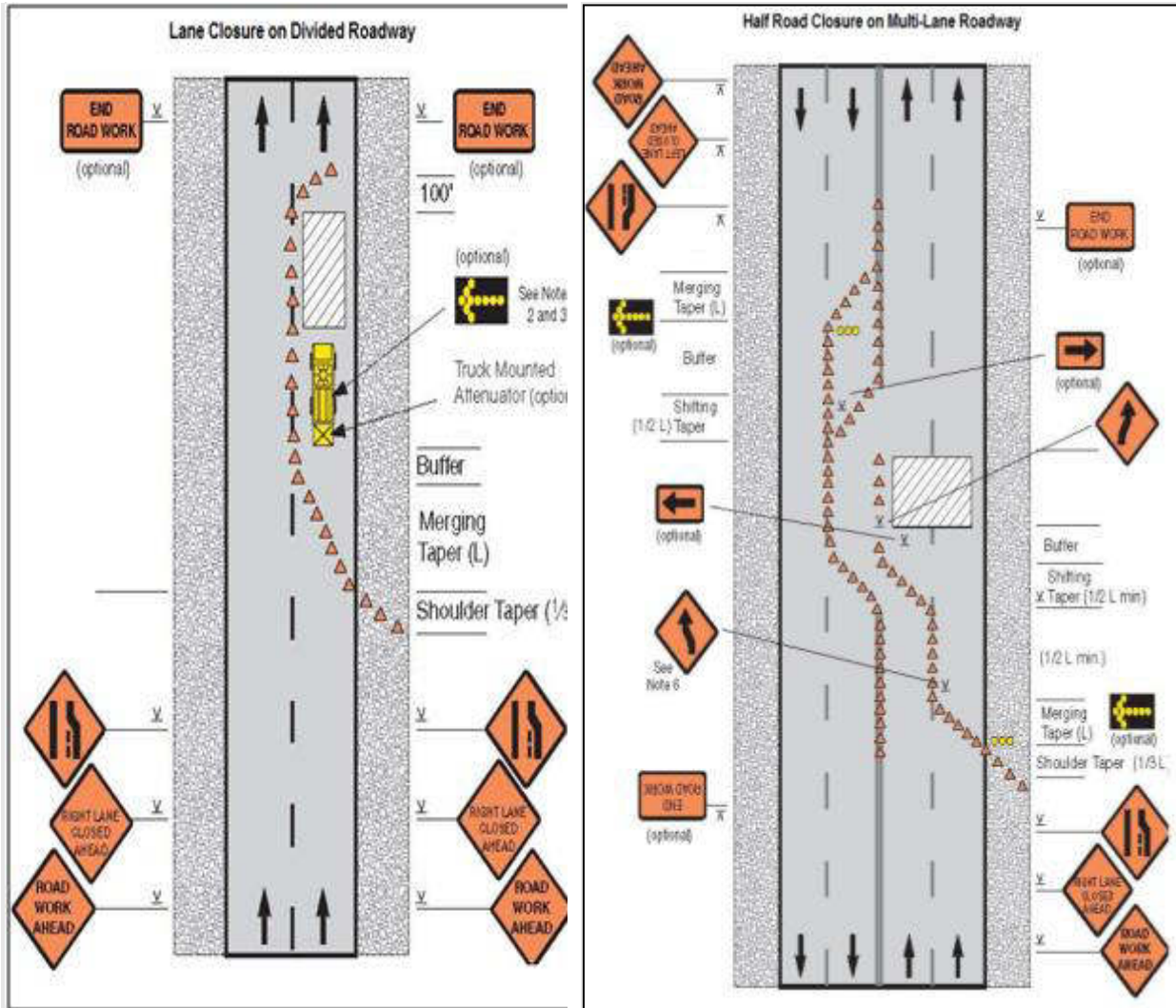
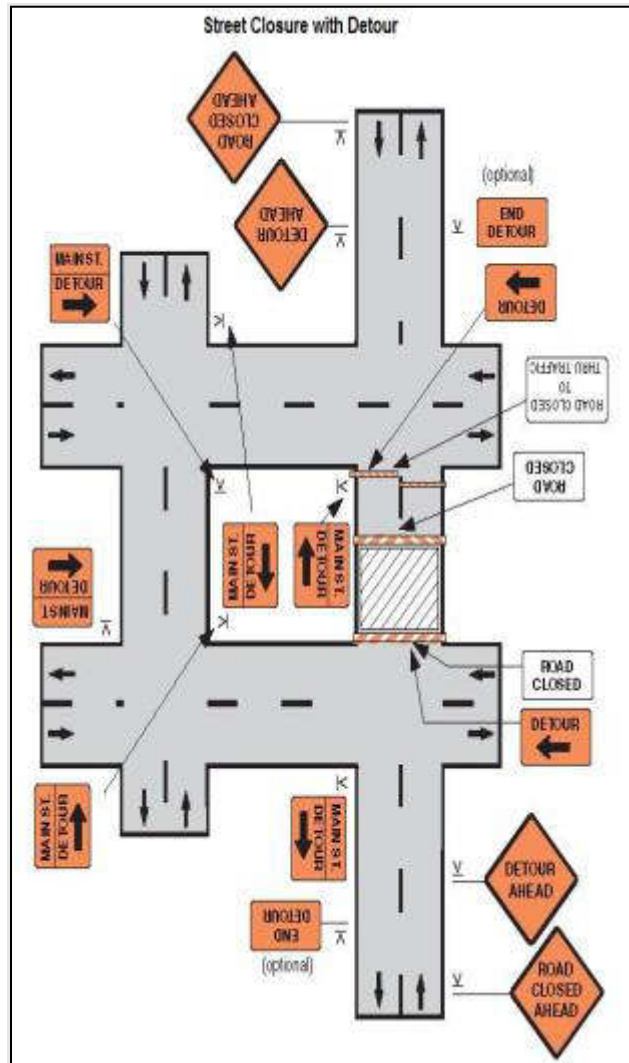


Figure A12: Street closure with detour



Appendix 12: Public Consultations Conducted During Project Preparation

1. Details of Public Consultation in Didwana Dated 02/01/2019

| S.No | Name of Persons | Location | Topic Discussed | Outcome |
|------|---|---------------------------------|--|--|
| 1 | Govind Ram Meena, Suresh, Bhura Ram, Narpat Ram, Ram Niwas, Jagdish & Bajrang Singh | STP near Mela Maida Nagaur Road | <p>Awareness of the project—including Project Coverage area,</p> <p>Present condition of Sewerage in the town</p> <p>Presence of any forest, wild life or any sensitive/ unique environmental components nearby the project,</p> <p>Presence of historical/ cultural/ religious sites nearby.</p> <p>Unfavorable climatic condition</p> <p>Present solid waste collection and disposal problem</p> <p>Dust and noise pollution and disturbances during construction work</p> <p>Safety of residents during construction phase and applying of vehicle for construction activities</p> <p>Requirement of enhancement of other facilities</p> <p>Treated water management released from STP</p> <p>Sludge Management</p> <p>Willingness to pay for improved services</p> | <p>Some People are aware of the proposed Project.</p> <p>People are concerned about the poor sewerage conditions in the area/town.</p> <p>There are not any forest, wildlife or any sensitive /unique environmental, component nearby the project.</p> <p>There are not any historical/cultural and religious sites in nearby the subproject area.</p> <p>Climate is dry except during monsoon season.</p> <p>Solid waste collection facility is poor in this area.</p> <p>Contractor should use modern machinery and water sprinkler to control dust and noise during construction phase.</p> <p>The contractor should take care of the safety arrangement during construction phase and should provide traffic diversion routes to avoid the vehicle congestion.</p> <p>People should be made aware through CAPC and outreach team of contractor before start of work in particular area.</p> <p>The locals feel that Parks, play grounds and Community halls are required in this town and in addition.</p> |

| S.No | Name of Persons | Location | Topic Discussed | Outcome |
|------|--|--|---|--|
| | | | | <p>Treated water will be reuse in agricultural activities in nearby area. During discussion with the local people near the STP, at present water is filled in vacant land presently use for Mela Maidan. People want to empty the water from there and retain the Mela Maidan as same earlier. ULB receives application from nearby farmers for reuse the treated water in agricultural purposes.</p> <p>Sludge will be reuse as manure in agricultural fields. People are interested to pay for improved services in the town.</p> |
| 2 | Chaina Ram, Capt. Ramchandra Thory, Bhanwar lal Jangid, Gopal, Shравan Lal & Willson Choudhary | SPS & Sewer laying network near RSEB Power House | <p>Awareness of the project-including Project Coverage area,</p> <p>Present condition of Sewerage</p> <p>In what way they may associate with the project</p> <p>Presence of any forest, wild life or any sensitive/ unique environmental components nearby the project</p> <p>Presence of historical/ cultural/ religious sites nearby.</p> <p>Occurrence of flood /earthquake etc.</p> <p>Drainage and sewerage problem facing</p> <p>Present drinking water problem-quantity and quality</p> <p>Dust and noise pollution and disturbances during construction work</p> <p>Public Health by proposed water supply subproject</p> <p>Plantation measures nearby the area</p> <p>Safety of residents during construction phase and</p> | <p>Some People are aware of the proposed Project.</p> <p>People are concerned about the poor sewerage conditions in the area.</p> <p>They want to engage with the project as a job opportunity and want to become beneficiaries. There is not any forest, wildlife or any sensitive /unique environmental, component nearby the project.</p> <p>There are not any historical/cultural and religious sites in nearby the subproject area.</p> <p>The area is not prone to flood/earthquake etc. No such incidences of natural disaster occurred in recent past.</p> <p>Drainage and sewerage condition is poor in the</p> |

| S.No | Name of Persons | Location | Topic Discussed | Outcome |
|------|-----------------|----------|--|---|
| | | | <p>applying of vehicle for construction activities</p> <p>Foul Smell and Vector borne diseases</p> <p>Requirement of enhancement of other facilities</p> <p>Willingness to pay for improved services</p> | <p>town and flow in open drains.</p> <p>People are concerned about the poor supply (intermittent supply on alternate days) and quality of water. Water supply is erratic. People demand 24x7 supply connections to be provided to their area under the proposed. They are willing to pay for getting regular potable water.</p> <p>Contractor should use modern machinery and water sprinkler to control dust and noise during construction phase.</p> <p>By the proposed project of water supply & sewerage in the town, health of public will be improved.</p> <p>By the proposed project, people get better quality of water will improves the public health.</p> <p>People want to plantation programme in the town and ensure the aftercare measures such as watering and manuring etc</p> <p>The contractor should take care of the safety arrangement during construction phase and should provide traffic diversion routes to avoid the vehicle congestion.</p> <p>People should be made aware through CAPC and outreach team of contractor before start of work in particular area.</p> <p>By the proposed project of sewerage in the town, environmental health and hygiene conditions will be improved.</p> <p>By the proposed project of sewerage, SPS will</p> |

| S.No | Name of Persons | Location | Topic Discussed | Outcome |
|------|---|----------------------|---|--|
| | | | | <p>mitigate the problem of foul smell and vector borne diseases in the area.</p> <p>The locals feels that Parks, play grounds and Community halls are required in this town and in addition.</p> <p>People are interested to pay for improved services in the town.</p> |
| 3 | Puran Mal, Sher Mohammad, Ram Nath, Ranjeet Singh, Pushp Lata, Arjun Singh, Pooja & Madari Chobdaar | SPS near Degana Road | <p>Awareness of the project-including Project Coverage area,</p> <p>Present condition of Sewerage</p> <p>In what way they may associate with the project</p> <p>Presence of any forest, wild life or any sensitive/ unique environmental components nearby the project</p> <p>Presence of historical/ cultural/ religious sites nearby.</p> <p>Drainage and sewerage problem facing</p> <p>Environmental Health & Hygiene</p> <p>Present solid waste collection and disposal problem</p> <p>Safety of residents during construction phase and applying of vehicle for construction activities</p> <p>Dust and noise pollution and disturbances during construction work</p> <p>Foul smell and vector borne diseases</p> <p>Setting up worker camp site within the village/ project locality</p> <p>Willingness to pay for improved services</p> | <p>People are aware about the subproject proposed in the town.</p> <p>People are concerned about the poor sewerage conditions.</p> <p>They want to engage with the project as a job opportunity and want to become beneficiaries.</p> <p>There is no such environmental sensitive components nearby the project.</p> <p>No historical/ cultural religious sites nearby the subproject area.</p> <p>Drainage and Sewerage are major problems in this area. These should be sort out immediately.</p> <p>By the proposed project sewerage in the town, environmental health and hygiene condition will be improved.</p> <p>Solid waste collection facility is poor in this area. The contractor should take care of the safety arrangement during construction phase and should provide traffic diversion routes to avoid the vehicle congestion.</p> <p>Contractor should use modern machinery and water sprinkler to control</p> |

| S.No | Name of Persons | Location | Topic Discussed | Outcome |
|------|---|--|--|---|
| | | | | <p>dust and noise during construction phase. People should be made aware through CAPC and outreach team of contractor before start of work in particular area.</p> <p>By the proposed SPS, foul smell and vector borne disease will be mitigated/ removed.</p> <p>There is enough space available nearby the project area to establish labour camp. People suggested establishing the worker camp away from the habitation so there is no conflict and disturbances.</p> <p>People are interested to pay for improved services in the town.</p> |
| 4 | Ramvatar Dadhich, Shravan Kumar, Kailash Soni, Ankit Kumar, Raja Ram, Deepa Vishwas, Bharat, Shanti Devi, Ghanshyam Tailor, Bhanwari Devi, Richhpal Singh, Roop Singh Rathor & Pusa Ram | Sewer laying Network near Dojraj Ganesh Temple | <p>Awareness of the project-including Project Coverage area,</p> <p>Present condition of Sewerage in the town.</p> <p>Presence of any forest, wild life or any sensitive/ unique environmental components nearby the project,</p> <p>Presence of historical/ cultural/ religious sites nearby.</p> <p>Unfavorable climatic condition</p> <p>Environmental Health and Hygiene</p> <p>Present solid waste collection and disposal problem</p> <p>Availability of Labour during construction time</p> | <p>People are aware about the subproject proposed in the town.</p> <p>People are concerned about the poor sewerage conditions. Sewage flow in open drains and cause nuisance and vector borne diseases. There are no such environmental sensitive components nearby the project.</p> <p>No historical/ cultural religious sites nearby the subproject area.</p> <p>Climate is dry except during monsoon season.</p> <p>Environmental Health and Hygiene condition is poor in the town. By the proposed project of Water supply and sewerage, will improve</p> |

| S.No | Name of Persons | Location | Topic Discussed | Outcome |
|------|-----------------|----------|--|---|
| | | | <p>Dust and noise pollution and disturbances during construction work</p> <p>Safety of residents during construction phase and applying of vehicle for construction activities</p> <p>Requirement of enhancement of other facilities</p> <p>Willingness to pay for improved services</p> | <p>the quality of environment, health & sanitation.</p> <p>Solid waste collection facility is poor in this area. Sufficient labour is available in nearby communities. People requested to engage the local people during construction phase. Contractor should use modern machinery and water sprinkler to control dust and noise during construction phase. All the measures of environment and person protection will be strictly followed. PPE's will be adopted at site.</p> <p>The contractor should take care of the safety arrangement during construction phase and should provide traffic diversion routes to avoid the vehicle congestion. People should be made aware through CAPC and outreach team of contractor before start of work in particular area. The locals feel that Parks play grounds and Community halls are required in this town and in addition. Peoples are interested to pay for improved services.</p> |

Photographs of Public Consultation-Didwana Town Dated 02.01.2019





SPS & Sewer Laying Network Near RSEB Power House





STP near Mela Maidan



SPS near Degana Road





2. Consultations at Didwana during project Design phase

| S.No | Date | Name of Persons | Location | Topic Discussed | Outcome |
|------|------------|---|----------------------------------|--|---|
| 1 | 08.08.2018 | Amit, Jishan, GulfanBano, Kalu Ji, Farookh, Sattar, Din Mohd. | Haider Colony, Ward 4 | 1) Present Status of Sewerage in the town 2) Work Proposed by RUIDP 3) Willingness to pay for improved services | 1)People are supportive of the project (especially women) as there is no sewerage system in the area. 2)People are willing to pay for improved services. |
| 2 | 08.08.2018 | Allaudin, Sharkukh, Sameer, RehmanBano | Amarpura, Near Government School | 1)Present Status of Sewerage in the town 2) Work Proposed by RUIDP 3) Willingness to pay for improved services | 1)People understand the requirement for proper sewerage system and issues related to it. 2)People are willing to pay for improved services. |
| 3 | 10.08.2018 | Durlab, Jogender, MahendraKachawa, Mangilal, | Kadiya Bas, Ward No 27 | (1) Present Status of Sewerage in the town 2) Work Proposed by RUIDP 3) Willingness to pay for improved services | People are supportive of the project and indicated their willingness to participate; they are willing to pay for improved services. |
| 4 | 10.08.2018 | Jainarayan, Hiralal, Khetaram, Kanaram | Singhi Bas | (1)Present Status of Sewerage in the town 2)Work Proposed by RUIDP 3) Willingness to pay for improved services | People are supportive of the project and acknowledge the requirement of improvement. |
| 5. | 11.08.2018 | Bajranglal | Medasar Bas | (1)Present status of SPS land (2) Present Status of Sewerage in the locality (3) Acceptance of proposed works | There is no sewerage system in the locality and proposed work will have benefits for them in terms of sanitation improvement. They are supportive of the proposed sewerage works. |

Photographs Of Public Consultations At Didwana



Consultation at Haider Colony



Consultation at Kadiya Bass



Consultation at Singhi Bas




Consultation at Amarpura



Appendix 13: Minutes of City Level Stakeholder Committee (CLC) Meeting

City level Stakeholder Committee (CLC) Meeting (dtd. 21.03.2018)-City stakeholder committee meeting was organized in Didwana on dtd. 21.03.2018 to discuss the matter of proposed sewerage works in Didwana under the chairmanship of District Collector, Nagaur in presence of consultants, RUIDP officials, PHED officials, Municipal officials and other invitee members. Proposed scope of works and technology was discussed in the meeting and it was decided that treated effluent shall be reused by Municipality in beneficial uses.

Minutes of CLC meeting with Outcomes

| | |
|---|-------------------------|
|  | |
| Office of the Executive Engineer Rajasthan Urban Sector Development Investment Programs IPIU, Shastri Bhawan, 2/66-67 J.N Vyas Colony, Nagaur | |
| Phone:- 01582-244280 | ipiu.ngr@rediffmail.com |
| No.E.E./NGR/2017-18 333 | Date: 26/03/2018 |
| <p>Minutes of City Level Committee meeting held on 21.03.2018 under chairmanship of District Collector, Nagaur for finalization of works of water supply in Kuchaman city & sewerage works in Ladnun, Makrana, Kuchaman city & Deedwana towns under RUIDP Phase-IV</p> <p>City Level Committee meeting was held on 21.03.2018 under chairmanship of District Collector, Nagaur for finalization of works of water supply in Kuchaman city & sewerage works in Ladnun, Makrana, Kuchaman city & Deedwana towns under RUIDP Phase-IV. Additional Collector, Nagaur presided the meeting on behalf of District Collector, Nagaur.</p> <p>List of Officials, public representative & stack holders, who attended the meeting, is enclosed at Annexure 'A'.</p> <p>It was initially briefed out that RUIDP will take up water supply works in Kuchaman city and sewerage works in Ladnun, Kuchaman city, Makrana & Deedwana towns under Phase-IV under ADB assistance. Water supply works in other towns (Ladnun/ Makrana & Deedwana) has already been sanctioned/ taken up by PHED.</p> <p>Important provisions considered in water supply/ sewerage works in towns were informed to all Stack-holders as below:</p> | |
| <p>General Provision:</p> <ul style="list-style-type: none"> > Full coverage of town under municipal boundary. > Digitization of all assets on GIS map. > Road restoration in full width of up to 4 M wide road. > Operation & maintenance for 10 years under the contract. > Performance based management contract. > O & M charges during 10 years O & M period will be borne by concerned line agency | |
| <p>Water Supply Works:</p> <ul style="list-style-type: none"> > Continuous pressurized water supply. > Single combined contract of water supply & sewerage works to have better execution planning of water supply/ sewerage works to avoid repeated damage of roads. > Reduction in Non-Revenue Water (NRW) on DMA based approach. > SCADA for fully centralized control for operation and monitoring of water production & distribution. > 100% metered water connection. | |
| <p>Sewerage Works :</p> <ul style="list-style-type: none"> > 80% of water supply is considered as sewage generation. > Sewerage in Makrana & Deedwana towns has partly been covered under 7 town projects. Remaining sewerage works to cover the uncovered | |



Office of the Executive Engineer
Rajasthan Urban Sector Development Investment Programs

IPIU, Shastri Bhawan, 2/66-67 J.N Vyas Colony, Nagaur

Phone:- 01582-244280

ipiu.ngr@rediffmail.com

No.E.E./NGR/2017-18/395

Date: 26/03/2018

- portion with integration of existing system and new STPs for balance capacity have been taken up in these towns.
- Installation of sensors in manholes to detect overflow of manholes.
- Provisions of trenchless method for laying of pipe lines for deep sewers/ road crossings/ busy road etc for safety reasons and to minimize inconvenience to public.
- House sewer connection inside house property included in the contract for fully utilization of assets.
- Provision of Over Head Reservoir (OHSR) for reuse of treated effluent in agriculture etc.
- 33% charges of water bills as sewerage charges to be collected by concerned ULB.
- Revenue of ULB through sale of treated effluent and collection of sewerage charges for self-sustainability.

Power Point Presentation of scope of works considered in the DPRs of water supply/ sewerage works with tentative cost of project in the towns were made. It was also informed that land for proposed head-works/ Pumping stations/ STPs have been made available.

During presentation, following suggestions/ comments were received as below:

Kuchaman City :

Chairman/ EO, Kuchaman informed, there is large number of institutions in the town and so large number of students are studying in the town; which is not included in the population census and therefore, there is need to consider for institutional water demand.

EO, Kuchaman was requested to provide the details of institutional population so that it may be considered in the proposal.

Ladnun :

MLA, Ladnun requested to take up water supply works also by RUIDP in place of PHED in single combined contract.

It was briefed out in the meeting that PHED has already sanctioned the works in the town and accordingly, RUIDP has not taken up water supply works in the town.

Makrana :

EO, Makrana informed that there is some old sewer line system laid about 15 years before; which is in damaged/ bad condition and need replacement and O&M of this old laid system should be integrated in this DPR.

(3)



Office of the Executive Engineer
Rajasthan Urban Sector Development Investment Programs

IPIU, Shastri Bhawan, 2/66-67 J.N Vyas Colony, Nagaur

Phone:- 01582-244280

ipiu.ngr@rediffmail.com

No.E.E./NGR/2017-18 /399

Date: 26/03/2018

It was assured that assessment of condition of old laid system will be carried out and accordingly, proposal for repair/ replacement with integration to existing system will be taken in this DPR.

EO, Makrana informed that Gram Panchayats are adjoining to the town and proposal to include these in the municipal limit is under consideration/ process.

It was informed that ULB may inform the population of each in writing so that flow may be included in the system design but sewerage network may only be executed after inclusion in the municipal area; which may also be taken up during execution of work.

Deedwana :

SE, PWD, Deedwana requested to lay sewer line on both side of 4-lane road/ highway.

It was informed that main sewer line will be laid on one side and lateral sewer line shall be laid on the other side of road; which may be connected with Main sewer line at crossings to avoid cross cutting of road for house property pipe lines.

Meeting ended with vote of thanks to the chair

Executive Engineer
(Member Secretary)
RUIDP, IPIU Nagaur

Date: 26/03/2018

No. E.E./NGR/2017-18 /400-420

Copy to following for information and necessary action please:

1. Hon'ble Member of Parliament, Nagaur
2. Hon'ble MLA, Ladnun/ Kuchaman/ Makrana/ Deedwana
3. PA to Project Director, RUIDP, Jaipur
4. PA to District Collector, Nagaur
5. Chairman, Municipal Council/ Board, Ladnun/ Kuchaman/ Makrana/ Deedwana
6. Superintending Engineer, PHED, Circle Nagaur
7. Superintending Engineer, PWD, Circle Nagaur/ Deedwana
8. Superintending Engineer, WRD, Circle Merta City
9. EO, Municipal Council/ Board, Ladnun/ Kuchaman/ Makrana/ Deedwana
10. Town Planner, Nagaur
11. Consultant M/s Exceltech, Jaipur

Executive Engineer,
RUIDP, IPIU Nagaur




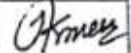

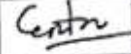








Attendance Sheet of CLC meeting

Annexure (A)

City Level Committee Meeting for DPR of Water Supply/ Sewerage Works in Makrana/
Kuchaman/ Ladnun/ Didwana towns of Nagaur District under RUIDP Phase-IV

Date: 21/03/2018

Attendance Sheet

| S. No. | Name | Designation & Department | Contact No. | Signature |
|--------|------------------------|-----------------------------------|-------------|---|
| 1. | | | | |
| 2. | Ashok Kumar | ADM | |  |
| 3. | Smt. Azi | Chairman Nagaur Panchayat Makrana | 9829078306 |  |
| 4. | Rakesh Chandra Gattani | Chairman Nagaur Palika Kuchaman | 9414484652 |  |
| 5. | Jitendra Kr. Meena | Nagaur Palika Didwana | 9460133581 |  |
| 6. | मिर्जा | MLA, Ladnun | 9414913190 |  |
| 7. | J. | | | |
| 8. | Dr. D R Jangiel | SE(W) RUIDP, JPR | 9166002200 |  |
| 9. | Pooveen Ankodia | SE (NS), RUIDP, JPR | 9414057444 |  |
| 10. | D.K. Mittal | EE, RUIDP NGR | 9783079996 |  |
| 11. | Mansingh Meera | JE, RUIDP NGR | 9414992211 |  |
| 12. | DINESH CHAUDHARY | Sr. Engg, RUIDP NGR | 9414060487 |  |
| 13. | Tofik Ahmed | Executive officer Ladnun | 9414984174 |  |
| 14. | Ravindra Singh | GA N. PLadnun | 9982221101 |  |
| 15. | L.R. Panwar | A.S.N. & T.A Water Resources | 9414495498 |  |
| 16. | Devendra Kumar | EE, Parbhakar RUIDP | 9414003317 |  |

Photograph of CLC meeting



Appendix 14: IFC benchmark standards for workers accommodation

August 2009

11

PART II: STANDARDS FOR AND MANAGEMENT OF WORKERS' ACCOMMODATION

I. Standards for workers' accommodation

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

A. National/local standards

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

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

Benchmark

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

B. General living facilities

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

Benchmarks

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

Drainage

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

Benchmarks

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

Heating, air conditioning, ventilation and light

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

Benchmarks

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

Water

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

Benchmarks

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

⁷ www.who.int/water_sanitation_health/dwq/whs/
8. 2014

4. Drinking water quality is regularly monitored.

Wastewater and solid waste

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

Benchmarks

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

⁹ As per the "Pollution Prevention and Abatement Handbook", World Bank Group, July 1999, available from www.worldbank.org

C. Room/dormitory facilities

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

Benchmarks

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

Additional issue

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

Bed arrangements and storage facilities

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

Benchmarks

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

D. Sanitary and toilet facilities

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

Benchmarks

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

Toilet facilities

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

Benchmarks

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

Showers/bathrooms and other sanitary facilities

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

Benchmarks

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

E. Canteen, cooking and laundry facilities

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

Benchmarks

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

Laundry facilities

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

Benchmarks

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

Additional issue

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

Additional issue

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

Canteen and cooking facilities

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

Benchmarks

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

F. Standards for nutrition and food safety

When cooking for a number of workers, hygiene and food safety are absolutely critical. In addition to providing safe food, providing nutritious food is important as it has a very direct impact on workers' productivity and well-being. An ILO study demonstrates that good nutrition at work leads to gains in productivity and worker morale, prevention of accidents and premature deaths and reductions in health care costs.²⁸

Benchmarks

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

Box 6 - Five keys to safer food

Keep clean

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

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

Separate raw and cooked

Separate raw meat, poultry and seafood from other foods.
Use separate equipment and utensils such as knives and cutting boards for handling raw foods.
Store food in containers to avoid contact between raw and prepared foods.

Raw food, especially meat, poultry and seafood, and their juices, can contain dangerous micro organisms which may be transferred onto other foods during food preparation and storage.

Cook thoroughly

Cook food thoroughly, especially meat, poultry, eggs and seafood.
Bring foods like soups and stews to boiling to make sure that they have reached 70°C. For meat and poultry, make sure that juices are clear, not pink. Ideally, use a thermometer.
Reheat cooked food thoroughly.

Proper cooking kills almost all dangerous micro organisms. Studies have shown that cooking food to a temperature of 70°C can help ensure it is safe for consumption. Foods that require special attention include minced meats, rolled roasts, large joints of meat and whole poultry.

Keep food at safe temperatures

Do not leave cooked food at room temperature for more than 2 hours.
Refrigerate promptly all cooked and perishable food (preferably below 5°C).
Keep cooked food piping hot (more than 60°C) prior to serving.
Do not store food too long even in the refrigerator.
Do not thaw frozen food at room temperature.

Micro organisms can multiply very quickly if food is stored at room temperature. By holding at temperatures below 5°C or above 60°C, the growth of micro organisms is slowed down or stopped. Some dangerous micro organisms still grow below 5°C.

Use safe water and raw materials

Use safe water or treat it to make it safe.
Select fresh and wholesome foods.
Choose foods processed for safety, such as pasteurised milk.
Wash fruits and vegetables, especially if eaten raw.
Do not use food beyond its expiry date.

Raw materials, including water and ice, may be contaminated with dangerous micro organisms and chemicals. Toxic chemicals may be formed in damaged and mouldy foods. Take care in selection of raw materials and implement simple measures such as washing.

Source: World Health Organization, *Food Safety*

www.who.int/foodsafety/publications/consumer/en/5keys_en.pdf

28. C. Wessely (2005), "Food at Work - Workplace solutions to malnutrition, obesity and chronic disease", International Labour Organization, Geneva.

G. Medical facilities

Access to adequate medical facilities is important to maintain workers' health and to provide adequate responses in case of health emergency situations. The availability or level of medical facilities provided in workers' accommodation is likely to depend on the number of workers living on site, the medical facilities already existing in the neighbouring communities and the availability of transport. However, first aid must always be available on site.

First aid facilities

Providing adequate first aid training and facilities can save lives and prevent minor injuries becoming major ones.

Other medical facilities

Depending on the number of workers living on site and the medical services offered in the surrounding communities, it is important to provide workers with additional medical facilities. Special facilities for sick workers and medical services such as dental care, surgery, a dedicated emergency room can, for instance, be provided.

Benchmarks

1. A number of first aid kits adequate to the number of residents are available.
2. First aid kits are adequately stocked. Where possible a 24/7 first aid service/facility is available.
3. An adequate number of staff/workers is trained to provide first aid.
4. Where possible and depending on the medical infrastructures existing in the community, other medical facilities are provided (nurse rooms, dental care, minor surgery).

Box 7 - UK/HSE First Aid facilities

What should be in a first aid kit?

There is no standard list and it very much depends on the assessment of the needs in a particular workplace:

- a leaflet giving general guidance on first aid, for example HSE leaflet Basic advice on first aid at work
- individually wrapped sterile adhesive dressings (assorted sizes)
- two sterile eye pads
- four individually wrapped triangular bandages (preferably sterile)
- six safety pins
- six medium-sized (approximately 12 cm x 12 cm) individually wrapped sterile unmedicated wound dressings
- two large (approximately 18 cm x 18 cm) sterile individually wrapped unmedicated wound dressings
- one pair of disposable gloves.

What should be kept in the first aid room?

The room should contain essential first aid facilities and equipment. Typical examples of these are:

- a sink with hot and cold running water
- drinking water and disposable cups
- soap and paper towels
- a store for first aid materials
- foot-operated refuse containers, lined with disposable yellow clinical waste bags or a container for the safe disposal of clinical waste
- a couch with waterproof protection, clean pillows and blankets
- a chair
- a telephone or other communication equipment
- a record book for recording incidents where first aid has been given.

Source: UK Health and Safety Executive

H. Leisure, social and telecommunication facilities

Basic leisure and social facilities are important for workers to rest and also to socialise during their free time. This is particularly true where workers' accommodation is located in remote areas far from any communities. Where workers' accommodation is located in the vicinity of a village or a town, existing leisure or social facilities can be used so long as this does not cause disruption to the access and enjoyment of local community members. But in any case, social spaces should also be provided on site. Exercise and recreational facilities will increase workers' welfare and reduce the impact of the presence of workers in the surrounding communities. In addition it is also important to provide workers with adequate means to communicate with the outside world, especially when workers' accommodation is located in a remote location or where workers live on site without their family or are migrants. Consideration of cultural attitudes is important. Provision of space for religious observance needs to be considered, taking account of the local context and potential conflicts in certain situations.

Benchmarks

1. Basic collective social/rest spaces are provided to workers. Standards range from providing workers multi-purpose halls to providing designated areas for radio, TV, cinema.
2. Recreational facilities are provided. Standards range from providing exercise equipment to providing a library, swimming pool, tennis courts, table tennis, educational facilities.
3. Workers are provided with dedicated places for religious observance if the context warrants.
4. Workers have access to public phones at affordable/public prices (that is, not inflated).
5. Internet facilities can also be provided, particularly where large numbers of expatriates/Third Country Nationals (TCNs) are accommodated.

Box 8 - Examples of social/leisure facilities

In Qatar there is a newly built 170-hectare complex which accommodates contractors and more than 35,000 workers for a project run by a major oil company. At the heart of this complex, the recreation area includes extensive sport facilities, a safety-training centre, an outdoor cinema and a park. The purpose of those facilities goes beyond providing adequate accommodation to the large numbers of contractors and workers on this project but is designed to provide the same level of services as a small town. The accommodation complex has a mayor, as well as a dedicated welfare team which is responsible for the workers' welfare, cultural festivals and also acts as the community's advocates.

II. Managing workers' accommodation

Once the living facilities have been constructed and are operational, effective ongoing management of living facilities is essential. This encompasses issues such as the physical maintenance of buildings, security and consultation with residents and neighbouring communities in order to ensure the implementation of the housing standards in the long term.

A. Management and staff

Worker camps and housing facilities should have a written management plan, including management policies or plans on health and safety, security, living conditions, workers' rights and representation, relationships with the communities and grievance processes. Part of those policies and plans can take the form of codes of conduct. The quality of the staff managing and maintaining the accommodation facilities will have a decisive impact on the level of standards which are implemented and the well-being of workers (for instance on the food safety or overall hygiene standards). It is therefore important to ensure that managers are competent and other workers are adequately skilled. The manager will be responsible for overseeing staff, for ensuring the implementation of the accommodation standards and for the implementation of the management plans. It is important the accommodation manager has the corresponding authority to do so.

If the facility is being managed by a contractor, as is often the case, the expected housing and management standards should be specified in the relevant contract, and mechanisms to ensure that those standards are implemented should be set up. As part of this process, the accommodation manager (or contractor) should have a duty to monitor the application of the accommodation standards and to report frequently on their implementation to the client.

Benchmarks

1. There are management plans and policies especially in the field of health and safety (with emergency responses), security, workers' rights, relationships with the communities.
2. An appointed person with the adequate background and experience is in charge of managing the workers' accommodation.
3. If contractors are being used, there are clear contractual management responsibilities and monitoring and reporting requirements.
4. Depending on the size of the accommodation, there is a sufficient number of staff in charge of cleaning, cooking and of general maintenance.
5. Such staff are recruited from the local communities.
6. Staff have received basic health and safety training.
7. Persons in charge of the kitchen are trained in nutrition and food-handling and adequately supervised.

B. Charging fees for accommodation and services

Charging fees for the accommodation or the services provided to workers such as food or transport should be avoided where workers do not have the choice to live or eat anywhere else, or if deemed unavoidable, should take into account the specific nature of workers' accommodation. Any charges should be transparent, discussed during recruitment and specified in workers' contracts. Any such charges should still leave workers with sufficient income and should never lead to a worker becoming indebted to an employer.

Benchmarks

1. When fees are charged, workers are provided with clear information and a detailed description of all payments made such as rent, deposit and other fees.
2. When company housing is considered to be part of workers' wages, it is best practice that workers are provided with an employment contract clearly specifying housing arrangements and regulations, in particular rules concerning payments and fees, facilities and services offered and rules of notice.
3. When fees are charged, the renting arrangements are fair and do not cost the worker more than a small proportion of income and never include a speculative profit.
4. Food and other services are free or are reasonably priced, never above the local market price.
5. The provision of accommodation or other services by employers as a payment for work is prohibited.

Additional issue

To avoid that fair renting arrangements turn into unfair ones, any deposit of advance should be set at a reasonable level and it is best practice that renting prices include a fixed fee covering the water needed and the use of the energy required to the functioning of the heating/cooling/ventilation/cooking systems. However, in such cases it might be necessary to raise workers' awareness to ensure that workers will use the facilities responsibly, particularly in areas where water is scarce.

C. Health and safety on site

The company or body in charge of managing the workers' accommodation should have the prime responsibility for ensuring workers' physical well-being and integrity. This involves making sure that the facilities are kept in good condition (ensuring that sanitary standards or fire regulations are respected for instance) and that adequate health and safety plans and standards are designed and implemented.

Benchmarks

1. Health and safety management plans including electrical, mechanical, structural and food safety have been carefully designed and are implemented.
2. The person in charge of managing the accommodation has a specific duty to report to the health authorities the outbreak of any contagious diseases, food poisoning and other important casualties.
3. An adequate number of staff/workers is trained to provide first aid.
4. A specific fire safety plan is prepared, including training of fire wardens; periodic testing and monitoring of fire safety equipment and periodic drills.
5. Guidance on the detrimental effects of the abuse of alcohol and drugs and other potentially harmful substances and the risk and concerns relating to HIV/AIDS and of other health risk-related activities is provided to workers. It is best practice to develop a clear policy on this issue.
6. Workers have access to adequate preventive measures such as contraception (condoms in particular) and mosquito nets.
7. Workers have easy access to medical facilities and medical staff. Where possible, female doctors/nurses should be available for female workers.
8. Emergency plans on health and fire safety are prepared. Depending on the local context, additional emergency plans are prepared as needed to handle specific occurrences (earthquakes, floods, tornadoes).

D. Security of workers' accommodation

Ensuring the security of workers and their property on the accommodation site is of key importance. To this end, a security plan must be carefully designed including appropriate measures to protect workers against theft and attacks. Policies regarding the use of force (force can only be used for preventive and defensive purposes in proportion to the nature and the extent of the threat) should also be

carefully designed. To implement those plans, it may be necessary to contract security services or to recruit one or several staff whose main responsibility is to provide security to safeguard workers and property. Before making any security arrangements, it is necessary to assess the risks of such arrangements to those within and outside the workers' accommodation and to respect best international practices, including IFC PS4 and EBRD PR4 and applicable law.¹¹ Particular attention should be paid to the safety and security of women workers.

Benchmarks

1. A security plan including clear measures to protect workers against theft and attack is implemented.
2. A security plan including clear policies on the use of force has been carefully designed and is implemented.
3. Security staff have been checked to ensure that they have not been implicated in any previous crimes or abuses. Where appropriate, security staff from both genders are recruited.
4. Security staff have a clear mandate and have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline or discriminate against workers.
5. Security staff have received adequate training in dealing with domestic violence and the use of force.
6. Security staff have a good understanding about the importance of respecting workers' rights and the rights of the communities.
7. Body searches are only allowed in specific circumstances and are performed by specially trained security staff using the least-intrusive means possible. Pat down searches on female workers can only be performed by female security staff.
8. Security staff adopt an appropriate conduct towards workers and communities.
9. Workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff.

¹¹ See for instance the *Voluntary Principles on Security and Human Rights*. www.voluntaryprinciples.org/volprinc

E. Workers' rights, rules and regulations on workers' accommodation

Freedoms and human rights of workers should be recognised and respected within their living quarters just as within the working environment. House rules and regulations should be reasonable and non-discriminatory. It is best practice that workers' representatives are consulted about those rules. House rules and regulations should not prevent workers from exercising their basic rights. In particular, workers' freedom of movement needs to be preserved if they are not to become effectively "trapped". To this end it is good practice to provide workers with 24/7 access to the accommodation and free transport services to and from the surrounding communities. Any restriction to this freedom of movement should be limited and duly justified. Penalties for breaking the rules should be proportional and implemented through a proper procedure allowing workers to defend themselves and to challenge the decision taken. The relationship between continuing employment and compliance with the rules of the workers' accommodation should be clear and particular attention should be paid to ensure that housing rules do not create indirect limitation of the right to freedom of association. Best practice might include a code of conduct relating to the accommodation to be signed together with the contract of employment.

Box 9 - Dole housing plantation regulation in Costa Rica

In every plantation there is an internal accommodation regulation that every worker is required to sign together with his/her employment contract. That document describes the behaviour which is expected from workers at all times and basic rules such as the prohibition of alcohol and the interdiction to make noise after a certain time at night. In case there is any problem concerning the application of those internal rules, a set of disciplinary procedures which have been designed with the workers' representatives can be enforced. Workers are absolutely free to enter or leave the site and do not have any restrictions in relation to accessing their living quarters. Families are not allowed in the living quarters unless they have been registered for a visit.

Benchmarks

1. Restriction of workers' freedom of movement to and from the site is limited and duly justified. It is good practice to provide workers 24/7 access to the accommodation site. Any restrictions based on security reasons should be balanced by the necessity to respect workers' freedom of movement.
2. Where possible, an adequate transport system to surrounding communities is provided. It is good practice to provide workers with free transportation to and from local communities.
3. Withholding workers' ID papers is prohibited.
4. Freedom of association is expressly respected. Provisions restricting workers' rights on site should take into account the direct and indirect effect on workers' freedom of association. It is best practice to provide trade union representatives access to workers in the accommodation site.
5. Workers' gender and religious, cultural and social backgrounds are respected. In particular, workers should be provided with the possibility of celebrating religious holidays and observances.
6. Workers are made aware of their rights and obligations and are provided with a copy of the internal workers' accommodation rules, procedures and sanction mechanisms in a language or through a media which they understand.
7. Housing regulations, including those relating to allocation of housing, should be non-discriminatory. Any justifiable discriminatory rules – for example all-male dormitories – should be strictly limited to the rules which are necessary to ensure the smooth running of the worker camp and to maintain a good relationship with the surrounding communities.
8. Where possible, visitor access should be allowed.
9. Decisions should be made on whether to prohibit alcohol, tobacco and third party access or not from the camp and the relevant rules should be clearly communicated to all residents and workers.
10. A fair and non-discriminatory procedure exists to implement disciplinary procedures including the right of workers to defend themselves (see also next section).

F. Consultation and grievance mechanisms

All residents should be made aware of any rules governing the accommodation and the consequences of breaking such rules. Processes that allow for consultation between site management and the resident workers will assist in the smooth running of an accommodation site. These may include a dormitory or camp committee as well as formal processes that allow workers to lodge any grievances about their accommodation.

Benchmarks

1. Mechanisms for workers' consultation have been designed and implemented. It is best practice to set up a review committee which includes representatives elected by workers.
2. Processes and mechanisms for workers to articulate their grievances are provided to workers. Such mechanisms are in accordance with PS2/PR2.
3. Workers subjected to disciplinary proceedings arising from behaviour in the accommodation should have access to a fair and transparent hearing with the possibility to contest decisions and refer the dispute to independent arbitration or relevant public authorities.
4. In case conflicts between workers themselves or between workers and staff break out, workers have the possibility of easily accessing a fair conflict resolution mechanism.
5. In cases where more serious offences occur, including serious physical or mental abuse, there are mechanisms to ensure full cooperation with the police authority (where adequate).

Additional issue

Alcohol is a complex issue and requires a very clear policy from the workers' accommodation management. If a non-alcohol policy is taken, special attention should be paid to clearly communicate the interdiction, how it applies and the consequences for breaching this rule. Special attention should also be paid to enforce it adequately.

G. Management of community relations

Workers' living facilities have various ongoing impacts on adjacent communities. In order to manage these, it is good practice to design a thorough community relations management plan. This plan will contain the processes to implement the findings of the preliminary community impact assessment and to identify, manage, mitigate or enhance ongoing impacts of the workers' accommodation on the surrounding communities. Issues to be taken into consideration include:

- community development – impact of workers' camp on local employment, possibility of enhancing local employment and income generation through local sourcing of goods and services
- community needs – ways to identify and address community needs related to the arrival of specific infrastructures such as telecommunications, water sanitation, roads, health care, education, housing
- community health and safety – addressing and reducing the risk in the increase in communicable diseases, corruption, trade in illegal substances such as drugs, alcohol (in the Muslim context), petty crimes and other sorts of violence, road accidents
- community social and cultural cohesion – ways to mitigate the impact of the presence of large numbers of foreign workers, often males, with different cultural and religious background, ways to mitigate the possible shift in social, economic and political structures due to changes in access to income generation opportunities.

Benchmarks

1. Community relations plans addressing issues around community development, community needs, community health and safety and community social and cultural cohesion have been designed and implemented.
2. Community relations plans include the setting up of a liaison mechanism allowing a constant exchange of information and consultation with the local communities in order to identify and respond quickly to any problems and maintain good working relationships.
3. A senior manager is in charge of implementing the community relations management plan and liaising with the community.

4. The impacts of workers' accommodation on local communities are periodically reviewed, mitigated or enhanced.
5. Community representatives are provided with an easy means to voice their opinions and to lodge complaints.
6. There is a transparent and efficient process for dealing with community grievances, in accordance with PS1/PR10.

Box 10 - Examples of community relations management

Community consultation in the Baku-Tbilisi-Ceyhan (BTC) pipeline

The BTC pipeline's Environment and Social Management Plans incorporated a Worker Camp Management Plan to be implemented by the construction contractor. As part of ongoing community liaison over the project as a whole, community liaison officers were appointed for worker camps who were responsible for meeting regularly with communities, identifying issues and addressing community concerns. A particular responsibility was to review HR records and disciplinary logs at worker camps to assess that rules were being implemented effectively and that any community liaison after any incidents was effective.

Appendix 15: Guidelines and Emergency Plan for Handling and Storing Chlorine

Instructions for Storage and Handling of Chlorine Cylinders (Based on the 'Manual on Operation and Maintenance of Water Supply Systems' published by the Central Public Health and Environmental Engineering Organization (CPHEEO) in 2005)

1. Storage Area

- (i) Obtain storage license from controller of explosives under Gas Cylinder Rules 2004 if the quantity of Cl₂ containers to be stored is more than 5 Nos;
- (ii) Storage area should be cool, dry, well ventilated, and clean of trash and protected from external heat sources. Please refer to Manual on "Water Supply and Treatment", (1999 Edition), for further details;
- (iii) Ventilation must be sufficient to prevent accumulation of vapour pockets. The exhaust should be located either near the floor or duct be provided extending to the floor. All fan switches should be outside the storage area;
- (iv) Do not store container directly under the sun;
- (v) Weather cock should be installed near the storage to determine wind direction;
- (vi) The storage building should be of non-combustible construction with at least two exits opening outside;
- (vii) Neutralization system should be provided
- (viii) Continuous monitoring of chlorine leak detection equipment with alarm should be installed in the storage area;
- (ix) The area should be free and remote from elevators, gangways or ventilating system to avoid dangerous concentration of Chlorine during leak;
- (x) Two portable foam type fire extinguishers should be provided in the premises;
- (xi) Corrosive substances shall not be stored nearby which react violently with each other;
- (xii) Unauthorized person should not be allowed to enter into the storage area.
- (xiii) The floor level of storage shed should be preferably 30 cms (at least one foot) higher from the ground level to avoid water logging; and
- (xiv) Ensure that all containers are properly fitted with safety caps or hooks.

2. Cylinder & Drum Containers

- (i) Store chlorine cylinders upright and secure them so that they do not fall;
- (ii) Drum containers should be stored on their sides on rails, a few inches above the floor. They should not be stacked one upon the other. They should be stored such that the valves are in vertical plane;
- (iii) Keep enough space between containers so as to have accessibility in case of emergency;
- (iv) Store the containers in a covered shed only. Keep them away from any source of heat as excessive heat may increase the pressure in container which will result into burst;
- (v) Do not store explosives, acids, turpentine, ether, anhydrous ammonia, finely divided metals or other flammable material in the vicinity of Chlorine;
- (vi) Do not store containers in wet and muddy areas;
- (vii) Store filled and empty containers separately;
- (viii) Protective covers for valves are secured even when the containers are empty, except during use in the system;
- (ix) Never use containers as a roller to move other equipment;

- (x) Never tamper with fusible plugs of tonners;
- (xi) Check leakages every day by means of ammonia torch. However, it should not be touched to brass components like valves of container for safety;
- (xii) Never carry out any welding work on the chlorine system as combustion of steel takes place at 2510C in presence of chlorine; and
- (xiii) The boxes containing emergency kit, safety applications and self contained breathing apparatus should be kept in working order in an easily approachable area.

3. Use of Cylinders & Drum Containers in Process System

- (i) Use containers in the order of their receipt, as valve packing can get hardened during prolonged storage and cause gas leaks;
- (ii) Do not use oil or lubricant on any valve of the containers;
- (iii) Badly fitting connections should not be forced and correct tool should always be used for opening and closing valves. They should never be hammered;
- (iv) The area should be well ventilated with frequent air changes.
- (v) Transport the cylinders to the process area by using crane, hoist or railings etc;
- (vi) The drum containers should be kept in a horizontal position in such a way that the valves are in a vertical plane. The upper valve gives out gas and the lower one gives out liquid chlorine;
- (vii) The cylinder should be kept in upright position in order to release gas from the valve. For liquid chlorine withdrawal, it should be inverted with the help of an inverted rack;
- (viii) Connect the containers to the system by using approved accessories;
- (ix) Use copper flexible tube, with lead washer containing 2 to 4% antimony or bonded asbestos or teflon washer. Use yoke clamp for connecting chlorine container;
- (x) Never use rubber tubes, PVC tubes etc. for making connections;
- (xi) Use the right spanner for operating the valve. Always keep the spanner on the valve spindle. Never use ill fitting spanner;
- (xii) After making the flexible connection, check for the leakage by means of ammonia torch but it should not come in contact with a valve;
- (xiii) Keep minimum distance between the container valve and header valve so that during change-over of the container, minimum amount of gas leaks;
- (xiv) The material of construction of the adopter should be same as that of valve outlet threads.
- (xv) The valve should not be used as a regulator for controlling the chlorine. During regulation due to high velocity of Chlorine, the valve gets damaged which in turn can cause difficulty in closing;
- (xvi) The tools and other equipment used for operating the container should be clean and free of grease, dust or grit;
- (xvii) Wear breathing apparatus while making the change-over of the container from the process header;
- (xviii) Do not heat the container to withdraw more gas at faster rate;
- (xix) Use pressure gauge and flow measuring device to control the flow and to know the quantity of gas left in the container;
- (xx) Use an inverted U type barometric leg or vacuum breaking arrangement for connecting the container to the process piping;
- (xxi) Withdrawal of the gas should be stopped when the gas pressure inside the container is between 0.1 to 0.5 kg/cm² approximately;

- (xxii) If withdrawal of the gas from the container connected to the process system has to be suspended for long intervals, it should be disconnected from the system, and the valve cap and hood replaced;
- (xxiii) Gas containers should be handled by trained persons only.

4. Disconnecting Containers from Process System

- (i) Use breathing apparatus before disconnecting the container;
- (ii) First close the container valve fully. After removal of chlorine the process valve should be closed;
- (iii) Remove the flexible connection, plug the flexible connection in order to avoid entry of humid air. Replace the valve cap or hood on the container;
- (iv) Put the tag on the empty container & bring it to storage area marked for empties; and
- (v) Check for the leakage.

5. Loading and Unloading of Containers

- (i) The handling of containers should be done under the supervision of trained and competent person;
- (ii) It should be done carefully with a crane, hoist or slanted ramp. Do not use magnet or sharp object for lifting the containers;
- (iii) Small cylinders should not be lifted by means of valve caps as these are not designed to carry the weight;
- (iv) The containers should not be allowed to strike against each other or against any hard object;
- (v) Vehicles should be braked and isolated against any movement;
- (vi) After loading, the containers should be secured properly with the help of wooden wedges, rope or sling wire so that they do not roll away;
- (vii) The containers should never be dropped directly to the ground or on the tyre from the vehicle;
- (viii) There should be no sharp projection in the vehicle;
- (ix) Containers must have valve caps and plugs fitted properly; and
- (x) Check containers for leakage before loading/unloading.

6. Transportation of Container

- (i) The name of the chemical along with diamond pictorial sign denoting the dangerous goods should be marked on the vehicle;
- (ii) The name of the transporter, his address and telephone number should be clearly written on the vehicle;
- (iii) The vehicle should not be used to transport any material other than what is written on it;
- (iv) Only trained drivers and cleaners should transport hazardous chemical
- (v) The driver should not transport any leaking cylinder;
- (vi) The cylinder should not project outside the vehicle;
- (vii) The transporter must ensure that every vehicle driver must carry "Trem Card" (Transport Emergency Card) and 'Instructions in writing booklet' and follow them;
- (viii) Every driver must carry safety appliances with him, viz; Emergency kit, breathing apparatus etc.;

- (ix) The vehicles must be driven carefully, specially in crowded localities and on bumpy roads. Do not apply sudden brakes;
- (x) Check for the leakage from time to time; and
- (xi) In the case of uncontrollable leakage the vehicle should be taken to an open area where there is less population.

7. **Emergency Kit.** It consists of various tools and appliances like gaskets, yokes, studs, tie rods hoods, clamps, spanners, mild steel channels, screws, pins, wooden pegs etc. of standard sizes. Separate kits are used for cylinders and tonners. All the gadgets are designed for using in controlling or stopping the leakages from valves, fusible plug and side walls of cylinders and containers used for handling chlorine.

- (i) Leakage may occur through the valve. There are basically four types of valve leaks:
 - (a) Valve packing;
 - (b) Valve seat;
 - (c) Defective inlet thread; and
 - (d) Broken valve thread;
- (ii) Leakage may occur through container wall. For controlling such leakages, clamps are used for cylinders and chain and yoke arrangement is used for tonner. Sometimes wooden peg is used by driving into the leaking hole as a temporary arrangement and
- (iii) Leakage may occur through fusible plug.
 - (a) If the leakage is through the threads of fusible plug, yoke, hood and cap nut arrangement is used to control the leak; and
 - (b) If fusible metal itself in the plug is leaking, yoke and stud arrangement is used to control the leak.

8. First Aid to be Provided for a Person Affected by Chlorine

- (i) **General.** Remove the affected person immediately to an uncontaminated area. Remove contaminated clothing and wash contaminated parts of the body with soap and plenty of water. Lay down the affected person in cardiac position and keep him warm. Call a physician for medical assistance at the earliest. Caution: Never attempt to neutralize chlorine with other chemicals;
- (ii) **Skin Contact.** Remove the contaminated clothes, wash the affected skin with large quantity of water. Caution: No ointment should be applied unless prescribed by the physician;
- (iii) **Eye Contact.** If eyes get affected with liquid chlorine or high concentration of chlorine gas, they must be flushed immediately with running water for atleast 15 minutes keeping the eyelids open by hand. Caution: No ointment should be used unless prescribed by an eye specialist; and
- (iv) **Inhalation.** If the victim is conscious, take him to a quiet place and lay him down on his back, with head and back elevated (cardiac position). Loosen his clothes and keep him warm using blankets. Give him tea, coffee, milk, peppermint etc. for making good effect on breathing system. If the victim is unconscious, but breathing, lay him down in the position mentioned above and give oxygen at low pressure until the arrival of doctor. If breathing has stopped, quickly stretch him out on the ground or a blanket if available, loosen his collar and belt and start artificial

respiration without delay. Neilson arm lift back pressure method is useful. Automatic artificial respiration is preferable if available. Continue the respiration until the arrival of the doctor. Amboo bag can also be used for this purpose.

9. On-Site Emergency Plan to Cover the Leakage of Chlorine

Introduction. As chlorine is a hazardous chemical, handling and storage of it demand adequate precautions to avoid possible hazards. Leakage of chlorine may develop into a major emergency. Therefore, the emergency procedure to cover this eventuality is essential. It is drawn in the form of on-site emergency plan. The elements of onsite emergency plan are as follows:

Identification of Hazard Chart. In this case the site risk is evaluated by the expert and the extent of the probable damage is calculated on the basis of stored chlorine quantity, nearby population, wind direction, type of equipment failure etc. For this purpose hazard analysis is conducted in which case all the hazardous properties of chlorine are considered. If evacuation is required, the range of it is calculated.

Appointing Key Persons. In order to control the incident like chlorine leakage, it is essential to appoint various persons with their well-defined responsibilities. Taking into account the various activities likely to be involved, the following key persons are appointed (i) Site Controller, (ii) Incident controller, (iii) Shift Executive In charge, (iv) Communication Officer, (v) Safety Officer, (vi) Fire and Security Officer, (vii) Utilities and Services In charge, (viii) Traffic Controller, and (ix) First Aider.

Assembly Points. These points are set up where persons from the plant would assemble in case of chlorine leakage. At these points the in-charge for counting the heads will be available.

Emergency Control Center. The control centre is the focal point in case of an emergency from where the operations to handle the emergency from are directed and coordinated. It contains site plan, telephone lines, public address system, safety equipment, first aid boxes, loud speaker, torches, list of essential telephone numbers, viz. fire brigade, police, hospital, civil defence, collector, factory inspector, organizational authorities, chlorine suppliers, mutual aid group, social workers, list of key persons and their addresses, copy of chemical fact sheet, location plan of fire hydrant, details of dispersion model of chlorine gas, population distribution pattern, location of alarm system.

Procedure to Meet Emergency. The actions to be taken by the staff and authority are given below; Emergency Alarm: An audible emergency alarm system is installed throughout the plant. On hearing the alarm the incident controller will activate the public address system to communicate with the staff about the emergency and give specific instructions for evacuations etc. anyone can report the occurrence of chlorine leakage to section in-charge or incident controller through telephone or intercom or in person.

Communication. Communication officer shall establish the communication suitable to that incident.

Services. For quickness and efficient operation of emergency plan the plant is divided into convenient number of zones and clearly marked on the plan. These are emergency services viz. fire fighting, first aid, rescue, alternative source of power supply, communication with local bodies etc. The incident controller will hand over the charge to the site controller of all these coordinating activities, when the site controller appears on the site. The site controller will coordinate all the

activities of the key persons. On hearing the emergency alarm system all the key persons will take their charge. In case of their absence other alternatives are nominated. The person nominated for personnel and administration purposes will be responsible for informing all statutory authorities, keeping account of all persons in the plant including contract labour, casual workers and visitors. He will be responsible for giving information to press or any outside agencies. He is also responsible for organizing canteen facilities and keeping informed the families of affected persons. The person nominated as security officer should guide police, fire fighting and control the vehicle entries. The site controller or any other nominated person will announce resumption of normalcy after everything is brought under control. The onsite emergency plan needs to be evaluated by mock drill. Any weaknesses noticed during such drills should be noted and the plan is modified to eliminate the weaknesses.

Emergency. Measures in case of leakage or spillage of Chlorine, the following emergency measures should be taken:

- (i) Take a shallow breath and keep eyes opened to a minimum;
- (ii) Evacuate the area;
- (iii) Investigate the leak with proper gas mask and other appropriate Personal protection;
- (iv) The investigator must be watched by a rescuer to rescue him in emergency;
- (v) If liquid leak occurs, turn the containers so as to leak only gas;
- (vi) In case of major leakage, all persons including neighbours should be warned;
- (vii) As the escaping gas is carried in the direction of the wind all persons should be moved in a direction opposite to that of the wind. Nose should be covered with wet handkerchief;
- (viii) Under no circumstances should water or other liquid be directed towards leaking containers, because water makes the leak worse due to corrosive effect;
- (ix) The spillage should be controlled for evaporation by spraying chilled water having temperature below 9.4°C. With this water crystalline hydrates are formed which will temporarily avoid evaporation. Then try to neutralize the spillage by caustic soda or soda ash or hydrated lime solution carefully. If fluorofoam is available, use for preventing the evaporation of liquid chlorine;
- (x) Use emergency kit for controlling the leak;
- (xi) On controlling the leakage, use the container in the system or neutralize the contents in alkali solution such as caustic soda, soda ash or hydrated lime. Caution: Keep the supply of caustic soda or soda ash or hydrated lime available. Do not push the leaking container in the alkali tank. Connect the container to the tank by barometric leg;
- (xii) If container commences leak during transport, it should be carried on to its destination or manufacturer or to remote place where it will be less harmful. Keeping the vehicle moving will prevent accumulation of high concentrations;
- (xiii) Only specially trained and equipped workers should deal with emergency arising due to major leakage;
- (xiv) If major leak takes place, alert the public nearby by sounding the siren;
- (xv) Any minor leakage must be attended immediately or it will become worse; and
- (xvi) If the leakage is in the process system, stop the valve on the container at once.

Safety Systems Required at Chlorination Plant. The following safety systems should be kept ready at the chlorination plant:

- (i) Breathing apparatus;
- (ii) Emergency kit;
- (iii) Leak detectors;
- (iv) Neutralisation tank;
- (v) Siren system;
- (vi) Display of boards in local language for public cautioning, first aid and list of different authorities with phone numbers;
- (vii) Communication system;
- (viii) Tagging system for equipments;
- (ix) First aid including tablets and cough mixtures;
- (x) Exhaust fans;
- (xi) Testing of pressure vessels, chlorine lines etc. every year as per factory act;
- (xii) Training & mock drill;
- (xiii) Safety showers;
- (xiv) Eye fountain;
- (xv) Personal protective equipment;
- (xvi) Protecting hoods for ton-containers;
- (xvii) Fire extinguishers; and
- (xviii) Wind cock.

Appendix 16: Semi Annual Environmental Monitoring Report Format

I. INTRODUCTION

- Overall project description and objectives
- Environmental category as per ADB Safeguard Policy Statement, 2009
- Environmental category of each subproject as per national laws and regulations
- Project Safeguards Team

| Name | Designation/Office | Email Address | Contact Number |
|----------------|--------------------|---------------|----------------|
| 1. PMU | | | |
| | | | |
| | | | |
| 2. PIUs | | | |
| | | | |
| | | | |
| | | | |
| 3. Consultants | | | |
| | | | |
| | | | |
| | | | |

- Overall project and sub-project progress and status
- Description of subprojects (package-wise) and status of implementation (preliminary, detailed design, on-going construction, completed, and/or O&M stage)

| Package Number | Components/List of Works | Status of Implementation (Preliminary Design/Detailed Design/On-going Construction/Completed/O&M) ^a | Contract Status (specify if under bidding or contract awarded) | On-going Construction | |
|----------------|--------------------------|--|--|-----------------------|--------------------------|
| | | | | %Physical Progress | Expected Completion Date |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

^a If on-going construction, include %physical progress and expected date of completion.

II. COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS^a

- Identify the role/s of Safeguards Team including schedule of on-site verification of reports submitted by consultants and contractors.
- For each package, provide name/s and contact details of contractor/s' nodal person/s for environmental safeguards.
- Include as appendix all supporting documents including **signed** monthly environmental site inspection reports prepared by consultants and/or contractors.
- With reference to approved EMP/site-specific EMP/construction EMP, complete the table below
- Provide the monitoring results as per the parameters outlined in the approved EMP (or site-specific EMP/construction EMP when applicable).
- In addition to the table on EMP implementation, the main text of the report should discuss in details the following items:
 - (i) **Grievance Redress Mechanism.** Provide information on establishment of grievance redress mechanism and capacity of grievance redress committee to address project-related issues/complaints. Include as appendix Notification of the GRM (town-wise if applicable).
 - (ii) **Complaints Received during the Reporting Period.** Provide information on number, nature, and resolution of complaints received during reporting period. Attach records as per GRM in the approved IEE. Identify safeguards team member/s involved in the GRM process. Attach minutes of meetings (ensure English translation is provided).
- Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
- Identify muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads.
- Identify type of erosion and sediment control measures installed on site/s, condition of erosion and sediment control measures including if these were intact following heavy rain;
- Identify designated areas for concrete works, chemical storage, construction materials, and refueling. Attach photographs of each area.
- Confirm spill kits on site and site procedure for handling emergencies.
- Identify any chemical stored on site and provide information on storage condition. Attach photograph.
- Describe management of stockpiles (construction materials, excavated soils, spoils, etc.). Provide photographs.
- Describe management of solid and liquid wastes on-site (quantity generated, transport, storage and disposal). Provide photographs.
- Provide information on barricades, signages, and on-site boards. Provide photographs.
- Provide information on
- Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary of Environmental Monitoring Activities (for the Reporting Period)^a

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

^a Attach Laboratory Results and Sampling Map/Locations

Overall Compliance with CEMP/EMP

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

V. APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

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

VI. MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS (ambient air, water quality and noise levels)

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

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

Air Quality Results

| Site No. | Date of Testing | Site Location | Parameters (Monitoring Results) | | | |
|----------|-----------------|---------------|---------------------------------|----------------------------|--------------------------|--------------------------|
| | | | PM10 µg/m ³ | PM2.5 µg/m ³ | SO2 µg/m ³ | NO2 µg/m ³ |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Surface Water Quality Results

| S.No. | Parameters | Results | | |
|-------|----------------|-------------------|-------------------|-------------------|
| | | Location-1 (Name) | Location-2 (Name) | Location-3 (Name) |
| 1. | pH | | | |
| 2. | Turbidity | | | |
| 3. | Total Hardness | | | |
| 4. | DO | | | |
| 5. | BOD | | | |
| 6. | COD | | | |
| 7. | Chloride | | | |
| 8. | Iron | | | |
| 9. | TSS | | | |
| 10. | Arsenic | | | |
| 11. | Cadmium | | | |
| 12. | Fluoride | | | |
| 13. | Potassium | | | |
| 14. | Sodium | | | |
| 15. | Calcium | | | |

| | | | | |
|-----|-------------------------|--|--|--|
| 16. | Zn | | | |
| 17. | Cr ⁺⁶ | | | |
| 18. | Magnesium | | | |
| 19. | Copper | | | |
| 20. | Manganese | | | |
| 21. | Sulphate | | | |
| 22. | Cyanide | | | |
| 23. | Nitrate | | | |
| 24. | Lead | | | |
| 25. | Boron | | | |
| 26. | Selenium | | | |
| 27. | Aluminium | | | |
| 28. | Total residual Chlorine | | | |

Ground water Quality Results

| S.No. | Parameters | Results | | |
|-------|-------------------|-------------------|-------------------|-------------------|
| | | Location-1 (Name) | Location-2 (Name) | Location-3 (Name) |
| 1. | pH | | | |
| 2. | Total Alkalinity | | | |
| 3. | Total Hardness | | | |
| 4. | Chloride | | | |
| 5. | Iron | | | |
| 6. | TDS | | | |
| 7. | Arsenic | | | |
| 8. | Fluoride | | | |
| 9. | Zn | | | |
| 10. | Cr+6 | | | |
| 11. | Copper | | | |
| 12. | Manganese | | | |
| 13. | Sulphate | | | |
| 14. | Phosphate | | | |
| 15. | Nitrate | | | |
| 16. | Lead | | | |
| 17. | Phenolic Compound | | | |

Noise Quality Results

| Site No. | Date of Testing | Site Location | LA _{eq} (dBA) (Monitoring Results) | |
|----------|-----------------|---------------|---|------------|
| | | | Day Time | Night Time |
| | | | | |
| | | | | |

VII. 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: | | | |
| A. DOCUMENTS AND RECORDS | | | |
| 1 | Site Inventory | | |
| 2 | List of Asbestos materials storage and installation points | | |
| 3 | Structure of Asbestos materials management committee | | |
| B. 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 | <table border="1"> <tr> <td>Location</td> <td></td> </tr> <tr> <td>Condition</td> <td>Intact/ damaged</td> </tr> <tr> <td>Purpose</td> <td></td> </tr> <tr> <td>Accessibility by the workers</td> <td></td> </tr> <tr> <td>Evidence of physical damage and approximate size (length, width, volume) without coming into contact with The damaged Asbestos materials</td> <td></td> </tr> <tr> <td>Impacts on the environment (Based on Asbestos fiber Monitoring)</td> <td></td> </tr> </table> | 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) | |
| 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 | <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Minimum 10-15 ft away from campus habitation. • 250m away from the water sources • 500-800m away from Children play area • The area should be isolated and covered from all the sides with restricted Access for 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. SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

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

IX. APPENDIXES

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

Appendix 17: Sample Environmental Site Inspection Report

Project Name _____
 Contract Number _____

NAME: _____ DATE: _____
 TITLE: _____ DMA: _____
 LOCATION: _____ GROUP: _____

WEATHER: _____

| | | |
|------------------------------|-------------------|--|
| Project Activity Stage | Survey | |
| | Design | |
| | Implementation | |
| | Pre-Commissioning | |
| | Guarantee Period | |

| Monitoring Items | Compliance |
|--|------------|
| Compliance marked as Yes / No / Not applicable (NA) / Partially Implemented (PI) | |
| EHS supervisor appointed by contractor and available on site | |
| Construction site management plan (spoils, safety, schedule, equipment etc.,) prepared | |
| Traffic management plan prepared | |
| Dust is under control | |
| Excavated soil properly placed within minimum space | |
| Construction area is confined; no traffic/pedestrian entry observed | |
| Surplus soil/debris/waste is disposed without delay | |
| Construction material (sand/gravel/aggregate) brought to site as & when required only | |
| Tarpaulins used to cover sand & other loose material when transported by vehicles | |
| After unloading , wheels & undercarriage of vehicles cleaned prior to leaving the site | |
| No chance finds encountered during excavation | |
| Work is planned in consultation with traffic police | |
| Work is not being conducted during heavy traffic | |
| Work at a stretch is completed within a day (excavation, pipe laying & backfilling) | |
| Pipe trenches are not kept open unduly | |
| Road is not completely closed; work is conducted on edge; at least one line is kept open | |
| Road is closed; alternative route provided & public informed, information board provided | |
| Pedestrian access to houses is not blocked due to pipe laying | |
| Spaces left in between trenches for access | |
| Wooden planks/metal sheets provided across trench for pedestrian | |
| No public/unauthorized entry observed in work site | |

| | |
|---|-------------------|
| Children safety measures (barricades, security) in place at works in residential areas | |
| Prior public information provided about the work, schedule and disturbances | |
| Caution/warning board provided on site | |
| Guards with red flag provided during work at busy roads | |
| Workers using appropriate PPE (boots, gloves, helmets, ear muffs etc) | |
| Workers conducting or near heavy noise work is provided with ear muffs | |
| Contractor is following standard & safe construction practices | |
| Deep excavation is conducted with land slip/protection measures | |
| First aid facilities are available on site and workers informed | |
| Drinking water provided at the site | |
| Monitoring Items | Compliance |
| Toilet facility provided at the site | |
| Separate toilet facility is provided for women workers | |
| Workers camps are maintained cleanly | |
| Adequate toilet & bath facilities provided | |
| Contractor employed local workers as far as possible | |
| Workers camp set up with the permission of PIU | |
| Adequate housing provided | |
| Sufficient water provided for drinking/washing/bath | |
| No noisy work is conducted in the nights | |
| Local people informed of noisy work | |
| No blasting activity conducted | |
| Pneumatic drills or other equipment creating vibration is not used near old/risky buildings | |

Signature

Sign off

Name
Position

Name
Position

Appendix 18: 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 19: Officer order for establishing GRM

167

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, PIU and 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 document the outcome of each grievance resolved in the Grievance Register. |
| 3rd level: All the grievances that are not addressed by PMU within 7 days, will be brought to the notice of Grievance Redress Committee (GRC). The City Level Committee (CLC), which will be established in every project town will act as GRC | SE/EE PIU will coordinate with PO Social/ PO Environment or other official of PMU and will prepare agenda for the GRC meeting accordingly and ensure keeping the same in GRC. | The GRC will resolve the grievance within 15 days of receiving the complaint. | PIU will be responsible to see through the process of redress of each grievance and document the outcomes. |
| 4th level: Very major issues that are beyond the jurisdictional authority of the CLC or those that have the potential to cause social conflicts or environmental damage or those that remain unresolved at PMU/CLC level, will be referred to the Empowered Committee (EC). | SE/EE PIU will assist PMU officials to prepare agenda for the Empowered committee meeting. | | SE/EE PIU will keep records of Empowered committee meeting and will ensure documentation of outcome. |

Please note that an aggrieved person shall have access to the country's legal system at any stage, and accessing the country's legal system can run parallel to accessing the GRM and is not 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 and will maintain Grievance Registers (refer annexure 1 & 2).

Addl. Project Director, RUIDP
G. S. Hada 5/18
Dated: ~~04-2018~~
04/05/18

F3(301)(50)RUIDP/PMU/PH-IV/WS/GENERAL/ 1283-84
Copy to following for information and necessary action.

- 1) PA to PD /CE /FA/DyPD(A)/SE(WS)/SE(WW)/PO(Environment)/PO(Social), RUIDP, Jaipur
- 2) All EE, PIU, Phase-IV for ensuring maintenance of the Grievance register and helpline and for resolving of Grievances.

K. M. Mandawaria
(K. M. Mandawaria)
PO(Co-ord.&Social)

Appendix 20: Management Plan for Night works at Project Sites

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

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

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

(xxxvi) Illumination should be as follows-

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

- (xxxvii) As far as possible ready mix concrete from batching plant to be used, otherwise the concrete should be prepared away from residential areas and brought to the site
 - (xxxviii) All the noise activity like hammering, cutting, crushing, running of heavy equipments should be done in day time and avoided in night time
 - (xxxix) Workers engaged in night works should have adequate rest/sleep in day time before start of night works
 - (xl) Worker engaged for night works should have previous experience of night works and should be physically fit for such works including clear vision in night
 - (xli) All the necessary provisions of traffic aids such as traffic signals, road signage, barricades, cautions boards, traffic diversion boards etc. should be available with fluorescent/retro-reflective arrangements.
 - (xlii) Workers should be trained before start of night works about risks and hazards of night works and their mitigation measures and should be provided all the protective aids (PPEs) including fluorescent/retro-reflective vests.
 - (xlili) Horns should not be permitted by equipments and vehicles
 - (xliv) Workers should not shout and create noise
 - (xlv) First aid and emergency vehicles should be available at site
 - (xlvi) Emergency preparedness plan should be operative during night works
 - (xlvii) Old persons and pregnant women and women having small kids should not work in night time
 - (xlviii) All the vehicles and equipments being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise
 - (xlix) All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works
7. PIU/DSC site engineers and contractors safety personnel should closely monitor the safety of works continuously and noise and illumination levels on hourly basis and maintain photographic and videographic records as well as register the observations
 8. Night works should be stopped early in the morning at least one hour before start of pedestrian/traffic movement
 9. After completion of night works all the site should be cleaned and maintained obstruction free for day time movement of vehicles and pedestrians
 10. Drivers and workers should be alert and responsive during night works
 11. All the wages to workers working in night hours should be as per the applicable labour acts
 12. Avoid any nuisance which may create problems to nearby habitants and work peacefully during night hours
 13. Night works should not be conducted near hospitals and during peak seasons such as peak tourist season, students' exam times etc.

Appendix 21: Photographs of Existing and Proposed Sites



STP SITE Mela Maidan



Existing STP at Mela Maidan



Existing STP at Mela Maidan



Effluent discharge of existing STP in lagoon



SPS Site at RSEB Campus



Approach road to proposed SPS site at RSEB Campus

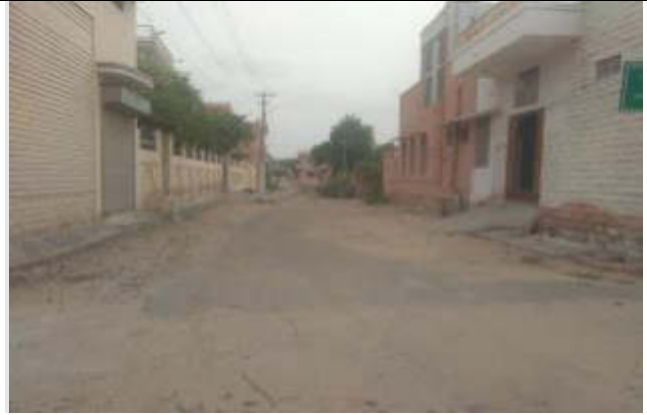


SPS at Degana Road



Salt Lake near proposed SPS site at Degana Road

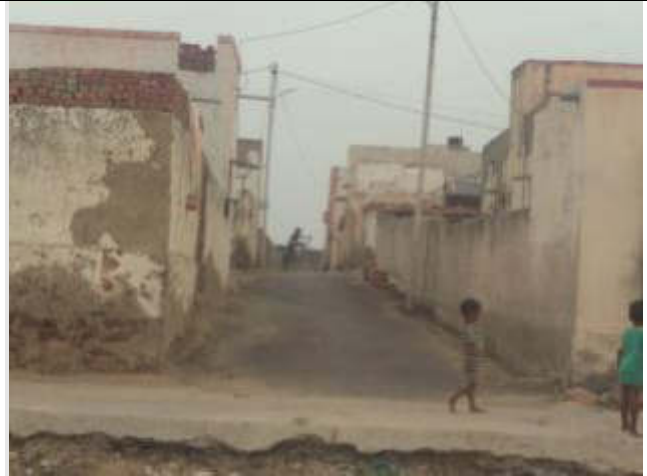
Approach road to SPS site at Degana Road



Partially Covered Sewered Areas of Town



Wide roads in town outer areas



Narrow Roads in town

Appendix 22: Environmental Monitoring Plan - Ambient Air, Noise, Water and Soil

1. Under RUIDP works Environmental Monitoring will done for ambient air, noise, surface water, ground water and soils with following parameters-
 - A. **Ambient Air Quality-** Particulate Matters PM₁₀, Particulate Matter PM_{2.5}, SO_x, NO_x, Carbon Monoxide (CO) as per methods and norms approved by CPCB
 - B. **Ambient Noise Quality-** L_{day} and L_{night} (in LeqdB) 24 hrs basis as per methods and norms approved by CPCB
 - C. **Surface Water Quality-** pH, Turbidity, Total Hardness, DO, BOD, COD, Chloride, Hg, Iron, TDS, TSS, Calcium, Zn, Cr⁺⁶, Magnesium, Copper, Manganese, Sulphate, Cyanide, Nitrate, Sodium, Potassium, Fluoride, Cadmium, Arsenic, Lead, Boron, Selenium, Aluminium, Total residual Chlorine
 - D. **Ground Water Quality-** pH, TDS, Total Hardness, Zn, Chloride, Iron, Copper, DO, Manganese, Sulphate, Nitrate, Fluoride, Hg, Cadmium, Cr⁺⁶, Arsenic, Lead, Total Alkalinity, Phosphate, Phenolic compound
 - E. **Soil quality-** pH, Elect. Conductivity (at 25⁰C), Moisture (at 105⁰C), Texture (silt, clay, sand), Calcium (as CaO), Magnesium (as Mg), Permeability, Nitrogen (as N), Sodium (as Na), Phosphate (as PO₄), Potassium (as K), Organic Matter, oil and grease
2. During pre-construction stage monitoring is required to establish baseline at following sites-

Environmental Monitoring in Pre-Construction Period

| S.N. | Type of monitoring | Location of monitoring and no. of samples | Total No. of samples |
|------|--------------------------|---|----------------------|
| 1 | Ambient Air Monitoring | STP site -1 SPS site -2 Construction camp-1 Additional site (if any)-1 | 5 |
| 2. | Ambient Noise monitoring | STP site -1 SPS site -2 Construction camp-1 Additional site (if any)-2 | 5 |
| 3. | Surface Water quality | Salt Lake near SPS, Degana Road | 1 |
| 4. | Ground Water quality | STP site-1 SPS site-2 Construction camp-1 | 4 |
| 5. | Soil Quality | STP site -1 SPS site -2 Construction camp-1 Additional site (if any)-1 | 5 |

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

Environmental Monitoring in Construction Period

| Proposed sites | Ambient Air quality | Ambient Noise quality | Surface water quality | Ground Water Quality | Soil Quality |
|--|---------------------|-----------------------|-------------------------------|----------------------|--------------|
| Pipe laying site within the town preferably near sensitive receptor* | One | One | Nil | Nil | One |
| Construction camp/storage yard/labor camp | One | One | Nil | One | One |
| SPS sites | Two | Two | One- Salt Lake, near SPS site | Two | Two |
| STP site | One | One | Nil | One | One |
| Total number of samples in each quarter (A) | 5 | 5 | 1 | 4 | 5 |
| Total number of samples in construction period (B) | 40 | 40 | 8 | 32 | 40 |

Calculation of total Number of samples-

Project duration= 3 years=12 quarters

Pre-construction phase= 3 months=1quarter

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

Monsoon period in project duration=3 quarter

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

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

Note -

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

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

Appendix 23: Guidelines for Safety during Monsoon/Heavy rainfall

Excavation and refilling of earth are common activities, which, if not carefully executed may pose problems to the safety of works as well as passersby and road users during the impending Monsoon.

Normal and heavy rainfall event affect our ongoing works, It should be our conscientious effort to ensure that such events do not prove to be problematic to people and structures in town. During monsoon PIU/PMDSC should ensure that any further excavation work is taken up only after ensuring that the earlier work is in safe stage. It is desired that DCM/ACM & Ex. En. PIU should inspect all sites during rains and take proactive actions.

Some of the precautions and mitigation measures to be taken are discussed below-

1. The execution of works having deep excavation in smaller lanes and congested areas should be completed well before monsoon. The works of deep excavation during monsoon should not be preferably taken up or extensive care should be taken for execution of such works.
2. The settlement in refilled trenches of sewerage and water supply lines may occur during monsoon. PMDSC and PIU team should inspect all sites after a storm to identify such reaches and take immediate corrective action by proper refilling and compacting. It is responsibility of all engineers to look after this activity during monsoon and ensure corrective actions from Contractor's side.
3. The contractor's crew should be equipped with vehicle, gum boots, raincoats, torch etc. to tackle such situation during and after rains. Adequate quantities of earth, debris and gravel should be stacked at strategic places so that no time is lost in procuring such material.
4. In trenches where pipe laying has been done and duly tested and approved, refilling should be done and all surplus material relocated to safe disposal sites such that it does not obstruct traffic or waterways.
5. All open ends of WS and WW pipelines should be firmly plugged to prevent debris from entering the pipeline. Manhole covers of sewer lines should be fixed in place to avoid any harm to road users.
6. Drains are primary or secondary carriers of storm water. Any unutilized construction material should be relocated to allow free passage of storm water. Surplus earth should be suitably and immediately be relocated to avoid earth from falling into the drain so that choking does not occur.
7. Overhead works should not be carried on in-weather conditions that threaten the safety of workers. More frequent checks on scaffold and bracings should be done during monsoon season.
8. Additional precautions should be taken of the power lines, ignorance and carelessness can cause major accidents and casualty.
9. Take preventive measures for water logging in working areas by providing dewatering pumps. Place bright and reflective warning signs.
10. Inspection should also be carried out before resumption of work after a shower/rain.
11. Storage of Construction Material: Steel & Cement are vital ingredients for quality construction work but in absence of proper storage, especially during monsoon, cement and steel may rapidly decline in quality and strength. Care should be taken to protect these materials and use of any exposed material should be allowed only after conducting fresh tests. Improper

storage of such material should be reported to SE PIU/ACM PMDSC and use of any apparently affected material should be done after permission of SE PIU/DCM/ACM.

Additional Precautions

1. Adequate set up and resources such as dewatering pumps, electrical routings etc should be planned ahead. Water logging on main roads to be avoided, where construction works are going on.
2. Ensuring the monsoon specific PPE's issued in adequate and are used during monsoon.
3. Use of electric extension box should be avoided; extension cables (if used) should not be wet and damaged. Cables connections should be only weatherproof/waterproof. Electrical and HSE personnel of contractor should visit permanent and running sites regularly. Transparent protective sheets/rain sheds should be placed for the power distribution boards.
4. Welding machines, bar cutting machines etc. should be kept in dry conditions; should not stand in water logged area. Breakers and Drill machines should not be used when raining; dirt/mud should be scrubbed with cloth.
5. Special Trainings to all drivers and operators on safe practices and all vehicles/ equipment's maintenance checks to be more frequent.
6. High boom equipment to be stopped during blowing of high speed wind and rain storm. Arresting of parked vehicles, equipment during monsoon should be done.
7. All chemicals should be stored as per MSDS, chemicals to be protected from water ingress. Chemical waste should be disposed for preventing overflow of chemicals.
8. At labor camps following precautions should be taken:-
 - Maintaining hygiene & proper housekeeping.
 - Additional health checkup camp to identify seasonal diseases
 - Preventive measures on mosquito/parasite breeding mainly in work locations and camps
 - Frequent cleaning of toilets
 - To avoid water borne diseases, high level of cleanliness to be maintained, drinking water containers need to be cleaned and kept covered. Walk areas and pathways to be covered with Murom and soft rock particles (to avoid soft soil conditions).
 - Obstacle free approach to rest sheds, camp and toilets.
 - Proper illumination, provision of battery operated emergency lights
 - No bonfires inside resting sheds. No use of wood.

SE-PIU and DCM/ACM-PMDSC should oversee the arrangements to effectively deal with the eventuality.

EHS officer of contractor should visit each site and camps more frequently. Contractor/EHS officer will also impart training on safe working methods during Monsoon and will keep a daily watch on weather conditions to share with site team to act accordingly.

Contractor should organize Monsoon Health Camps and Monitor Workmen Habitat and Hygiene.

Appendix 24: Audit Report of Existing Sewerage System of Didwana

1. Name of Plant: Sewerage Treatment Plant Didwana
2. Capacity: 5 MLD
3. Technology: SBR Technology
4. Executing agency: Nagar Palika Didwana
5. Implementing agency: Rajasthan Urban Infrastructure Finance and Development Corporation (RUIFDCO), Govt. of Rajasthan
6. Project name under which this STP was constructed: 7 City Sewerage Project
7. Name of contractor: Lahoty Buildcon Ltd.
8. Date of start of the construction of STP: 14/04/2013
9. Status of work progress of STP: Completed
10. Sewerage networks laid under the project (type, dia and length):

| | |
|---------|---------------|
| Type: | RCC NP3, NP4 |
| Dia: | 200 TO 900 MM |
| Length: | 89.84KM |
11. Nos., locations and capacities of SPS: 1 Nos. Khariya talab 4.72 MLD
12. Cumulative Progress % (including STP/SPs/Network): All are 100 % completed
13. Areas of different units of plant (sq. mtrs): 14000 sqmt.
14. Total Area of land used for STP: 13 bigha (32881 sq. mt)
15. Land ownership details: (khasra nos.) Nagar Palika Didwana, Khasra no. 822
16. Estimated/Final cost of STP: 6.94 Cr.
17. O&M period of contract: 10 Year
18. Tree plantations done under this project (nos. and types of trees): 1200 Nos
19. Date of completion of construction works of STP: 05/08/2016
20. Reasons of delay, if any: Delay due to ban in sand by Govt., delay in drawing approvals and payments, other reasons
21. Status of Consent to Establish (CTE) from Pollution Control Board: obtained
22. Validity of CTE: 2016
23. Status of Consent to Operate (CTO) from Pollution Control Board: not obtained (applied)
24. Validity of CTO: applied and pending with RPCB
25. Status of sewerage networks: Completed
26. Total area of city covered with this STP: Near about 70-75%

27. Details of total covered area with this STP: 70-75% approx.. (Zone-1 - 40%, Zone-2 - 100%, Zone-3 - 100%, Zone-4 - 100%, Zone-6 - 30%, Zone-7 - 15% & Zone-8 - 100%)
28. Total Population covered (number and %): 63% approx
29. Whether trail run completed, if yes give date, if no give tentative date: yes
30. Estimated date of commissioning of this STP: Already commissioned
31. What are the parameters of discharge of treated effluent:

| Parameters | Standard value |
|-------------------------------|----------------|
| 5 day BOD at 20 degree C temp | 10 mg/lit |
| COD | 100 mg/lit |
| TSS | 10 mg/lit |
| PH | 6_9 |
| TKN (as N) | 10 mg/lit |
| TP | 1 mg/lit |

32. What are the proposals/methods for reuse/disposal of treated effluent from STP: treated effluent stored in vacant govt. land from where govt. agencies take it for use in road construction and irrigation works through tankers
33. What are the proposals/methods for reuse/disposal of treated sludge from STP: currently treated sludge is being sold to farmers by contractor but there is no awareness among farmers for reuse of treated sludge in agriculture
34. Is this plant anywhere related/dependent on proposed STP (7MLD) under RUIDP Phase-4 project: no except land for proposed STP is within the same campus of existing STP
35. Status and type of electricity connection: dedicated grid supply with approved load-319 KW
36. Whether DG set installed, if yes give capacity and type of DG set: 215KW
37. Whether consent from Pollution Control Board taken for DG set: No
38. Fresh water requirements/day (for domestic use) and type of water supply: no water supply, Tanker is used
39. If tube well installed, provide number and capacity of tube well and status of clearance from Ground Water Board for tube well: NA
40. Numbers of employees proposed for operation of plant (designation wise numbers of employees): 11 Nos Including Guard
41. Is rain water harvesting system established, if yes, details and cost of rain water harvesting :No rain water harvesting system established
42. Power generation system installed, if yes, give details: NO

- 43. O&M manual prepared by contractor (submitted/approved): SUBMITTED
- 44. Emergency operating system prepared for O&M: No
- 45. Whether provisions for odour control taken in design, if yes give details: No
- 46. If provisions taken to protect inconvenience to nearby habitants, give details: Not applicable no habitation nearby

Photographs of Existing STP and SPS, Didwana






Existing STP near Mela Maidan



Existing SPS at Kharia Talab

Appendix 25: Details of land availability, ownership and status of No Objection Certificate (NOC) for sites

| Project Component | Location | Ownership | Area of government land available at the location (m ²) | Area required(m ²) | Khasra No. | NOC Status | Photo of Land |
|---|---------------------------------------|--------------|---|--------------------------------|---|---|--|
| Sewerage | | | | | | | |
| Construction of 1 nos of STP of 3 MLD with SBR technology | Existing STP campus near Mela Maidan. | Nagar Palika | 13000 | 4000 | 822 | Attached |  |
| Construction of Sewerage Pumping Station (1.7MLD) | at Degana Road | Nagar Palika | Sufficient land available | | Shall be made available by Nagar Palika | |  |
| Construction of 1nos of Sewerage Pumping Station (1.3MLD) | at RSEB Powerhouse on Ladnu Road | RSEB | 93573 | 700 | 54,58,59,274 /57,275/60 | Attached. Land will be transfer to Nagar Palika, which is under progress. |  |

Source: Nagar Palika, Didwana

Letter by Nagar Palika for Land Availability for SPS at RSEB Campus

क्रमांक 3094

दिनांक 12/9/18

श्रीमानअधीक्षण अभियंता महोदय
आरयूआईडीपी
जयपुर

विषय :- डीडवाना शहर की सीवरेजप्रणाली विकसित करने हेतु
नगरपालिकाडीडवानाद्वाराआर.एस.ई.बी पावर हाउस सीमा के भीतर सीवरेजपंपिंग स्टेशन स्थापित
करने हेतु भूमि उपलब्ध करवाने बाबत ॥

महोदय

उपरोक्त विषयान्तर्गत निवेदन है की नगर पालिका डीडवाना द्वारा डीडवाना शहर की सीवरेज प्रणाली
को विकसित करने हेतु आर.एस.ई.बी पावर हाउस सीमा के भीतर प्रस्तावित पंपिंग स्टेशन के लिए
आर.एस.ई.बी पावर हाउस सीमा के भीतर आवश्यक भूमि चिन्हितकरा दी गई है । यह भूमि नगर
पालिका डीडवाना के क्षेत्राधिकार मे है , अतः इस भूमि का उपयोग पंपिंग स्टेशन के लिए प्रस्तावित
है ॥ भूमि संभन्धित समस्त अभिलेख आपको अतिशीघ्रह उपलब्ध करवा दिये जाएंगे।

12/9/18
अधिशायीअधिकारी
नगरपालिकाडीडवाना
जिलानागौर

Transcript in English

No.: 3094

Date: 12.09.2018

To,

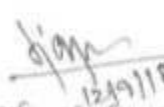
Superintending Engineer, RUIDP, Jaipur

Subject: Regarding availability of land for SPS in RSEB Campus

It is stated that Nagar Palika, Didwana City has demarcated land for proposed sewage pumping station for Didwana city sewerage system within the campus of RSEB (Rajasthan State Electricity Board). This land is under jurisdiction of Nagar Palika, Didwana, which is proposed for construction of SPS. Documents related to land shall be made available as soon as possible.

Signed by: Executive Officer, Nagar Palika, Didwana, District Nagaur

Letter by Nagar Palika for Land Availability for SPS at Degana Road

| | |
|---|----------------|
| क्रमांक 3078 | दिनांक 12/9/18 |
| <p>श्रीमानअधीक्षण अभियंता महोदय आयूआईडीपी जयपुर</p> | |
| <p>विषय :- डीडवाना शहर की सीवरेजप्रणाली विकसित करने हेतु नगरपालिकाडीडवानाद्वारासाल्टएरिया के निकट सीवरेजपंपिंग स्टेशन स्थापित करने हेतु भूमि उपलब्ध करवाने बाबत ॥</p> | |
| <p>महोदय</p> <p>उपरोक्त विषयान्तर्गत निवेदन है की नगर पालिका डीडवाना द्वारा डीडवाना शहर की सीवरेज प्रणाली को विकसित करने हेतु साल्टएरिया के निकट प्रस्तावित पंपिंग स्टेशन के लिए साल्टएरिया के निकट आवश्यक भूमि चिन्हितकरा दी गई है । यह भूमि नगर पालिका डीडवाना के क्षेत्राधिकार मे है , अतः इस भूमि का उपयोग पंपिंग स्टेशन के लिए प्रस्तावित है ॥ भूमि संबंधित सम्स्त अभिलेख आपको अतिशीघ्र उपलब्ध करवा दिये जाएंगे।</p> | |
| <p align="center">  12/9/18 अधिशायी अधिकारी नगरपालिका डीडवाना जिला नगौर </p> | |

Transcript in English
No: 3078

Date: 12.09.2018

To,
Superintending Engineer, RUIDP, Jaipur

Subject: Regarding availability of land for SPS near salt area

Sir,

It is stated that land is demarcated for proposed SPS near salt area for construction of SPS. This land is under jurisdiction of Nagar Palika Didwana, which is proposed for construction of SPS. Land related papers shall be made available as soon as possible.

Signed
Executive Officer,
Nagar Palika, Didwana
District Nagaur

Appendix 26: Biodiversity Assessment Report for Didwana

Biodiversity Assessment – Didwana Town Sewerage Subproject

A. Introduction

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

B. Project Description

The project is located in Didwana Town, Nagaur District of Rajasthan State. Most of the project components are planned and will be located inside the municipality limits. The sewerage system for the city will be improved with installation of 2 sewage pump stations of 1.7 MLD and 1.3 MLD capacity at Degana road and Ladnun road, respectively. Construction of 1 no. of STP based on SBR technology of 3.0 MLD capacity on land within existing STP campus area. Laying sewer lines of 61km length for new sewers (including 10km trenchless) underground and 3.700 km of pumping mains in city area to cover left out areas of the habitation. The location of project component on google map is given in Figure-1.

Figure 1: Project area on Town Map



C. Establishing project area of influence (PAI)

The project area of influence (PAI) for the study is established on basis of locations on project components of proposed project. The scope of work covering all components and associated facilities under the project in Didwana Town are considered as a project area of influence (PAI). The critical habitat assessment has been conducted within the boundaries of PAI which has been established using ecological units and/or physical features within the landscape such as roads, railway line, hills or seasonal streams. The established PAI for sewerage treatment system in Didwana Town is given in Figure -2.

Figure 2: Map showing boundary of PAI Didwana subproject



The boundaries of PAI for subproject has been established on the basis of physical/topographical features surrounding Didwana City. On west direction a village road from Baliya village to National Highway -65A is taken for limit of the PAI area. The buffer of 500m outer side along the road section of State Highway-70 has been established as boundary of PAI in north and east direction of the Town. In the south of the Town, there are Salt fields exist, the fields are considered as boundary of study area under the subproject. The salt fields are natural wetland collecting water in monsoon season and saline water is used for salt production.

D. Biodiversity Assessment

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

D.1 Key Biodiversity Area

The project areas have been screened to determine presence of Key Biodiversity Areas (KBAs) using the Integrated Biodiversity Assessment Tool (IBAT)²⁸. As per the Proximity report generated by IBAT, there are neither protected area nor any key biodiversity areas within the buffer of 10km radius of the subproject components. The nearest protected area is Tal Chappar Wildlife Sanctuary; which is approx. 40 km away (nearest aerial distance) from the Didwana town area. However, there are 29 International Union for the Conservation of Nature (IUCN) Red List threatened species. The key findings of the IBAT report are presented in the subsequent sections.

D.2 Protected Area- Tal Chappar Wildlife Sanctuary

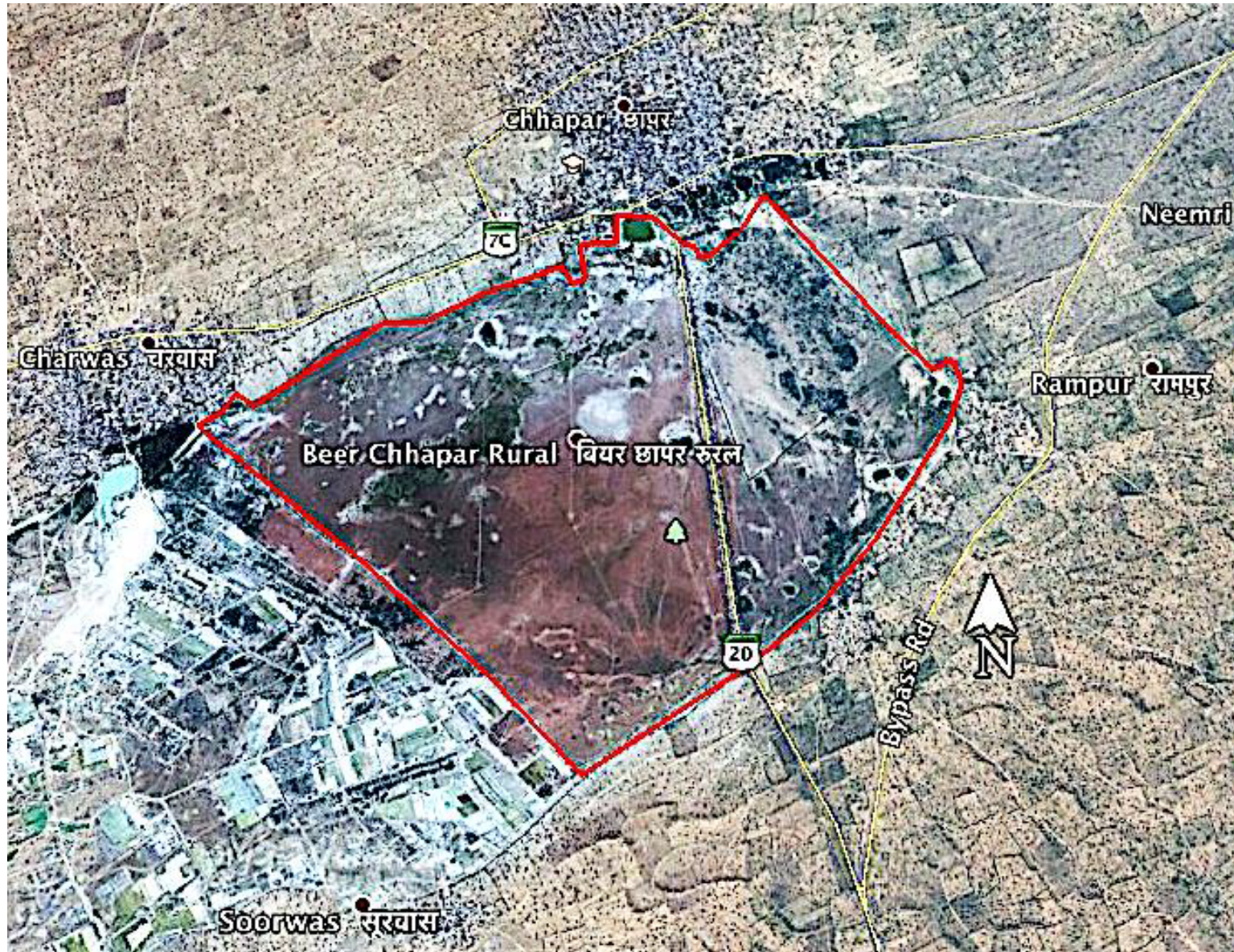
The area is nationally notified protected area under Wildlife Protection Act 1972, located on South west direction of the project town at an approx. 40 km nearest aerial distance. Figure-3 shows map of the Tal Chappar Wildlife Sanctuary area.

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

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

²⁸ IBAT is a multi-institutional programme of work involving BirdLife International, Conservation International, IUCN and UNEP-WCMC. IBAT provides a basic risk screening on biodiversity. It draws together information on globally recognised biodiversity information drawn from a number of IUCN's Knowledge Products: IUCN Red List of Threatened Species, Key Biodiversity Areas (priority sites for conservation) and Protected Planet/The World Database on Protected Areas (covering nationally and internationally recognised sites, including IUCN management categories I–VI, Ramsar Wetlands of International Importance and World Heritage sites).

Figure 3: Map showing Tal Chhappar Wildlife Sanctuary



D.3 Critically Endangered / Endangered Species

A total of 29 IUCN red list (CR, EN & VU) species reported within 50km radius. Out of these 29 IUCN red list species, 13 species are classified as Critically Endangered (CR) and Endangered (EN). Birds are common species which includes 21 species (CR-4, EN-7 & VU-10), 5 mammals (EN-1, VU-4), 1 reptile (VU-1) and 2 plants (VU-2). Table-1 lists the species designated by the International Union for the Conservation of Nature (IUCN) as Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) having recorded ranges that include the study area.

Table 3: List of species designated by IUCN threatened species as CR, EN & VU

| S.No. | Scientific Name | Common Name | IUCN Red List category |
|-------|--------------------------------|------------------------|------------------------|
| | Birds | | |
| 1 | <i>Ardeotis nigriceps</i> | Great Indian Bustard | CR |
| 2 | <i>Vanellus gregarius</i> | Sociable Lapwing | CR |
| 3 | <i>Gyps bengalensis</i> | White-rumped Vulture | CR |
| 4 | <i>Gyps indicus</i> | Indian Vulture | CR |
| 5 | <i>Oxyura leucocephala</i> | White-headed Duck | EN |
| 6 | <i>Neophron percnopterus</i> | Egyptian Vulture | EN |
| 7 | <i>Aquila nipalensis</i> | Steppe Eagle | EN |
| 8 | <i>Falco cherrug</i> | Saker Falcon | EN |
| 9 | <i>Leptoptilos dubius</i> | Greater Adjutant | EN |
| 10 | <i>Sterna acuticauda</i> | Black-bellied tern | EN |
| 11 | <i>Sypheotides indicus</i> | Lesser Florican | EN |
| 12 | <i>Antigone antigone</i> | Sarus crane | VU |
| 13 | <i>Aquila heliaca</i> | Eastern imperial eagle | VU |
| 14 | <i>Aquila rapax</i> | Tawny eagle | VU |
| 15 | <i>Aythya ferina</i> | Common pochard | VU |
| 16 | <i>Chlamydotis macqueenii</i> | Asian houbara | VU |
| 17 | <i>Ciconia episcopus</i> | Asian woollyneck | VU |
| 18 | <i>Clanga clanga</i> | Greater spotted eagle | VU |
| 19 | <i>Columba eversmanni</i> | Yellow-eyed pigeon | VU |
| 20 | <i>Rynchops albicollis</i> | Indian skimmer | VU |
| 21 | <i>Saxicola macrorhynchus</i> | White-browed bushchat | VU |
| | Mammals | | |
| 22 | <i>Manis crassicaudata</i> | Indian Pangolin | CR |
| 23 | <i>Lutrogale perspicillata</i> | Smooth-coated otter | VU |
| 24 | <i>Panthera pardus</i> | Leopard | VU |
| 25 | <i>Tetracerus quadricornis</i> | Four-horned antelope | VU |
| 26 | <i>Rusa unicolor</i> | Sambar | VU |
| | Reptile | | |
| 27 | <i>Crocodylus palustris</i> | Mugger | VU |
| | Plant | | |
| 28 | <i>Anacyclus pyrethrum</i> | Atlas daisy | VU |
| 29 | <i>Oryza malampuzhaensis</i> | Asian Rice | VU |

E. Critical Habitat Assessment Process

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

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

- Criterion 1: Critically Endangered and Endangered Species
- Criterion 2: Endemic and Restricted range Species
- Criterion 3: Migratory and Congregatory Species
- Criterion 4: Highly Threatened or Unique Ecosystems
- Criterion 5: Key Evolutionary Processes

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

E.1 Criterion 1: Critically Endangered and Endangered Species

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

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

Thresholds for Criterion 1 are the following:

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

E.2 Criterion 2: Endemic and Restricted range Species

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

- For terrestrial vertebrates and plants, restricted range species are defined as those species that have an EOO less than 50,000 km².
- For marine systems, restricted range species are provisionally being considered those with an EOO of less than 100,000 km².
- For coastal, riverine, and other aquatic species in habitats that do not exceed 200 km width at any point (for example, rivers), restricted range is defined as having a global range of less than or equal to 500 km linear geographic span (i.e., the distance between occupied locations furthest apart).

The threshold for Criterion 2 is the following:

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

E.3 Criterion 3: Migratory and Congregatory Species

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

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

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

Thresholds for Criterion 3 are the following:

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

E.4 Criterion 4: Highly Threatened or Unique Ecosystems

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

relevant qualified organizations (including internationally recognized Non-Government Organizations (NGOs)).

The thresholds for Criterion 4 are the following:

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

E.5 Criterion 5: Key Evolutionary Processes

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

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

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

F. Critical Habitat Assessment in PAI

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

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

A habitat analysis carried out for the Critically Endangered (CR) and Endangered species reported in the project area of influence (50km) shows that it is likely that the 29 species identified in IBAT are mostly located inside the ecological areas and not within the project area of influence (PAI). Details of the habitat analysis in the PAI is presented in Table-2.

Table 4: Habitat Analysis in PAI – Didwana Subproject

| S. No. | Common Name (Species Name) | IUCN Category | Habitat Preferences | Likelihood of Occurrence in PAI |
|--------------|--|---------------|---|---|
| Birds | | | | |
| 1 | Great Indian Bustard (<i>Ardeotis nigriceps</i>) | CR | Grassland - Subtropical/Tropical Dry | None: Possible range extend in State of Rajasthan. The species occurs in the Indian Subcontinent, with strongholds in the Thar desert in the north-west and the Deccan tableland of the Peninsula. Mainly found in Western Rajasthan with small population in in Gujarat, Maharashtra, Andhra Pradesh and Karnataka. https://www.iucnredlist.org/species/22691932/134188105#geographic-range |
| 2 | Sociable Lapwing (<i>Vanellus gregarious</i>) | CR | Desert, Wetlands (inland), Grassland, Artificial/Terrestrial | None; The species occurs in the north-west part of India, as non-breeding habitat, mainly in Great Rann of Kutch. https://www.iucnredlist.org/species/22694053/130586388#habitat-ecology |
| 3 | White-rumped vulture (<i>Gyps bengalensis</i>) | CR | Forest, Grassland, Shrubland, Savanna, Artificial/Terrestrial | Yes, the species habitat in South Asia and South-east Asia. Habitat reported in North India including Rajasthan state. https://www.iucnredlist.org/species/22695194/118307773 |
| 4 | Indian Vulture (<i>Gyps indicus</i>) | CR | Forest, Grassland, Shrubland, Savanna, Artificial/Terrestrial | Yes; possibility of habitat in Rajasthan, species breeds in south-east Pakistan and peninsular India south of the Gangetic plain, north to Delhi, east through Madhya Pradesh, south to the Nilgiris, and occasionally further south. https://www.iucnredlist.org/species/22729731/117875047 |
| 5 | White-headed Duck (<i>Oxyura leucocephala</i>) | EN | Wetlands (inland), Artificial/Aquatic & Marine, Marine Coastal/Supratidal | None: Habitat range in South Asia is limited to Pakistan and rarely reported in India. https://www.iucnredlist.org/species/22679814/119403602 |
| 6 | Egyptian Vulture | EN | Rocky areas (eg. inland cliffs, mountain peaks), Wetlands (inland), | Yes; extend of migratory bird species breeding habitat during winter in India including Rajasthan state. https://www.iucnredlist.org/species/22695180/154895845 |

| S. No. | Common Name (Species Name) | IUCN Category | Habitat Preferences | Likelihood of Occurrence in PAI |
|--------|--|---------------|--|--|
| | (<i>Neophron percnopterus</i>) | | Grassland, Shrubland, Savanna, Artificial/Terrestrial | |
| 7 | Steppe Eagle (<i>Aquila nipalensis</i>) | EN | Rocky areas (eg. inland cliffs, mountain peaks), Grassland, Savanna | Yes; extend of migratory bird species non-breeding habitat during winter in India including Rajasthan state. https://www.iucnredlist.org/species/22696038/155419092 |
| 8 | Saker Falcon (<i>Falco cherrug</i>) | EN | Marine Intertidal, Wetlands (inland), Grassland, Shrubland, Artificial/Terrestrial | Yes; extend of migratory bird species non-breeding habitat during winter in India including Rajasthan state. https://www.iucnredlist.org/species/22696495/110525916 |
| 9 | Greater Adjutant (<i>Leptoptilos dubius</i>) | EN | Forest, Wetlands (inland), Artificial/Terrestrial, Grassland | None; in India species breeding habitat extend is limited in Assam and Bihar state only. https://www.iucnredlist.org/species/22697721/93633471 |
| 10 | Black-bellied Tern (<i>Sterna acuticauda</i>) | EN | Wetlands (inland) | None: breeding range extend into parts of India excluding Rajasthan State. https://www.iucnredlist.org/species/22694711/110488626 |
| 11 | Lesser Florican (<i>Sypheotides indicus</i>) | EN | Grassland, Artificial/Terrestrial | Yes; possibility of habitat in Rajasthan state as species breeds in Gujarat, Rajasthan, Maharashtra, Madhya Pradesh & Andhra Pradesh. https://www.iucnredlist.org/species/22692024/110438391 |
| 12 | Sarus crane (<i>Antigone antigone</i>) | VU | Grassland, Artificial/Terrestrial, Wetlands (inland), Artificial/Aquatic & Marine | None; habitat extend of the bird species resident is mainly in Uttar Pradesh State and nearby areas of surrounding states, breeding habitat during winter extended in adjoining areas of Rajasthan state. https://www.iucnredlist.org/species/22692064/93335364 |

| S. No. | Common Name (<i>Species Name</i>) | IUCN Category | Habitat Preferences | Likelihood of Occurrence in PAI |
|--------|--|---------------|--|--|
| 13 | Eastern imperial eagle (<i>Aquila heliaca</i>) | VU | Forest, Wetlands (inland), Grassland, Shrubland, Artificial/Terrestrial | None; in India species non-breeding habitat extend is limited in Northern parts only. https://www.iucnredlist.org/species/22696048/155464885 |
| 14 | Tawny eagle (<i>Aquila rapax</i>) | VU | Forest, Grassland, Shrubland, Savanna, Artificial/Terrestrial | Yes; habitat extend of the bird species resident is mainly in central India including Rajasthan state https://www.iucnredlist.org/species/22696033/131671001 |
| 15 | Common pochard (<i>Aythya ferina</i>) | VU | Marine Neritic, Wetlands (inland), Marine Coastal/Supratidal, Artificial/Aquatic & Marine | None; the migratory bird specie's non-breeding habitat extend during winter season is limited in eastern and northern parts of India https://www.iucnredlist.org/species/22680358/155473754 |
| 16 | Asian houbara (<i>Chlamydotis macqueenii</i>) | VU | Desert, Grassland, Artificial/Terrestrial | None; in India species non-breeding habitat extend is limited in western parts of Punjab and Rajasthan State. https://www.iucnredlist.org/species/22733562/155425140 |
| 17 | Asian woollyneck (<i>Ciconia episcopus</i>) | VU | Marine Intertidal, Forest, Artificial/Terrestrial, Artificial/Aquatic & Marine, Grassland, Wetlands (inland), Marine Neritic | Yes; the species is found patchily across South Asia and South East Asia, range extends throughout India https://www.iucnredlist.org/species/22727255/110064997 |
| 18 | Greater spotted eagle (<i>Clanga clanga</i>) | VU | Forest, Wetlands (inland), Shrubland, Artificial/Aquatic & Marine, Grassland | Yes; the species non-breeding habitat is found across South Asia and South East Asia, range extends throughout northeast and Northern India https://www.iucnredlist.org/species/22696027/110443604 |
| 19 | Yellow-eyed pigeon (<i>Columba evermanni</i>) | VU | Desert, Caves and Subterranean Habitats (non-aquatic), Wetlands | None; in India species non-breeding habitat extend is limited in north-west parts including parts of Rajasthan State. https://www.iucnredlist.org/species/22690097/110099638 |

| S. No. | Common Name (Species Name) | IUCN Category | Habitat Preferences | Likelihood of Occurrence in PAI |
|----------------|--|---------------|--|--|
| | | | (inland), Shrubland, Artificial/Terrestrial | |
| 20 | Indian skimmer (<i>Rynchops albicollis</i>) | VU | Wetlands (inland) | Yes; the species is found patchily across India; range extends throughout Rajasthan State. https://www.iucnredlist.org/species/22694268/110600990 |
| 21 | White-browed bushchat (<i>Saxicola macrorhynchus</i>) | VU | Desert, Grassland, Shrubland | None; The species is endemic to the north-west Indian subcontinent, distribution recorded in Punjab, Haryana, Uttar Pradesh, Rajasthan and Gujarat. The recent regular records of this species from Tal Chhapar in Churu district of Rajasthan State. https://www.iucnredlist.org/species/22710160/110578039 |
| Mammals | | | | |
| 22 | Indian Pangolin (<i>Manis crassicaudata</i>) | CR | Forest, Savanna, Shrubland, Artificial/Terrestrial, Grassland | Yes; species is distributed in South Asia through much of India including Rajasthan https://www.iucnredlist.org/species/12761/123583998 |
| 23 | Smooth-coated otter (<i>Lutrogale perspicillata</i>) | VU | Artificial/Aquatic & Marine, Wetlands (inland), Forest, Grassland, Marine Coastal/Supratidal, Marine Neritic, Marine Intertidal, Shrubland | Yes; species is distributed in South Asia through much of India including Rajasthan https://www.iucnredlist.org/species/12427/21934884 |
| 24 | Leopard (<i>Panthera pardus</i>) | VU | Forest, Desert, Rocky areas (eg. inland cliffs, mountain peaks), Grassland, Savanna, Shrubland | None; Leopard range widespread in inside and outside Protected Areas of India. https://www.iucnredlist.org/species/15954/160698029 |

| S. No. | Common Name (<i>Species Name</i>) | IUCN Category | Habitat Preferences | Likelihood of Occurrence in PAI |
|----------------|---|---------------|---|--|
| 25 | Four-horned antelope (<i>Tetracerus quadricornis</i>) | VU | Forest, Shrubland | None; species habitat is extended most parts of India including Rajasthan https://www.iucnredlist.org/species/21661/50195368 |
| 26 | Sambar (<i>Rusa unicolor</i>) | VU | Forest, Artificial/Terrestrial, Savanna, Shrubland, Grassland, Wetlands (inland) | None; the habitat extend is throughout India except North India and western parts of Rajasthan and Gujarat state. https://www.iucnredlist.org/species/41790/85628124 |
| Reptile | | | | |
| 27 | Mugger (<i>Crocodylus palustris</i>) | VU | Wetlands (inland), Marine Neritic, Artificial/Aquatic & Marine | None; the species habitat extends in India to waterbodies including rivers, in Rajasthan State mainly in River Chambal. https://www.iucnredlist.org/species/5667/3046723 |
| Plant | | | | |
| 28 | Atlas daisy (<i>Anacyclus pyrethrum</i>) | VU | Rocky areas (eg. inland cliffs, mountain peaks), Forest, Grassland, Shrubland | Yes; the plant species is native to India and extend of occurrence in Rajasthan State. https://www.iucnredlist.org/species/202924/121743450 |
| 29 | Asian Rice (<i>Oryza malampuzhaensis</i>) | VU | Particularly found in forest reserves either in marshy fields or along the margins of streams or rivulets in the forest interiors | None; the species is endemic to the Kerala region in India. https://www.iucnredlist.org/species/112680709/113899465 |

F.2 Assessment output based on Criteria 4&5

The ecosystem within the project area of influence has not been assessed to date under IUCN assessment for the extinction threat to species. The ecosystem within the PAI is not considered to be highly threatened, as main land use is of residential & commercial in urban or agricultural in the surrounding locality. Further, there is no key evolutionary processes²⁹ within the PAI, as key indicator for evolutionary process areas is presence of a high number of endemic or range restricted species. Therefore, the project area of influence does not meet the thresholds set out in Criterion 4 & 5.

F.3 Protected Areas

As per ADB's SPS 2009; the designated³⁰ or proposed protected areas at national and international level should be considered as Critical Habitat. In the PAI for subproject in Didwana Town there is no national protected area and no international designated site or proposed and notified protected area. The nearest national protected area is Tal Chappar Wildlife Sanctuary, which is approx. 40 km away from the PAI boundary established for critical habitat assessment study.

G. Impacts & Mitigation Measures

The project components are proposed to be implemented within the developed areas of Didwana Town and on land under municipal limits. The project area is approx. 40 km (nearest aerial distance) away from the boundary of Tal Chappar Wildlife Sanctuary. The protected area of Tal Chappar has also been established an IBA site due to migratory birds visit the area during winter season.

The species of vulture and eagle reported from Tal Chappar wildlife sanctuary or passing by may visit the project area due extend range of habitat or in search of food during migration period in the salt fields located in south of the town. The availability of these species in the PAI need to be confirm with local community and district forest and wildlife department.

Implementation of subproject for water supply and sewage treatment plant for the town will result in reduce in waste water in reservoir. It is generally known that birds generally migrate in winter season. The treated water from proposed sewerage treatment plant will be used for irrigation purposes in agriculture fields and horticulture plantation in area. This will increase in food sources and with horticulture plantation will be improve settler and nesting ground for birds.

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

²⁹ The evolutionary processes often occur in an isolated habitat and ecosystem due to physical or biological barriers, for example habitat on islands or valley.

³⁰ As per ADB's SPS the sites which are of international designation, such as Ramsar and UNESCO sites should be considered as Critical Habitat.

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

The such impacts on avifauna can be mitigated by following measures:

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

The anticipated impacts on ecological system due to project and proposed mitigation measures for EMP are provided in Table -3.

Table 5: Impact-mitigation measures for EMP

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

| Field | Anticipated Impact | Mitigation Measure | Responsible for Implementation | Monitoring of Mitigation | Cost and Source of Funds |
|--------------------------|--|---|--------------------------------|--------------------------|---|
| | | <ul style="list-style-type: none"> (ii) Prepare and implement construction waste management plan (iii) Disposal of waste at designated sites and approval from local authorities (iv) Conduct surface quality monitoring according to the EMP. | | | |
| Construction Workers | Involvement in illegal hunting, trapping and wildlife trading | <ul style="list-style-type: none"> (i) Awareness training to workers on wildlife presence in the project area and protection of wildlife. (ii) Reporting to PMU on slighting of wild animals in the project area. (iii) Employment agreements should specify heavy penalties for illegal hunting, trapping and wildlife trading – all other ancillary works should also agree not to participate in such activities. (iv) Strict anti-poaching surveillance measures need to be implemented, especially during project construction phase | Construction Contractor | PMU | Cost for implementation of mitigation measures responsibility of contractor |
| Operational Stage | | | | | |
| Project area development | Failure of STP for wastewater treatment, plantation of non-fruit bearing trees, contamination of water source or agriculture fields due to inadequately treated wastewater | <ul style="list-style-type: none"> (i) Regular monitoring of treated effluent quality before discharge or reuse for plantation and irrigation purposes (ii) Tree plantation and landscaping in the project area as per approved plan | O&M Contractor | Didwana Nagar Palika | Contractor's O&M cost |

| Field | Anticipated Impact | Mitigation Measure | Responsible for Implementation | Monitoring of Mitigation | Cost and Source of Funds |
|--------------|---------------------------|----------------------------------|---------------------------------------|---------------------------------|---------------------------------|
| | | with preference to local species | | | |

H. Conclusion

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

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

This assessment study for Critical Habitat indicates that within the PAI there are no known species which would qualify the area as Critical Habitat for Criterion 1 - 3. Further, within the PAI there are chances that migratory bird (falcon, sarus, vultures and eagle) species may be visiting the satellite wetland which is next to proposed STP location. The presence of birds in the satellite wetland need to confirm by PIU by field visit and consultation with local community and divisional forest & wildlife department. The PAI does not qualify as Critical Habitat under Criteria 4 and 5.

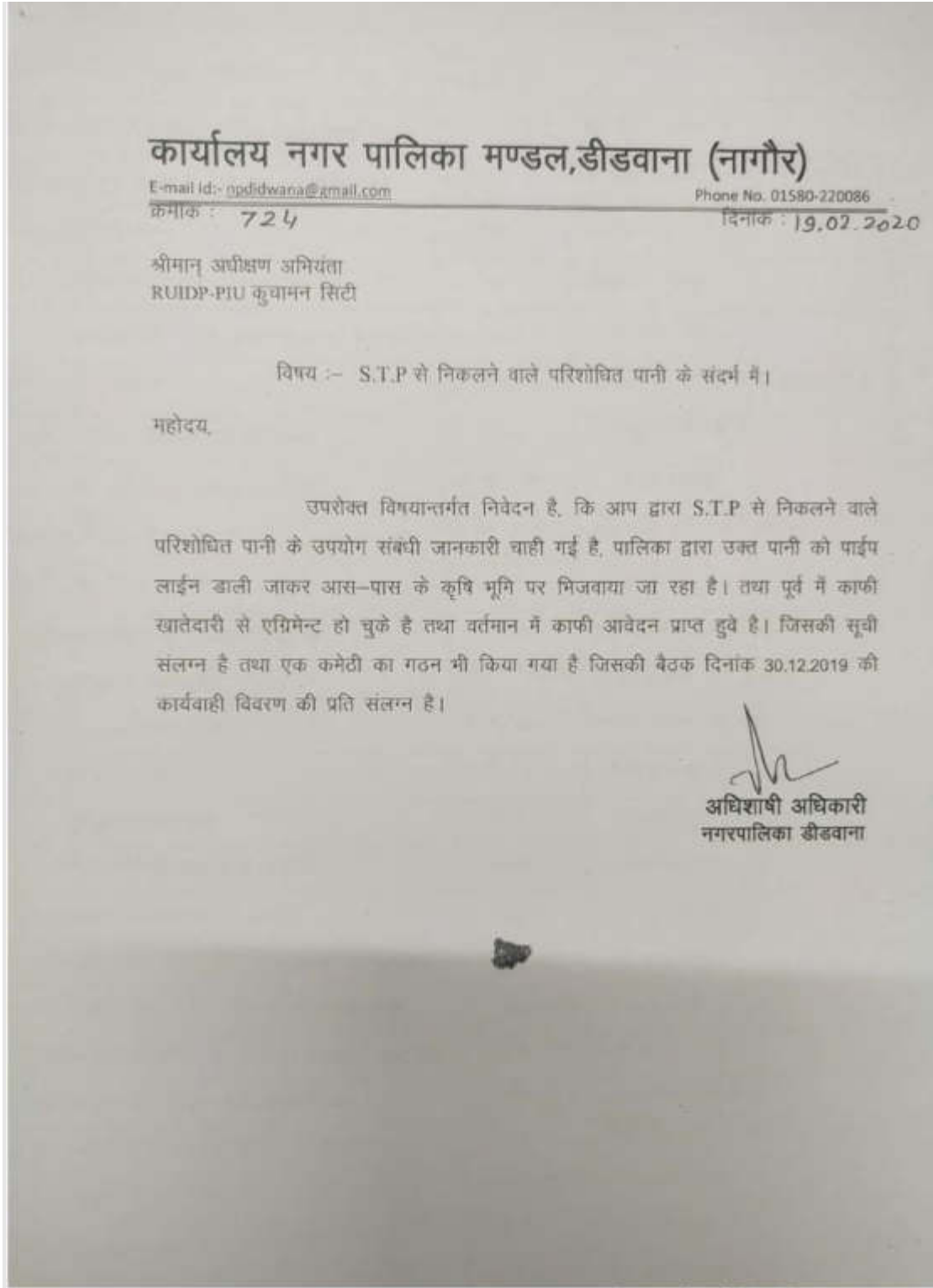
The implementation of project component is not anticipated to trigger in a population reduction of any recognized endangered or critically endangered species or a loss in area of the habitat for wildlife. The construction activities of the project may lead to some impacts on biodiversity and ecosystem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

I. Recommendation

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

- i. PIU should conduct consultation before start of work with local community in subproject area and district forest and wildlife department to confirm the presence of migratory birds in various small wetlands and salt fields located south for Didwana Town under subproject as mentioned in this assessment report (Table -2 of this report).
- ii. Contract a local biodiversity expert to further verify the presence of IUCN red list species in the subproject area,
- iii. On confirmation of enlisted species in the subproject area, same will be reported to PIU and do not start of works on site until clearance from PIU
- iv. Update Environmental management plan based on findings/verification of IUCN species in the subproject area, and
- v. The finding/presence of IUCN red list species in the subproject area are confirmed in course of construction work, PIU shall stop the work and coordinate with forest department for the translocation of species.

Appendix 27: MOU between Nagar Palika and Farmers regarding Reuse of Treated effluent and disposal



Transcript in English

No:- 724

Date:-19-02-2020

To,
The Superintending Engineer,
RUIDP-PIU,
Kuchaman City.

Subject:-Disposal of treated effluent from proposed STP.

Respected Sir,

With due regards in the context of above cited subject as you enquire about disposal of treated water from STP,

We want to inform you that from municipal board we supplying our treated water up to farmers through pipeline for agriculture. In past so many agreements with farmers was done and presently many applications are under review which list is attached. We developed a committee which meet on 30.12.2019 the MOM of meeting is attached.

Thanking you.

| क्र. सं. | आवेदक का नाम | खसरा नम्बर | पंच |
|----------|--------------------------------------|--------------------------------|----------------------------------|
| 1 | श्रीमति धारू देवी W/O मोहन लाल | 1529, 1558 | मु. रो. बोलिया |
| 2 | श्री अशुल सार 5/0 सुना सिलावर | 1347 1870 | सिलावटे की शमी, शिव मंदिर के पास |
| 3 | " राजेन्द्र प्रसाद 5/0 लालचन्द पंवार | 791 | बगला बास |
| 4 | " पुनम-नन्द 5/0 लालचन्द पंवार | 791 | बगला बास |
| 5 | " अंकर लाल 5/0 लालचन्द पंवार | 791 | बगला बास |
| 6 | श्रीमति जेनुन | 1829 | कोळिया - रघुनाथपुरा लेड |
| 7 | श्री इस्माईल मोहम्मद | 120 | रघुनाथपुरा |
| 8 | " डॉ. जोरम सिंह रागेड | 115, 110 | अमरपुरा |
| 9 | श्रीमति हवीश रवासुन W/O इमाम खां | 1020, 1022 1028 | पढाणे की नदी के ल |
| 10 | श्री लियोड राम | 257 | अमरपुरा |
| 11 | " सुमदास 5/0 बतरदास | 400 | सिंही बालाजी मंदिर |
| 12 | " युसुफ अली | 735, 732, 736 | इंडोलाब की शमी |
| 13 | " तुलसीशंकर मंड | 576/201 | झांपरी गेट के पुर (अमरपुरा) |
| 14 | " सुरजमल | 451/295 | अमरपुरा |
| 15 | " देवत लाल | 178 | अमरपुरा |
| 16 | " कौदराम केवलचन्द भाई | 223 | अमरपुरा |
| 17 | " गुलाम अंसम खां आदि | 254 | अमरपुरा |
| 18 | श्रीमति आरगादेवी W/O राम गोपाल भासी | 359/39 | अमरपुरा |
| 19 | श्री अ० सार 5/0 मो० रामजान | 344 | बोलिया |
| 20 | श्रीमति गंधीदेवी W/O नारायण लाल | 190, 193, 229 | रामसिंहपुरा |
| 21 | श्री राम गोपाल 5/0 जीवाराज | 144, 145, 152 149, 174, 175 | हरनारायण बास |
| 22 | " मंगलूदीन, कासम मोहम्मद | 739 | इशादिग बीमद दरगाह के पास |
| 23 | " दुर्जनराम 5/0 अन्दाशम गुर्जन | 381/586 | अमरपुरा |
| 24 | " अमर कुमार 5/0 डिरानाराम | 671 | अमरपुरा |
| 25 | " अंकर लाल | 587 | अमरपुरा |
| 26 | " बन्नीलाल | 670 | अमरपुरा |

| | | | |
|----|----------------------------------|---------------------------|------------------|
| 27 | श्री राम नारायण १/० द्विजानारायण | 585 | अमरपुरा |
| 28 | " भाग्यराम १/० दानगराज | 104 | इंडोलीकोडी गाँवी |
| 29 | " स्वागतरमल १/० राम कुंवार | 486, 497, 498 440, 580 | - |
| 30 | " केशवदास १/० जैलराम | 178 | अमरपुरा |
| 31 | " मोहम्मद मुहम्मद नार | 508 | - |
| 32 | " सखीस | 508 | अमरपुरा |
| 33 | " शिवराम १/० द्विजानारायण | 360 | |
| 34 | " सुभाषिम १/० नारायणराय | 1140/1025 | वाठिया |
| 35 | " बीरराम, पीयाराम शर्मा | 1024/360 | --- |
| 36 | " अमर लाल, हेमाराय | 361 | --- |
| 37 | जीमिरी दिवना १/० युसुफ | 25 | कोलिमा (वाठिया) |
| 38 | श्री नौशाद अली १/० मोहम्मद रमजान | 25 | --- |
| 39 | " मोहम्मद आयुब १/० मोहम्मद रमजान | 25 | --- |
| 40 | " हाथम अली १/० मोहम्मद रमजान | 25 | --- |
| 41 | " मोहम्मद अली १/० मोहम्मद रमजान | 25 | --- |
| 42 | " रमजान १/० अल्लारी | 392 | --- |
| 43 | " पादुम १/० अल्लारी | 392 | --- |
| 44 | " मोहम्मद इस्माइल १/० अल्लारी | 392 | --- |
| 45 | " जाकीर हुसैन खोसरो १/० अल्लारी | 392 | --- |

आज दिनांक 30.12.2019 को समय पर कार्यलय मगर पालिका मे एक बैठक का आयोजन किया गया जिसमे निम्नानुसार सदस्य महानुभाव उपस्थित हुये -

1. श्री बाबू रंग बैंगाना अध्यक्ष
2. " उमोद टसन प्रधान सदस्य
3. " ईरफान सदस्य
4. " अब्दुल नासीर सदस्य
5. " अरुण कुमार मेधावाल सदस्य
6. " राम स्वरुप जांगीड कास्त.सदस्य
7. " नन्द हिरोर होलानी कास्त.सदस्य
8. " गणपतराम मासी कास्त.सदस्य
9. " शिवमाराज धासोड कास्त.सदस्य

बैठक का काम पूर्ण होने पर आज ही बैठक की कार्यवाही प्रारम्भ की गई -

अध्यक्ष महोदय की आला से प्राथमिकी अधिकारी ने सदन से आग्रह किया कि सीवरेज के परेशोचित पानी को चाय / पेड, पौधो के लिए सिंचाई कार्य हेतु कौर्ड बैठक दिनांक 18.12.19 के प्रस्ताव सं. 08 पर विचार करे हेतु -

इस पर उपस्थित सम्स्त सदस्यो ने निम्न बिन्दुओ पर अपनी राय प्रदाप की -


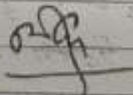
1. ग्रामानी कू कू को पाईप लाईन के लिफ्ट गीड करे हेतु नोटिस दिया जावे, तथा पुराने बाँलष को बदल कर नये बाँलष लगाने हेतु पाबन्द डिपा जावे ।
2. रघुनाथपुरा मे कोरेरान पर 280 फीट की लंबाई लुरल बुसवाने हेतु ।

- लगातार

3. S.T.P से गाडीवासी रोड होते हुए लाउत्र रोड तक 17 किलोमीटर 8 इंच की साईन डलवाई जाये।
4. S.T.P के पीछे 3500 फुट का लॉन्ग बुलवाये हेड।
5. सड़क के दोनो ओर 5 किलोमीटर तक 5 इंच की पाईप साईन डलवाई जाये। खेतों में कनेक्शन हेड सिंचाई हेतु कनेक्शन देने हेतु आयेदु से शर्तबुक्त शपथ-पत्र एवं भूमि संबंधी सम्पूर्ण दस्तावेज देने पर कनेक्शन दिया जाये।
7. S.T.P के पीछे डैम की खुदाई करने पर जो मिट्टी निकलती है उसे वसा स्ट्रेण्ड के पास खड्डे में डलवाई जाये।
8. लाउत्र रोड बाई पास पर नये 10 वूनाराम के खेत में खड्डे भरवाये हेड।
9. पूर्व में जिन डेडेदारो ने पाईप साईन डालने का कार्य किया है, वो शुभवला पूर्ण नहीं है। अतः आगामी कार्य में उक्त डेडेदारो को निविदा में गिस्सा नहीं लेने दिया जाये।

बाद विचार-निर्णय सर्व सम्मति से यह निर्णय लिया गया है कि सदस्य मतनुसारो के सुझावानुसार पाखना एवं कार्यवाही की जाये।

तत्पश्चात अध्यक्ष महोदय द्वारा धन्यवाद ज्ञापित करते हुए सभा समाप्त की गई।

Transcript in English

MOM

Today on date 30.12.2019 a meeting is being held at Nagar Palika office in this meeting following person as are present.

1. Babu Kha Beragi Chairperson
2. Umad Hasan Pathan Member
3. Irfan Member
4. Abdul Naasir Member
5. Shravan Kumar Member
6. Ram swarup Member
7. Nand Kishor Member
8. Ganpat ram Member
9. Likhmaram member

After completion of coram the meeting is being started.

From the permission of chairperson the EO of Nagar Palika request to reuse of treated water from STP in agriculture. On this all members are put the following points.

1. A notice to Bhawani Co. has to be issued to change the valves.
2. 280 ft. pipeline has to be laid up to Raghunathpura.
3. 8 inch pipeline of 17 km has to be laid up to ladhun road from STP for reuse of water.
4. 3500 fitt pipeline has to be laid on back side of STP.
5. A pipeline from STP to 5 km pipeline has to be laid up to 5 inch dia.
6. For the connection application for treated effluent, shall be done only after agreement and completed documents of land.
7. Digged soil from pond used for disposal of water shall be deposit in pits near bus stand.
8. Balance digged soil shall be filled in land of Naresh s/o Luna Ram on ladhun road.

After discussion with all members and decided that the suggestions from all members, follow the compliance and take action accordingly. After that meeting is over with vote of thanks by the Chairperson.


Handwritten notes and stamps at the top of the document. On the left, there is a box with the number '150'. In the center, there is a circular stamp with the text 'INSURANCE' and '02/01/19'. To the right, there are handwritten notes including 'जमान', 'सिवरेज', 'श्री जमान', and '25/1/19'. There is also a signature on the right side.

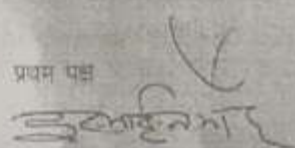
ईकरारनामा/अनुबंध-पत्र:-

ईकरारनामा/अनुबंध-पत्र का लेख्य-पत्र में इस्माइल माहम्मद पुत्र श्री जमानुद्दीन उम्र 78 साल जाति रंगरेज निवासी रघुनाथपुरा तहसील डीडवाना जिला नागीर राजपु वाला इस लेख्य-पत्र में आगे प्रथम पक्ष के नाम से सम्बोधित किया जावेगा ने बहक अधिशाषी अधिकारी, नगरपालिका मण्डल, डीडवाना जिला नागीर राजपु जिन्हें आगे द्वितीय पक्ष के नाम से सम्बोधित किया जावेगा।

द्वितीय पक्ष नगरपालिका द्वारा सिवरेज के एसटीपी प्लांट से निकलने वाले परिसोधित पानी को एसटीपी से रघुनाथपुरा व कोलिया की तरफ पाईप लाईन द्वारा भिजवाये जाने हेतु पाईप लाईन अगली जा रही है, पानी के स्टोरेज के लिए द्वितीय पक्ष नगरपालिका द्वारा मुझ प्रथम पक्ष से इस संबंध में भाई की गई, मुझ प्रथम पक्ष ने इस पानी को स्टोरेज के लिए अपने छेत प्राप्त रघुनाथपुरा में खसतल नम्बर 542, एकड़मा... में से 1/4 बीघा (26 दिन्ना) भूखण्ड में पानी स्टोरेज कराने की सहमति देया है। स्टोरेज करने के लिए खुदाई का काम आगे द्वितीय पक्ष नगरपालिका द्वारा किया जावेगा इस मुझ पाईप लाईन के तहत एक पाईप लाईन नगरपालिका द्वारा की जाती जायेगी। पानी के स्टोरेज के लिए खुदाई करते गये खदद/साकार की देखनाल मुझ प्रथम पक्ष स्वयं की रहेगी। मुझ प्रथम पक्ष द्वारा किसी अन्य को एसटीपी का परिसोधित पानी सफाई किया गया या टैंकर आदि भरवाये जाते पाये गये तो यह एग््रीमेंट निरस्त मानते हुये एग््रीमेंट अवहेलना मानकर नगरपालिका अग्रोन कार्यवाही करम के लिए स्वतन्त्र रहेगी।

अतः ईकरारनामा/अनुबंध पत्र का लेख्य-पत्र मुझ पक्षकारन ने बिना किसी द्रनाय के, पूर्ण होशो-हवास, स्वस्थ चित्त बुद्धि से निष्पादित कर दिया है, जो बकत जरूरत काम आवे सधा प्रमाणित रहे।
इति दिनांक

द्वितीय पक्ष 

प्रथम पक्ष 

साक्षीगण

1

2

Transcript in English

Agreement

In this agreement Ismile Mohammad son of Jamaluddin age 18 yrs from Raghunathpura Tehsil Didwana District- Nagaur Rajasthan is says first party and EO Nagar Palika Didwana is says second party.

Second party EO Nagar Palika has to be laid the pipeline for agriculture use of treated water from STP for the storage of water first party 0.25 bigha land gives to Nagar Palika on his farm located at Raghunathpura. All excavation works has to be done by Nagar Palika and maintenance has been done by first party.

First party can use the water in own land only can't supply by tankers or other without permission of second party.

Second Party

First Party

Appendix 28: WHO Interim Guidance on Water, Sanitation, Hygiene and Waste Management for the COVID-19 virus



Water, sanitation, hygiene, and waste management for the COVID-19 virus

Interim guidance
19 March 2020

Background

This interim guidance supplements the infection prevention and control (IPC) documents by summarizing WHO guidance on water, sanitation and health care waste relevant to viruses, including coronaviruses. It is intended for water and sanitation practitioners and providers and health care providers who want to know more about water, sanitation and hygiene (WASH) risks and practices.

The provision of safe water, sanitation, and hygienic conditions is essential to protecting human health during all infectious disease outbreaks, including the COVID-19 outbreak. Ensuring good and consistently applied WASH and waste management practices in communities, homes, schools, marketplaces, and health care facilities will help prevent human-to-human transmission of the COVID-19 virus.

The most important information concerning WASH and the COVID-19 virus is summarized here.

- Frequent and proper hand hygiene is one of the most important measures that can be used to prevent infection with the COVID-19 virus. WASH practitioners should work to enable more frequent and regular hand hygiene by improving facilities and using proven behavior-change techniques.
- WHO guidance on the safe management of drinking-water and sanitation services applies to the COVID-19 outbreak. Extra measures are not needed. Disinfection will facilitate more rapid die-off of the COVID-19 virus.
- Many co-benefits will be realized by safely managing water and sanitation services and applying good hygiene practices.

Currently, there is no evidence about the survival of the COVID-19 virus in drinking-water or sewage. The morphology and chemical structure of the COVID-19 virus are similar to those of other human coronaviruses for which there are data about both survival in the environment and effective inactivation measures. This document draws upon the evidence base and WHO guidance on how to protect against viruses in sewage and drinking-water. This document will be updated as new information becomes available.

1. COVID-19 transmission

There are two main routes of transmission of the COVID-19 virus: respiratory and contact. Respiratory droplets are generated when an infected person coughs or sneezes. Any person who is in close contact with someone who has respiratory symptoms (sneezing, coughing) is at risk of being exposed to potentially infective respiratory droplets.¹ Droplets may also land on surfaces where the virus could remain viable; thus, the immediate environment of an infected individual can serve as a source of transmission (contact transmission).

Approximately 2–10% of cases of confirmed COVID-19 disease present with diarrhoea,^{2,4} and two studies detected COVID-19 viral RNA fragments in the faecal matter of COVID-19 patients.^{5,6} However, only one study has cultured the COVID-19 virus from a single stool specimen.⁷ There have been no reports of faecal–oral transmission of the COVID-19 virus.

2. Persistence of the COVID-19 virus in drinking-water, faeces and sewage and on surfaces.

Although persistence in drinking-water is possible, there is no evidence from surrogate human coronaviruses that they are present in surface or groundwater sources or transmitted through contaminated drinking water. The COVID-19 virus is an enveloped virus, with a fragile outer membrane. Generally, enveloped viruses are less stable in the environment and are more susceptible to oxidants, such as chlorine. While there is no evidence to date about survival of the COVID-19 virus in water or sewage, the virus is likely to become inactivated significantly faster than non-enveloped human enteric viruses with known waterborne transmission (such as adenoviruses, norovirus, rotavirus and hepatitis A). For example, one study found that a surrogate human coronavirus survived only 2 days in dechlorinated tap water and in hospital wastewater at 20°C.⁸ Other studies concur, noting that the human coronaviruses transmissible gastroenteritis coronavirus and mouse hepatitis virus demonstrated a 99.9% die-off in from 2 days⁹ at 23°C to 2 weeks¹⁰ 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 ≥ 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.¹⁵ 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.¹⁵ 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).²⁵ If there is a high groundwater table or a lack of space to dig pits, excreta should be retained in impermeable storage containers and left for as long as feasible to allow for a reduction in virus levels before moving it off-site for additional treatment or safe disposal, or both. A two-tank system with parallel tanks would help facilitate inactivation by maximizing retention times, as one tank could be used until full, then allowed to sit while the next tank is being filled. Particular care should be taken to avoid splashing and the release of droplets while cleaning or emptying tanks.

3. Toilets and the handling of faeces

It is critical to conduct hand hygiene when there is suspected or direct contact with faeces (if hands are dirty, then soap and water are preferred to the use of an alcohol-based hand rub). If the patient is unable to use a latrine, excreta should be collected in either a diaper or a clean bedpan and immediately and carefully disposed of into a separate toilet or latrine used only by suspected or confirmed cases of COVID-19. In all health care settings, including those with suspected or confirmed COVID-19 cases, faeces must be treated as a biohazard and handled as little as possible. Anyone handling

faeces should follow WHO contact and droplet precautions¹⁸ and use PPE to prevent exposure, including long-sleeved gowns, gloves, boots, masks, and goggles or a face shield. If diapers are used, they should be disposed of as infectious waste as they would be in all situations. Workers should be properly trained in how to put on, use, and remove PPE so that these protective barriers are not breached.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.

All individuals dealing with soiled bedding, towels, and clothes from patients with COVID-19 infection should wear appropriate PPE before touching soiled items, including heavy duty gloves, a mask, eye protection (goggles or a face shield), a long-sleeved gown, an apron if the gown is not fluid resistant, and boots or closed shoes. They should perform hand hygiene after exposure to blood or body fluids and after removing PPE. Soiled linen should be placed in clearly labelled, leak-proof bags or containers, after carefully removing any solid excrement and putting it in a covered bucket to be disposed of in a toilet or latrine. Machine washing with warm water at 60–90°C (140–194°F) with laundry detergent is recommended. The laundry can then be dried according to routine procedures. If machine washing is not possible, linens can be soaked in hot water and soap in a large drum using a stick to stir and being careful to avoid splashing. The drum should then be emptied, and the linens soaked in 0.05% chlorine for approximately 30 minutes. Finally, the laundry should be rinsed with clean water and the linens allowed to dry fully in sunlight.

If excreta are on surfaces (such as linens or the floor), the excreta should be carefully removed with towels and immediately safely disposed of in a toilet or latrine. If the towels are single use, they should be treated as infectious waste; if they are reusable, they should be treated as soiled linens. The area should then be cleaned and disinfected (with, for example, 0.5% free chlorine solution), following published guidance on cleaning and disinfection procedures for spilled body fluids.²⁷

6. Safely disposing of greywater or water from washing PPE, surfaces and floors.

Current WHO recommendations are to clean utility gloves or heavy duty, reusable plastic aprons with soap and water and then decontaminate them with 0.5% sodium hypochlorite solution after each use. Single-use gloves (nitrile or latex) and gowns should be discarded after each use and not reused; hand hygiene should be performed after PPE is removed. If greywater includes disinfectant used in prior cleaning, it does not need to be chlorinated or treated again. However, it is important that such water is disposed of in drains connected to a septic system or sewer or in a soakaway pit. If greywater is disposed of in a soakaway pit, the pit should be fenced off within the health facility grounds to prevent tampering and to avoid possible exposure in the case of overflow.

7. Safe management of health care waste

Best practices for safely managing health care waste should be followed, including assigning responsibility and sufficient human and material resources to dispose of such waste safely. There is no evidence that direct, unprotected human contact during the handling of health care waste has resulted in the transmission of the COVID-19 virus. All health care waste produced during the care of COVID-19 patients should be collected safely in designated containers and bags, treated, and then safely disposed of or treated, or both, preferably on-site. If waste is moved off-site, it is critical to understand where and how it will be treated and destroyed. All who handle health care waste should wear appropriate PPE (boots, apron, long-sleeved gown, thick gloves, mask, and goggles or a face shield) and perform hand hygiene after removing it. For more information refer to the WHO guidance, Safe management of wastes from health-care activities.²⁸

Considerations for WASH practices in homes and communities.

Upholding best WASH practices in the home and community is also important for preventing the spread of COVID-19 and when caring for patients at home. Regular and correct hand hygiene is of particular importance.

1. Hand hygiene

Hand hygiene in non-health care settings is one of the most important measures that can prevent COVID-19 infection. In homes, schools and crowded public spaces – such as markets, places of worship, and train or bus stations – regular handwashing should occur before preparing food, before and after eating, after using the toilet or changing a child's diaper, and after touching animals. Functioning handwashing facilities with water and soap should be available within 5 m of toilets.

2. Treatment and handling requirements for excreta.

Best WASH practices, particularly handwashing with soap and clean water, should be strictly applied and maintained because these provide an important additional barrier to COVID-19 transmission and to the transmission of infectious diseases in general.¹⁷ Consideration should be given to safely managing human excreta throughout the entire sanitation chain, starting with ensuring access to regularly cleaned, accessible, and functioning toilets or latrines and to the safe containment, conveyance, treatment, and eventual disposal of sewage.

When there are suspected or confirmed cases of COVID-19 in the home setting, immediate action must be taken to protect caregivers and other family members from the risk of contact with respiratory secretions and excreta that may contain the COVID-19 virus. Frequently touched surfaces throughout the patient's care area should be cleaned regularly, such as bedside tables, bed frames and other bedroom furniture. Bathrooms should be cleaned and disinfected at least once a day. Regular household soap or detergent should be used for cleaning first and then, after rinsing, regular household disinfectant containing 0.5% sodium hypochlorite (that is, equivalent to 5000 ppm or 1-part household bleach with 5% sodium hypochlorite to 9 parts water) should be applied. PPE should be worn while cleaning, including mask, goggles, a fluid-resistant apron, and gloves,²⁹ and hand hygiene with an alcohol-based hand rub or soap and water should be performed after removing PPE.

References

1. Coronavirus disease (COVID-19) advice for the public. Geneva: World Health Organization; 2020 (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>, accessed 3 March 2020).
2. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395:497–506. doi:10.1016/S0140-6736(20)30183-5.

Water, sanitation, hygiene, and waste management for the COVID-19 virus: interim guidance

3. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*. 2020;395:507–13. doi:10.1016/S0140-6736(20)30211-7.
4. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA*. 2020. Feb 7. doi:10.1001/jama.2020.1585.
5. Xiao E, Tang M, Zheng Y, Li C, He J, Hong H, et al. Evidence for gastrointestinal infection of SARS-CoV-2. medRxiv. doi:10.1101/2020.02.17.20023721.
6. Holshue ML, DeBolt C, Lindquist S, Lofy KH, Wiesman J, Bruce H et al. for the Washington State 2019-nCoV Case Investigation Team. First case of 2019 novel coronavirus in the United States. *N Engl J Med*. 2020. Jan 31. doi:10.1056/NEJMoa2001191.
7. Zhang Y, Chen C, Zhu S et al. [Isolation of 2019-nCoV from a stool specimen of a laboratory-confirmed case of the coronavirus disease 2019 (COVID-19)]. *China CDC Weekly*. 2020;2(8):123-4. (In Chinese.)
8. Wang XW, Li JS, Zhen B, Kong QX, Song N, Xiao WJ et al. Study on the resistance of severe acute respiratory syndrome-associated coronavirus. *J Virol Methods*. 2005;126:171–7. doi:10.1016/j.jviromet.2005.02.005.
9. Gundy P, Gerba CP, Pepper IL. Survival of coronaviruses in water and wastewater. *Food Environ Virol*. 2009;1:10-14. doi:10.1007/s12560-008-9001-6.
10. Casanova L, Rutalal WA, Weber DJ, Sobsey MD. Survival of surrogate coronaviruses in water. *Water Res*. 2009;43(7):1893–8. doi:10.1016/j.watres.2009.02.002.
11. Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *J Hosp Infect*. 2020;104(3):246–51. doi:10.1016/j.jhin.2020.01.022.
12. Guidelines for drinking-water quality, fourth edition, incorporating the first addendum. Geneva: World Health Organization; 2017 (<http://apps.who.int/iris/bitstream/10665/254637/1/9789241549950-eng.pdf>, accessed 3 March 2020).
13. SARS-CoV-2 – water and sanitation. Adelaide: Water Research Australia; 2020 (http://www.waterra.com.au/c9544/media/system/attrib/file/2199/WaterRA_FS_Coronavirus_V10.pdf, accessed 3 March 2020).
14. Essential environmental health standards in health care. Geneva: World Health Organization; 2008 (https://apps.who.int/iris/bitstream/handle/10665/43767/9789241547239_eng.pdf?sequence=1&isAllowed=y, accessed 3 March 2020).
15. My 5 moments for hand hygiene. In: WHO/Infection prevention and control [website]. Geneva: World Health Organization; 2020 (<https://www.who.int/infection-prevention/campaigns/clean-hands/5moments/en/>, accessed 3 March 2020).
16. Siddharta A, Pfaender S, Vielle NJ, Dijkman R, Friesland M, Becker B, et al. Virucidal activity of World Health Organization-recommended formulations against enveloped viruses, including Zika, Ebola, and emerging coronaviruses. *J Infect Dis*. 2017;215(6):902–6. doi:10.1093/infdis/jix046.
17. WHO guidelines on hand hygiene in health care settings. Geneva: World Health Organization; 2009 (https://apps.who.int/iris/bitstream/handle/10665/44102/9789241597906_eng.pdf?sequence=1&isAllowed=y, accessed 3 March 2020).
18. Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected: interim guidance, 25 January 2020. Geneva: World Health Organization ([https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-\(ncov\)-infection-is-suspected-20200125](https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected-20200125), accessed 3 March 2020).
19. Q&A on infection prevention and control for health care workers caring for patients with suspected or confirmed 2019-nCoV. In: WHO/Newsroom [website]. Geneva: World Health Organization; 2020 (<https://www.who.int/news-room/q-a-detail/q-a-on-infection-prevention-and-control-for-health-care-workers-caring-for-patients-with-suspected-or-confirmed-2019-ncov>, accessed 3 March 2020).
20. Health aspects of plumbing. Geneva: World Health Organization; 2006 (<https://apps.who.int/iris/handle/10665/43423>, accessed 3 March 2020).
21. Guidelines on sanitation and health. Geneva: World Health Organization; 2018 (<https://apps.who.int/iris/bitstream/handle/10665/274939/9789241514705-eng.pdf?ua=1>, accessed 3 March 2020).
22. Yu ITS, Li Y, Wong TW, Tam W, Chan A, Lee JHW, et al. Evidence of airborne transmission of the severe acute respiratory syndrome virus. *N Engl J Med*. 2004;350(17):1731–9. doi:10.1056/NEJMoa032867.
23. Regan H. How can the coronavirus spread through bathroom pipes? Experts are investigating in Hong Kong. CNN. 12 February 2020 (<https://edition.cnn.com/2020/02/12/asia/hong-kong-coronavirus-pipes-intl-hnk/index.html>).
24. Sanitation safety planning: manual for safe use and disposal of wastewater, greywater and excreta. Geneva: World Health Organization; 2015 (<https://apps.who.int/iris/handle/10665/171753>, accessed 3 March 2020).
25. How to put on and take off personal protective equipment. Geneva: World Health Organization; 2008 (<https://apps.who.int/iris/handle/10665/70066>, accessed 3 March 2020).
26. Chemical disinfectants: guideline for disinfection and sterilization in healthcare facilities (2008). In: CDC/Infection Control [website]. Atlanta: US Centers for Disease Control and Prevention; 2019. <https://www.cdc.gov/infectioncontrol/guidelines/disinfection/disinfection-methods/chemical.html>, accessed 3 March 2020).

27. Best practices for environmental cleaning in healthcare facilities in resource-limited settings. Atlanta: US Centers for Disease Control and Prevention; 2019 (<https://www.cdc.gov/hai/pdfs/resource-limited/environmental-cleaning-508.pdf>, accessed 3 March 2020).
28. Safe management of wastes from health-care activities: a summary. Geneva: World Health Organization; 2017 (<https://apps.who.int/iris/handle/10665/259491>, accessed 3 March 2020).
29. Home care for patients with suspected novel coronavirus (COVID-19) infection presenting with mild symptoms, and management of their contacts: interim guidance, 4 February 2020. ([https://www.who.int/publications-detail/home-care-for-patients-with-suspected-novel-coronavirus-\(ncov\)-infection-presenting-with-mild-symptoms-and-management-of-contacts](https://www.who.int/publications-detail/home-care-for-patients-with-suspected-novel-coronavirus-(ncov)-infection-presenting-with-mild-symptoms-and-management-of-contacts), accessed 3 March 2020).

US Centers for Disease Control and Prevention, United States of America; David Berendes, US Centers for Disease Control and Prevention, United States of America; Lisa Casanova, Georgia State University, United States of America; David Cunliffe, SA Health, Australia; Rick Gelting, US Centers for Disease Control and Prevention, United States of America; Dr Thomas Handzel, US Centers for Disease Control and Prevention, United States of America; Paul Hunter, University of East Anglia, United Kingdom; Ana Maria de Roda Husman, National Institute for Public Health and the Environment, the Netherlands; Peter Maes, Médecins Sans Frontières, Belgium; Molly Patrick, US Centers for Disease Control and Prevention, United States of America; Mark Sobsey, University of North Carolina-Chapel Hill, United States of America.

WHO continues to monitor the situation closely for any changes that may affect this interim guidance. Should any factors change, WHO will issue a further update. Otherwise, this interim guidance document will expire 2 years after the date of publication.

Contributors

This interim guidance was written by staff from WHO and UNICEF. In addition, a number of experts and WASH practitioners contributed. They include Matt Arduino,

© World Health Organization 2020. Some rights reserved. This work is available under the [CC BY-NC-SA 3.0 IGO](https://creativecommons.org/licenses/by-nc-sa/3.0/) licence.

WHO reference number: WHO/2019-nCoV/IPC_WASH/2020.2