Initial Environmental Examination

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IND: Visakhapatnam-Chennai Industrial Corridor Develoment Program (VCICDP)

24x7 Water Supply in North West area of Visakhapatnam

Prepared by Greater Visakhapatnam Municipal Corporation,
Government of Andhra Pradesh for the Asian Development Bank

CURRENCY EQUIVALENTS

(as of 08 March 2016)

Currency unit	–	Indian rupee (Rs)
Rs1.00	=	$0.0149
$1.00	=	INR66.9940

ABBREVIATIONS

ADB	-	Asian Development Bank
APPCB	-	Andhra Pradesh Pollution Control Board
BGL	-	Below Ground Level
BOD	-	Biological Oxygen Demand
BIS	-	Bureau of Indian Standard
CPCB	-	Central Pollution Control Board
DO	-	Dissolved Oxygen
DoE	-	Department of Environment
PMSC	-	Project Management and Supervision Consultant
EA	-	executing agency
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
EMoP	-	Environmental Monitoring Plan
ESO	-	Environmental and Safety Officer
GoAP	-	Government of Andhra Pradesh
GoI	-	Government of India
IEE	-	initial environmental examination
IMD	-	Indian Meteorological Department
IS	-	Indian Standard
MFF	-	Multi Tranche Financial Facility
MoEF	-	Ministry of Environment and Forests
MSL	-	Mean Sea Level
MW	-	Mega Watt
NSDP	-	Net State Domestic Product
NGO	-	nongovernment organization
NH	-	National Highway
NOx	-	Oxides of Nitrogen
PIU	-	Project Implementation Unit
PWD	-	Public Works Department
RF	-	Reserve Forest
ROW	-	Right of Way
	-	Greater Vizag Municipal Corporation
SH	-	State Highway
SPCB	-	State Pollution Control Board
SPM	-	Suspended Particulate Matter
SO_2	-	Sulphur Dioxide
SSI	-	Small Scale Industries
SPCB	-	State Pollution Control Board
TA	-	technical assistance
TDS	-	Total Dissolved Solids
TSS	-	Total Suspended Solid

NOTES

(i) In this report, "$" refers to US dollars.
(ii) “INR” and “Rs” refer to Indian rupees

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EXECUTIVE SUMMARY

1. The Visakhapatnam-Chennai Industrial Corridor Development Program (VCICDP) is proposed to support the Government of Andhra Pradesh (GoAP) for infrastructure development, and policy and institutional reforms to stimulate economic growth and employment generation.

2. VCICDP will help boost manufacturing sector growth along the Visakhapatnam-Chennai Industrial Corridor (VCIC), which runs over 800 km from north to south covering almost the entire coastline of the state of Andhra Pradesh covering a population of 49.4 million and an area of 160,205 km^2. The VCIC is part of the East Coast Economic Corridor, which is India's first coastal economic corridor, and is poised to play a critical role in driving India's new "Act East Policy" and "Make in India" initiatives. The "Act East Policy" is a proactive initiative focused on, among others, increasing the integration of the Indian economy with the dynamic global production networks of the Association of Southeast Asian Nations.

3. VCICDP will complement the ongoing efforts of the Government of Andhra Pradesh (GoAP) to enhance manufacturing sector growth and create high quality jobs in the state of Andhra Pradesh.

4. The 24/7 Water Supply Subproject under the Visakhapatnam Chennai Industrial Corridor Development Program (VCICDP) aims to improve the level, quality and sustainability of water supply services for the city of Visakhapatnam contributing to improved quality of life among the urban poor. The subproject will be implemented over a period of two years beginning in 2016, and will be funded by a loan via the Multi tranche Financing Facility (MFF) of the Asian Development Bank (ADB).

5. Greater Visakhapatnam Municipal Corporation () is a Local Body under the Ministry of Administration and Urban Development (MA&UD), Government of Andhra Pradesh (GoAP) with the responsibility of providing basic civic services like roads, water supply & sewerage, health & sanitation and storm water disposal for the Visakhapatnam city. This is the biggest city in the state of Andhra Pradesh and has jurisdiction over an area of 534 square kilometers (sq. km).. with a population[1] of 17,30,320. Central area of Visakhapatnam is further divided into 3 sectors namely NE, NW and SW blocks. WSS improvement schemes for NE and SW sectors were already sanctioned under JNNURM and NW was not sanctioned previously. The subproject will have 24x7 water supply for the NW area of GVMC.

6. At present 12 reservoirs with a storage capacity of 14,702 kilo liters (KL) against a required capacity of 27,720 KL in NW sector. Hence 12 additional reservoirs with a total storage volume of 13,900 KL are proposed to bring the total storage to 1/3 of intermediate demand. The subproject has been formulated to serve NW areas of the Central town area drawing water from existing Narwa Water Treatment Plant (WTP).

7. 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. This Initial Environmental Examination (IEE)

[1] The Population figures are as per Census 2011

addresses components proposed under Project 1 which includes urban infrastructure development component.

8. This IEE has been prepared for the proposed water supply subproject which includes (i) replacement of existing PSC pipe line with 1100mm dia DI K9 pipe for a length of 7,509.00m from Narva WTP to Rama Krishnapuram; (ii) laying of 150mm to 1000mm dia DI feeder mains in NW Sector; (iii) providing 3,200m 800mm dia DI K9 pumping main, pump sets, pump house, gensets and transformer, etc.; (iv) laying of 100mm dia to 500mm dia DI K7 Distribution lines for a length of 304,875m; (v) reservoirs; (vi) fixing of high-precise and tamper-proof water meters for measurement of water consumed by residents including house service connections; (vii) fixing of bulk flow meters at all existing and proposed reservoirs; and (viii) fixing of pressure reducing valve (PRVs) in DMA zones. Construction work is likely to commence in 2016 and will be completed in 18 months for the total water supply subproject. However individual components will be taken phase-wise in an average of 24 months construction period.

9. This IEE aims to (i) provide critical facts, significant finding, and recommended actions; (ii) present the national and local legal and institutional framework within which the environmental assessment has been carried out; (iii) provide information on existing geographic, ecological, social and temporal context including associated facilities within the subproject's area of influence; (iv) assess the subproject's likely positive and negative direct and indirect impacts to physical, biological, socioeconomic, and physical cultural resources in the subproject's area of influence; (v) identify mitigation measures and any residual negative impacts that cannot be mitigated; (vi) describe the process undertaken during project design to engage stakeholders and the planned information disclosure measures and the process for carrying out consultation with affected people and facilitating their participation during project implementation; (vii) describe the subproject's grievance redress mechanism for resolving complaints about environmental performance; (viii) present the set of mitigation measures to be undertaken to avoid, reduce, mitigate, or compensate for adverse environmental impacts; (ix) to describe the monitoring measures and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures; and (x) identify who is responsible for carrying out the mitigation and monitoring measures.

10. Potential negative impacts were identified in relation to pre-, construction and operation of the improved infrastructure, but no permanent environmental impacts were identified as being due to either the subproject design or location. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. These were discussed with specialists responsible for the engineering aspects, and as a result some measures have already been included in the designs for the infrastructure. This means that the number of impacts and their significance have already been reduced by amending the design.

11. The public participation processes to be undertaken during project detailed design will ensure stakeholders are engaged during the preparation/finalization of the IEE. The planned information disclosure measures and process for carrying out consultation with affected people will facilitate their participation during project implementation.

12. The subproject's Grievance Redress Mechanism will provide the citizens with a platform for redress of their grievances and describes the informal and formal channels, time frame and mechanisms for resolving complaints about environmental performance.

13. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between PMU, PMSC and the contractors. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (i) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (ii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iii) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (iv) ensure that safety recommendations are complied with.

14. The contractor will be required to submit to , for review and approval, 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 of the EMP to ensure no significant environmental impacts; (iii) monitoring program as per SEP; and (iv) budget for SEP implementation. No works are allowed to commence prior to approval of SEP.

15. A copy of the EMP/approved SEP will be kept on site during the construction period at all times. The EMP has been made binding on all contractors operating on the site and included in the bid and contract documents. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

16. The subproject is unlikely to cause significant adverse impacts because: (i) most of the individual components involve straightforward construction and operation, so impacts will be mainly localized; (ii) in most cases the predicted impacts are localized and likely to be associated with the construction process at isolated locations and are produced because the process is invasive, involving excavation, obstruction at specific construction locations, and earth movements; and (iii) being located mainly along roads and built-up area will not cause direct impact on terrestrial biodiversity values. The potential adverse 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.

17. Therefore, as per ADB SPS, the subproject is classified as environmental Category B and does not require further Environmental Impact Assessment.

I. INTRODUCTION

A. Background

1. The 24/7 Water Supply Subproject under the Visakhapatnam Chennai Industrial Corridor Development Program (VCICDP) aims to improve the level, quality and sustainability of water supply services for the city of Visakhapatnam contributing to improved quality of life among the urban poor. The subproject will be implemented over a period of two years beginning in 2016, and will be funded by a loan via the Multi tranche Financing Facility (MFF) of the Asian Development Bank (ADB).

B. Background of IEE

2. 24x7 water supply project is one of the projects proposed in Project 1. Water supply is currently intermittent, unreliable and suffers with huge losses and quality issues. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for environmental assessment are described in ADB's Safeguards Policy Statement (2009). This Initial Environmental Examination (IEE) has been prepared and assesses the environmental impacts and provides mitigation and monitoring measures to ensure no significant impacts as a result of the project.

C. Purpose of the IEE

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. This Initial Environmental Examination (IEE) has been prepared for the proposed water supply subproject which includes (i) replacement of existing PSC pipe line with 1100mm dia DI K9 pipe for a length of 7,509.00m from Narva WTP to Rama Krishnapuram; (ii) laying of 150mm to 1000mm dia DI feeder mains in NW Sector; (iii) providing 3,200m 800mm dia DI K9 pumping main, pump sets, pump house, gensets and transformer, etc.; (iv) laying of 100mm dia to 500mm dia DI K7 Distribution lines for a length of 304,875m; (v) reservoirs; (vi) fixing of high-precise and tamper-proof water meters for measurement of water consumed by residents including house service connections; (vii) fixing of bulk flow meters at all existing and proposed reservoirs; and (viii) fixing of pressure reducing valve (PRVs) in DMA zones.

4. This IEE aims to (i) provide critical facts, significant finding, and recommended actions; (ii) present the national and local legal and institutional framework within which the environmental assessment has been carried out; (iii) provide information on existing geographic, ecological, social and temporal context including associated facilities within the subproject's area of influence; (iv) assess the subproject's likely positive and negative direct and indirect impacts to physical, biological, socioeconomic, and physical cultural resources in the subproject's area of influence; (v) identify mitigation measures and any residual negative impacts that cannot be mitigated; (vi) describe the process undertaken during project design to engage stakeholders and the planned information disclosure measures and the process for carrying out consultation with affected people and facilitating their participation during project implementation; (vii) describe the subproject's grievance redress mechanism for resolving complaints about environmental performance; (viii) present the set of mitigation measures to be undertaken to avoid, reduce, mitigate, or compensate for adverse environmental impacts; (ix) to describe the monitoring measures and reporting procedures to ensure early detection of

conditions that necessitate particular mitigation measures; and (x) identify who is responsible for carrying out the mitigation and monitoring measures.

D. Extent of the IEE Study

5. This IEE report has been prepared on the basis of pre-feasibility study and preliminary DPR, field investigations and surveys, stakeholder consultations and meetings to meet the requirements for environmental assessment process and documentation as per ADB's Safeguard Policy Statement (SPS, 2009). The extent of the IEE was decided considering all likely impacts and risks analyzed in the context of the project's area of influence encompassing: (i) the primary project site(s) and related facilities like site clearance, utility shifting etc. (ii) associated facilities project viz. borrowing, quarrying, disposal of debris, construction camp etc. (iii) areas and communities potentially affected by cumulative impacts, and (iv) potential impact from unplanned but predictable developments caused by the project that may occur at later stage or at a different location.

E. IEE Methodology

6. IEE commenced with an initial pre-feasibility site visit and review of the technical details provided by the GVMC and DPR team and preceding environmental assessment reports conducted for the project road. This was followed by a reconnaissance site visit and discussion with the implementing agency to reconfirm the technical details of the project road improvement work. This helped identify environmental attributes which may get altered due to the project and incorporate additional information to the baseline environmental scenario/environmental setting of the project to meet the ADB Safeguard requirements. Further steps followed for IEE has been concisely described in following paragraphs.

1. Primary Data Collection

7. Inventory of all environmental features viz. terrain, geologically unstable areas, waterways/water bodies, road side vegetation, sensitive receptors, common property resources, utilities, flooding/water logging, and industries was conducted along the project road within the area of interest/core zone. Since the proposed road is widening of an existing road and does not impact forest area outside the right of way, no bio-diversity study was undertaken. The data collection from the field was completed with the help of trained enumerators / investigators.

2. Secondary Data Collection

8. Published reports, government websites, recognized institutions and relevant government departments were consulted to gather information and maps of the project influence area. For information on ambient air quality, soil quality, background noise level, surface and groundwater quality, environmental assessment done by DPR Consultants was referred.

3. Public Consultation

9. Besides consultations with the government agencies, consultations with local people/beneficiary population were held at all major habitations to collect baseline information to better understand of potential impacts and appreciate the perspectives/concerns of the

stakeholders. Information gathered were integrated in project design and formulating of the EMP.

4. Other Tools

10. Remote sensing and GIS based land use map of the study area has been reviewed through recent satellite imagery and verified on the ground.

5. Assessment of Potential Impacts

11. Potential significant impacts were identified on the basis of: analytical review of baseline data; review of environmental conditions at site; analytical review of the underlying socio-economic conditions with the project influence area.

6. Preparation of the Environment Management Plan

12. An EMP for the project was prepared to specify the steps required to ensure that the necessary measures will be taken. The EMP includes the monitoring plan giving details of the resources budgeted and the implementation arrangements.

F. Structure of the report

13. The IEE has been structured as recommended in SPS, 2009. An introduction section has been included to have a general overview of the project. Executive Summary describing critical facts, significant findings, and recommended actions has been presented in the beginning of the report. The report has been compiled and presented as follows.

(i) Executive Summary
(ii) Chapter 1- Introduction
(iii) Chapter 2- Policy, Legal and Administrative Framework
(iv) Chapter 3- Description of Project
(v) Chapter 4- Description of the Environment
(vi) Chapter 5- Anticipated Impacts and Mitigation Measures
(vii) Chapter 6- Information Disclosure, Consultation, and Participation
(viii) Chapter 7- EMP and Grievance Redress Mechanism
(ix) Chapter 8 - Conclusion and Recommendation.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. Environmental Legislation (National and State Laws)

14. Implementation of VCICDP will be governed by environmental acts, rules, policies, and regulations of the Government of India. These regulations impose restrictions on the activities to minimize/mitigate likely impacts on the environment. Many of these are cross sector and several of them are directly related to environmental issues. The most important of these is the “Environmental Impact Assessment (EIA) Notification, 2006”.

15. The EIA Notification, 2006, sets out the requirement for environmental assessment in India. This states that prior environmental clearance (EC) is mandatory for the development activities listed in its schedule, and 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.

(i) Category A projects require EC from MoEF. The proponent is required to provide preliminary details of the project in the prescribed form, after which an Expert Appraisal Committee (EAC) of the MoEF prepares comprehensive terms of reference (ToR) for the EIA study within 60 days. On completion of the study and review of the report by the EAC, MoEF considers the recommendation of the EAC and provides the EC if appropriate.

(ii) Category B projects require EC from the State Environment Impact Assessment Authority (SEIAA). The State-level EAC categorizes the project as either B1 (requiring EIA study) or B2 (no EIA study), and prepares ToR for B1 projects within 60 days. On completion of the study and review of the report by the EAC, the SEIAA issues the EC based on the EAC recommendation. The Notification also provides that any project or activity classified as category B will be treated as category A if it is located in whole or in part within 10 km from the boundary of protected areas, notified areas or inter-state or international boundaries.

16. Relevant to VCICDP, common effluent treatment plant (CETP) development (new or modification) will attract EIA Notification, 2006 and has been classified as Category B. None of the transport, power, urban/industrial water supply and sewerage infrastructure proposed under VCICDP attracts EIA Notification Schedule, and therefore EC is not required.

17. In addition to the EIA Notification, 2006, there are a number of other acts, rules and regulations currently in force that could apply to the subproject under the VCICDP. Salient features and applicability of these legislations are provided in Table 1. This presents specific requirements for the project. Annex 2 provides the environmental standards for air, surface water, groundwater, emissions, noise, vehicular exhaust and disposal to land/agricultural use of sludge and bio-solids.[1]

Table 1: Applicable Government of India Environmental Legislations and Specific Requirements

No.	Legislation	Requirements for the Project	Applicability
1	National Environment Policy (NEP), 2006	Project should adhere to the NEP principle of: enhancing and conservation of environmental resources and abatement of pollution	The policy governing the environmental rules and legislations and is applicable to all the subprojects.
2	EIA Notification, 2006	Environmental Clearance (EC)	The proposed component of the water supply distribution network is not anticipated to

[1] During the design, construction, and operation of the project the PMU and PIUs will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines. 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.

No.	Legislation	Requirements for the Project	Applicability
			require Environmental Clearance.
3	Water (Prevention and Control of Pollution) Act, 1974 amended 1988 and its Rules, 1975	• Consent for establishment (CFE) and consent for operation (CFO) from APPCB • Compliance to conditions and disposal standards stipulated in the CFE and CFO	Applicable to construction activities of the subproject.
4	Air (Prevention and Control of Pollution) Act, 1981, amended 1987 and its Rules 1982	• CFE and CFO from APPCB as applicable • Compliance to conditions and emissions standards stipulated in the CFE and CFO.	Applicable to construction activities of the subproject. For the subproject, the following will require CFE and CFO: (i) diesel generators; (ii) and (iii) vehicles emitting air pollutants.
5	Environmental (Protection) Act, 1986 amended 1991 and the following rules/notifications: • Environment (Protection) Rules, 1986 including amendments • Municipal Solid Wastes (Management and Handling) Rules, 2000 • Noise Pollution (Regulation and Control) Rules, 2000 • Environmental Standards of Central Pollution Control Board (CPCB) • Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2009	• Solid waste and sludge generated at proposed facilities shall be disposed in accordance with the MSWM Rules. • Compliance with noise standards • Compliance to environmental standards (discharge of effluents) • Restriction of activities (including construction, tree cutting, etc.) in the notified zones. There are no eco sensitive zones in or near the subproject locations • Rules defines and classifies hazardous waste provides procedures for handling hazardous waste • Requires Pollution Control Board's consent for handling hazardous waste • Procedure for storage of Hazardous waste and provides procedures for recycling, reprocessing or reuse, important and export of hazardous waste.	Applicable to construction activities of the subproject.
6	Contract Labour (Regulation and Abolition) Act, 1970; • The Inter-State Migrant Workmen (Regulation of	• Department of Labour, GoAP as principle employer • Contractor shall register with Labour Department,	• Applicable to all construction/civil works. • GVMC to obtain Certificate of Registration.

No.	Legislation	Requirements for the Project	Applicability
	Employment and • Conditions of Service) Act, 1979	GoAP if inter-state migrant workmen are engaged • Adequate and appropriate amenities and facilities shall be provided to workers including housing, medical aid, traveling expenses from home and back, etc.,	• Contractors to obtain license from designated labour officer
7	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996	• Cess should be paid at rate not exceeding 2% of the cost of construction as may be notified • The employer is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for workers near the workplace etc. • The employer has to obtain a registration certificate from the Registering Officer	Applicable to any building or other construction work and employ 10 or more workers
8	The Child Labour (Prohibition and Regulation) Act, 1986	• No child below 14 years of age will be employed or permitted to work in all the subprojects.	No child below 14 years of age will be employed or permitted to work in all the subprojects.
9	Minimum Wages Act, 1948	• All construction workers should be paid not less than the prescribed minimum wage	Applicable to construction activities of the subproject.
10	Workmen Compensation Act, 1923	• Compensation for workers in case of injury by accident	Applicable to construction activities of the subproject.
11	Equal Remuneration Act, 1979	• Equal wages for work of equal nature to male and female workers	Applicable to construction activities of the subproject.
15	AP State Environment Policy	• Follows the National Environment Policy, 2006 • Project implementation should adhere to the policy aims	Applicable to construction activities of the subproject.
16	The Motor Vehicles Act, 1988	• Standards for vehicular pollution and prevention control. The authority also checks emission standards of registered vehicles, collects road taxes, and issues licenses. • In August 1997, the	Applicable to construction activities of the subproject.

No.	Legislation	Requirements for the Project	Applicability
		Pollution under Control Certificate (PUC) program was launched in an attempt to crackdown on the vehicular emissions in the States. • All the vehicles that will be used in construction of the subprojects will have to comply with the PUC norms set down under this act.	
17	Public Liability and Insurance Act 1991	Protection from hazardous materials and accident.	Applicable to construction activities of the subproject.
18	National Environment Appellate Authority Act (NEAA) 1997	Grievances process and how they will be dealt with.	Applicable to construction activities of the subproject.
19	Explosive Act 1984 - For transporting and storing diesel, bitumen etc.	Safe transportation, storage and use of explosive material.	Applicable to construction activities of the subproject.
20	Permission for use of water for construction purpose from irrigation department	Use of surface water for construction	Applicable to construction activities of the subproject. To be obtained prior to initiation of any work involving use of surface water for construction

18. **Government Regulatory Body.** The Andhra Pradesh Pollution Control Board (APPCB) is the main state-level regulatory agency that is responsible environment protection and pollution control. APPCB through its 19 Regional Offices (RO) across the state regulates environmental protection related activities. Subproject towns across the Visakhapatnam Chennai Industrial Corridor are under the jurisdiction of different Regional Officer's and they will monitor the Subprojects operation and compliance with the standards.

19. APPCB monitors the environmental parameters to check whether or not it meets the standards stipulated in its consent order. Surveillance monitoring by APPCB staff, at least once a year, by visiting the project sites and collecting the sample and testing at APPCB laboratory, and specific monitoring in case of public complaints.

7. International Environmental Agreements

20. India is a party to the following international convention that may apply to this subproject, especially in selection and screening of subprojects under restricted/sensitive areas.

Table 2: International Agreements and Applicability to GVMC subproject under VCICDP

No.	Agreement	Requirements for the Project
1	Ramsar Convention on Wetlands of International Importance, 1971. The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. According to the Ramsar list of Wetlands of International Importance, there are 25 designated wetlands in India which are required to be protected.	There is one Ramsar Site[2] in Andhra Pradesh however it is not located within or adjacent to the subproject site.
2	Convention on the Transboundary Movements of Hazardous Wastes and Their Disposal, 1989 To protect human health and the environment against the adverse effects of hazardous wastes. This aims at (i) reduction of hazardous waste generation, promotion of environmentally sound management (ii) restriction of transboundary movements, and (iii) a regulatory system for transboundary movements.	Wastes generated from the construction sites may fall in hazardous waste category. The waste will be managed in accordance with the country laws and will be disposed within the country, and therefore will not attract this convention.
3	Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris 1972)	This Convention defines and provides for the conservation of the world`s heritage by listing the natural and cultural sites whose value should be preserved. Not applicable for subproject.
4	Convention on Biological Diversity (1992)	This provides for a framework for biodiversity and requires signatories to develop a National Biodiversity Strategy and Action Plan. Not applicable for this subproject.
5	United Nations Framework Convention on Climate Change (UNFCCC), 1993	The UNFCC is an international environmental treaty with the main objective to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system. India signed the UNFCC on 10 June 1992 and ratified it on 1 November 1993. The project will ensure that all construction activities will not significantly increase the GHG emissions and ensure that design of all infrastructure are resilient climate change impacts

[2] Kolleru Lake

B. ADB Policy

21. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, and loans involving financial intermediaries, and private sector loans.

22. **Screening and Categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature and magnitude of its potential impacts, and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impact and are assigned to one of the following four categories:

(i) **Category A.** Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.

(ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

(iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.

(iv) **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all Projects will result in insignificant impacts.

23. ADB Rapid Environmental Assessment (REA) Checklist for Water Supply (Appendix 7) has been used for the screening and categorization. Result of the screening shows the potential impacts are site-specific, short duration, not significant and few if any of them are irreversible. Thus this subproject is classified as Category B as per ADB SPS. This IEE has been prepared and covers the general environmental profile of the sub project area, an assessment of the potential environmental impacts on physical, ecological, economic, and social and cultural resources within the project's influence area during design and/or pre-construction, construction, and operation stages. An environmental management plan and an environmental monitoring plan are integral part of the IEE. The IEE followed a number of steps:

(i) Conduct field visits to collect primary or secondary data relevant to the project area to establish the baseline environmental condition;

(ii) Assess the potential impacts on environmental attributes due to the location, design, construction and operation of the subproject through field investigations and data analysis;

(iii) Explore opportunities for environmental enhancement and identify measures;

(iv) Prepare an environment management plan (EMP) outlining the measures for mitigating the impacts identified including the institutional arrangements;

(v) Identify critical environmental parameters required to be monitored subsequent to the implementation of the subproject and prepare an environmental monitoring plan;

(vi) Compare the environmental safeguard requirements of Government of India, Government of Andhra Pradesh and ADB, and identify measures to bridge the gap, if any;
(vii) Carry out consultation with affected stakeholders, local administrative bodies to identify perception of the Project, introduce project components and anticipated impacts; and
(viii) Disclose the draft IEE at ADB website and prepare project brief and/or FAQs in local language to be made publicly available at the offices of APRDC.

24. A number of field visits were done during the project preparatory phase from March – August 2015. Field visits were done to conduct ocular inspection and to assess the existing condition of the physical and biological environment of selected subproject sites, consult with local people that may be potentially affected by the subprojects, coordinate with APRDC, executing agency and local authorities, and to conduct secondary data collection. .

25. **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.

26. **Public disclosure.** ADB will post this IEE, or any update and environmental monitoring reports submitted by the Project Management Unit (PMU) during project implementation upon receipt on its website as well as disclose relevant information in accessible manner in local communities.

III. DESCRIPTION OF THE PROJECT COMPONENTS

A. Present Situation

27. IN NW Sector Presently 265 kms is covered by Distribution network and another 43 Kms is uncovered by distribution network. All distribution network is of AC pipes, HDPE pipes and small quantity of CI pipes which needs immediate replacement. The details of distribution network existing in NW and SW sectors are as follows:

Table 3: Details of the Existing Distribution Network NW Sector[3]

S. No.	Block No.	Type of Pipe						Length(m) of pipe retained
		AC	HDPE	PVC	CI	DI	Total	
1	1	Yes	Yes	No	No	No	6,458	0
2	2	Yes	Yes	No	Yes	No	17,359	0
3	3	Yes	Yes	No	No	No	16,714	1,976
4	4	Yes	Yes	No	Yes	No	10,253	0
5	5	Yes	Yes	No	No	No	9,654	0
6	6	Yes	Yes	No	No	No	33,721	3,755
7	7	Yes	Yes	No	Yes	No	14,431	0
8	8	Yes	Yes	No	No	No	24,718	0
9	9	Yes	Yes	No	Yes	No	17,118	2,049

[3] DPR on "Water Supply Distribution through SCADA including Implementation of 24x7 water supply project in NW sector of GVMC under JnNURM"

S. No.	Block No.	Type of Pipe						Length(m) of pipe retained
		AC	HDPE	PVC	CI	DI	Total	
10	10	Yes	Yes	No	No	No	30,692	4,319
11	11	Yes	Yes	No	No	No	9,244	914
12	12	Yes	Yes	No	No	No	29,271	2,407
13	13	Yes	Yes	No	No	No	13,578	2,100
14	14	Yes	Yes	No	Yes	No	6,823	1,635
15	15	Yes	Yes	No	No	No	11,101	1,149
16	16	Yes	Yes	No	No	No	13,817	2,452
	Total						264,952	22,756

28. As per the population statistics, at present the Central area of is having a population of 8.62 lakhs in which most of the population is solely dependent on the municipal water supply. Water by tanks is also being supplied to the areas where service connections do not exist. Average per capita supply is 50 to 70% of norms varying largely from 70 to 100 liters per capita per day (lpcd) at present.

29. Central area of is spread over an area of 115 Sq.Km with a population density of 7495 persons/sq km. Present population is estimated as 8.62 lakhs in 2014, prospective population by 2023 is13.73 lakhs and ultimate population by 2038 is 17.57 lakhs. The Central town area of have been divided into 3 sectors namely SW Sector, NW Sector and NE Sector for efficient management of water supply system.NE and SW sector of Central area has already approved under JNNURM and present proposal is to implement 24x7water supply in left out areas i.e. NW in central area.

30. Water supply requirement at 150 lpcd + 15% unaccounted for water (UFW) + fire demand is 153.32 million liters per day (MLD) for present, 240.54 MLD for intermediate year (2029) 307.27 MLD for ultimate year (2044). The availability of water from various sources/reservoirs and the demand for and 32 peripheral areas for different design years and shortfall are furnished in the following table:

Table 4: Water Source and Availability in GVMC Area

Sl. No	**Name of Source**	**Availability of Water**	**Total Demand for including Bulk**			**Total Demand for Central area**			**Drawl from various Sources to Project area**
			2014	**2029**	**2044**	**2014**	**2029**	**2044**	
		MLD	MLD	MLD	MLD	MLD	MLD	MLD	MLD
1	YLMC	386.4	458	635	887	197	273	363	214.49
2	Thatipudi	45.46							26.05
3	MGR	41.00							41.00
4	Gosthani	16.37							16.37
5	Raiwada	68.19							65.00
6	Mudasarlova	1.82							1.82
7	Gambheeram gadda	8.18							8.18
8	Infiltration wells at MGR	4.55							4.55

Sl. No	Name of Source	Availability of Water	Total Demand for including Bulk			Total Demand for Central area			Drawl from
9	Filtration plant through KBR source	9.09							9.09
	Total	**581.07**							**386.55**

Figure 1: Water Sources Map for GVMC Area

31. It has been observed that there is a net short fall of 122 MLD in 2044 AD. In order to meet the short fall, it is proposed to draw the balance demand from the Polavaram Canal which is under execution and expected to be completed within 5 Years. Resolution of Water for allocated Quantity of 24 TMC (1855 MLD) from Polavaram Project Left Main Canal both for

domestic water supply and industries of Visakhapatnam has already been obtained vide GO MS No.96, I & CAD Govt of AP dated 10-9-2004.

32. In earlier approved projects on source augmentation, WTP capacities are fully augmented to meet 2023 demand. Projects has already sanctioned earlier for old city, 32 peripherals, Gajuwaka area and NE block of central area including refurbishment of distribution network.

33. No projects for distribution network augmentation are approved earlier under JnNURM for SW and NW blocks of Central area in. Present proposal is aimed to supply water to NW blocks of Central area of for 24X7. Proposal has been formulated to serve NW areas Central town area duly drawing water from existing Narwa WTP. It has been proposed to draw water from balancing reservoir located at Padmanabhapuram.

34. For the present project area i.e for NW of population and water supply requirements are as follows.

S. No	Description	Project Area		
		NW Sector		
		2014	2029	2044
1	Population	391300	542500	924200
2	Demand in MLD	67.50	93.58	159.42

Table 5: NW Sector Block wise population

Block No.	2014	2029	2044
1	17176	23814	40183
2	23107	32038	54054
3	20910	28992	48918
4	10082	13978	23585
5	7259	10062	16977
6	34209	47385	80026
7	15658	21710	36631
8	39937	55370	93424
9	16345	22742	38385
10	29639	41275	78026
11	39351	54334	92057
12	24741	34302	57877
13	34777	48210	81343
14	33453	46380	78258
15	16588	22995	38799
16	28068	38913	65657
Total	**391300**	**542500**	**924200**

35. Details of water supply with different sources in the NW sector are provided in the DPR report[4] prepared by for the project.

[4] Detailed Project Report (DPR) on “Water Supply Distribution through SCADA including Implementation of 24x7 water supply project in NW sector of GVMC under JnNURM”

B. Water Supply Improvements under Implementation

36. The Distribution system for the entire town had been designed and after completion of this subproject an average of 100 lpcd will be supplied to the public.

37. The entire designed network could not be taken up due to the paucity of funds in JNNRUM. However, the core areas and the area where the rapid development has been taken place are included in the prioritized estimate under VCICDP Project 1.

C. Proposed 24X7 Water Supply System

38. The subproject includes (i) replacement of existing PSC pipe line with 1100mm dia DI K9 pipe for a length of 7,509.00m from Narva WTP to Rama Krishnapuram; (ii) laying of 150mm to 1000mm dia DI feeder mains in NW Sector; (iii) providing 3,200m 800mm dia DI K9 pumping main, pump sets, pump house, gensets and transformer, etc.; (iv) laying of 100mm dia to 500mm dia DI K7 Distribution lines for a length of 304,875m; (v) reservoirs; (vi) fixing of high-precise and tamper-proof water meters for measurement of water consumed by residents including house service connections; (vii) fixing of bulk flow meters at all existing and proposed reservoirs; and (viii) fixing of pressure reducing valve (PRVs) in DMA zones. Table 6 provides the details of the subproject components involving civil works.

Table 6: Proposed Subproject Components involving Civil Works

S. No.	Component	Capacity	Dia (mm)	Length (km)/ No.
I.	**Elevated Service Reservoirs**			
1	Near Mother Teresa Hospital, Butchurajapalyam Road (Near APSEB Colony)	2200		
2	Ramamurthy Pantulupeta	3000		
3a	Abidnagar Park	800		
3b	Narasimhanagar Park	800		
II.	**Balancing Reservoir and Sump**			
4	VUDA Colony, Madhavdhara (balancing reservoir)	1600		
5	Madhavdhara, VUDA Layout (sump)	1100		
III.	**Ground Level Service Reservoirs**			
6	Murli Nagar NGGOS Colony	500		
7	Varahagiri Colony	2500		
8	Sweeper's Colony	2200		
IV.	**Transmission Mains / Feeder Mains**			
			1200	7.74
			1000	0.53
			900	3.51
			800	1.32
			700	2.58
			600	4.68
			500	1.02
	Smaller pipe dia		150-450	12.18
	Total length of transmission/feeder mains			33.56
V.	**Pumping Mains**			
	Total length of pumping mains		1100	1.1
VI.	**Distribution Network**			

S. No.	Component	Capacity	Dia (mm)	Length (km)/ No.
	Total length of distribution network		150-600	326
VII.	**House Service Connections (HSC)**			
	No. of HSC			41,500

39. Construction work is likely to commence in 2016 and will be completed in 18 months for the total water supply subproject. However individual components will be taken phase-wise in an average of 24 months construction period.

IV. DESCRIPTION OF THE ENVIRONMENT

A. Environmental Profile

40. City municipal council is a Grade-II municipality situated 65 km north-east from Belgaum headquarters. The Taluk is situated in the North - West Karnataka, & is bound by Bagalkot district on East, Hukkeri Taluka on the North. city is located along the Sankeshwar - Yaragatti SH and road railway station is 12 km from the city on the Pune – Bangalore railway line. The Ghataprabha River flows along the northern boundary of this city the Markandeya River flows along the Western boundary of the city and joins Ghataprabha River.

B. Physical Resources

1. Topography, Geology, and Soils

41. The subproject locations are all around the city of Visakhapatnam. Visakhapatnam is strategically located midway between Howrah and Chennai, the two of the four metropolis of the country. The city is rated as the fastest growing city on the East. The industrialization and the accompanying urbanization is responsible for the rapid growth of the city. Visakhapatnam is the second largest city in Andhra Pradesh, a sprawling industrial city and one of the emerging metropolises.

42. Visakhapatnam is located on the east coast of India, in 17 degree 42' North latitude and 82 degree 02' East range of hills. Based on topographical conditions, the city and its environs can be divided into four categories viz. Hilly region, Upland tracks, Rolling plains and Plains. The Kailasa and Yarada are the major hill ranges in the city. The Kailasa hill range stretches from Simhachalam to MVP Colony on the north flank of the city. The city, which appears like a small basin, is surrounded by the Yarada hill popularly known as Dolphin’s nose (358m) on the side of the Kailasgiri hills on the north, with the Bay of Bengal forming the eastern wall. The coastal line runs from north- east to south west over a distance of six kilometres. On the west there is an extensive tidal basin called Upputeru now under reclamation. Beyond Yarada there is a valley followed by another range of hills.

2. Meteorology and Climate

43. **Climate:** The city area falls under semi-arid type of climate.

44. **Rainfall:** Annual rainfall in the area has an average of 953 mm. In the Bay of Bengal, depressions are likely to be encountered in all seasons of the year with a gradual fall in

pressure. On an average 4 to 5 cyclones per year occur. However, at particular locations the average frequencies may be lower. Hind casting studies indicated that the Coast is mainly affected by waves generated by Cyclones from the South East to South East direction. The highest waves are experienced in the period April September when the winds are more intense and consistent. The deep sea waves with the highest and lowest period frequent from the South West quadrant. Waves of over 1.5 m in the height may be expected approximately 14% of the time. The daily record of tidal levels shows two highs and two lows. There is published evidence to indicate that strong tides as much as 60 cm in excess of the predicted tides may occur during the cyclones.

45. **Temperature:** Ambient air temperature ranges between 45 degrees to 12 degrees C. Sea surface temperature range is from 33degrees maximum to 20 degrees C minimum. Monthly mean relative humidity is between100% to 4%.

3. Air Quality and Noise

46. **Air Quality.** Air quality in the subproject area is considered to be good and better when compared to the main city area due to the absence of industries in and around the area. Primary air quality data for all subproject sites will be gathered and monitored by the contractor during implementation. ADB SPS requires that the subproject applies pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as World Bank Group's EHS Guidelines. Table 7 provides the WHO ambient air quality guidelines.

Table 7: WHO Ambient Air Quality Guidelines

Table 1.1.1: WHO Ambient Air Quality Guidelines[7,8]		
	Averaging Period	Guideline value in µg/m³
Sulfur dioxide (SO_2)	24-hour 10 minute	125 (Interim target-1) 50 (Interim target-2) 20 (guideline) 500 (guideline)
Nitrogen dioxide (NO_2)	1-year 1-hour	40 (guideline) 200 (guideline)
Particulate Matter PM_{10}	1-year 24-hour	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline) 150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)
Particulate Matter $PM_{2.5}$	1-year 24-hour	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline) 75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)

47. **Noise Quality.** Noise pollution is not a problem in the area.. It is expected that noise is neither a major issue in the majority of subproject area nor expected to be a problem except where the project road passes through the settlements, market areas, and junctions at village areas. At busy junction small contribution to the noise levels are expected, but still the ambient noise quality is expected to be well within the permissible limits.

48. During the construction period, temporary increase in the noise levels are expected due to movement of construction machineries and construction activities associated with proposed road development. Suitable barriers in the form of noise barriers and timely scheduling of construction activities will minimize these affects to the greater extent. ADB SPS requires that the subproject applies pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as World Bank Group's EHS Guidelines. Table 8 provides the noise level guidelines.

Table 8: World Bank Group's EHS Noise Level Guidelines

Table 1.7.1- Noise Level Guidelines[54]		
	One Hour L_{Aeq} (dBA)	
Receptor	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational[55]	55	45
Industrial; commercial	70	70

4. Natural Hazards

49. **Seismicity:** Earlier the city fell under the seismic zone of Category II, where earthquakes of magnitude 5.6 and above do not occur. But in recent revised seismic map by National Geophysical Research Institute the zone has been elevated to Category III which suggests that earthquakes of magnitude greater than 5.6 are possible.

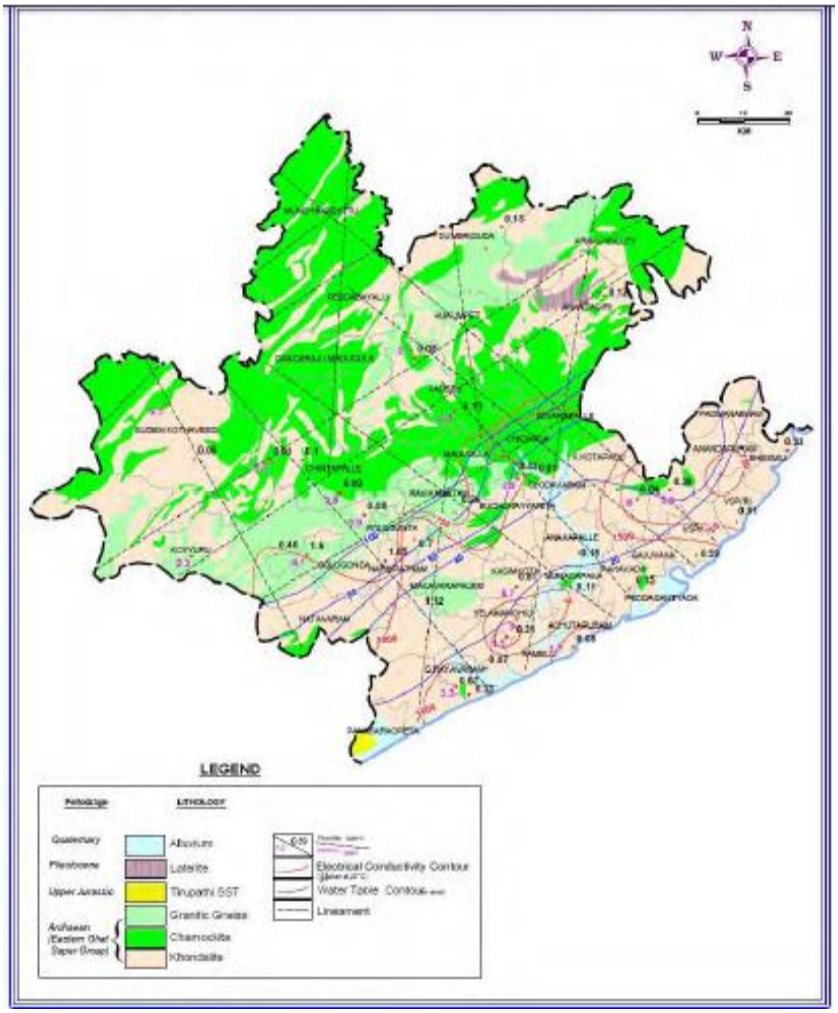
5. Water Resources

50. The water sources around the project location areas are as below:

WATER RESOURCES – WATER AVAILABILITY

Reservoir	Distance (in Km)	Water Supply (in MGD)
Godavari	156/212	15.20
Raiwada	67	15.60
Tatipudi	62	8.00
Mehadrigedda	20	8.50
Gosthani	30	5.10
Mudasarlova	10	0.50
Gambheeram (few months	20	0.40
MGR Filtration	25	1.20
WS Schemes (lift) (Villages)		3.00
Total Supply		57.50

Figure 2: Hydrological Map for Visakhapatnam District



6. Biological Resources

51. **Vegetation:** The areas around the canals are paddy fields, and some isolated areas having vegetation cover of trees like palm trees, coconut trees, mango trees, papaya trees etc. also some coffee plantations are found around the subproject locations.

52. **Migratory birds:** Andhra Pradesh attracts a number of migratory birds. Andhra Pradesh also has a number of bird sanctuaries. Atapaka Bird Sanctuary, also known as Kolleru Wildlife Sanctuary, is a largest freshwater lake located in West Godavari district of Andhra Pradesh. The sanctuary falls under Kaikalur Forest Range. It is one of the Ramsar convention wetland sites, spread over an area of 308.55 km^2 (119.13 sq mi). Telineelapuram and Telukunchi Bird Sanctuaries are located in Srikakulam district of Andhra Pradesh. Every year, over 3,000 pelicans and painted storks visit from Siberia to these villages during September and stay until March. Pulicat Lake Bird Sanctuary is a famous 481 km². Protected area in Nellore District of Andhra Pradesh state. Pulicat Lake is the second largest brackish-water ecosystem in India. Central location is: 13°34′N 80°12′E. 327.33 km² is managed by the Andhra Pradesh Forest Department and 153.67 km² is managed by the Tamil Nadu Forest Department. 108 km² is

national park area. Rainfall ranges from 800 to 2000 mm. Temperature varies from 14 °C to 33 °C. Altitude ranges from 100' MSL to 1200' MSL

7. Socioeconomic Profile

53. **Demography**: Andhra Pradesh is one of the southern state of Indian sub-continent. There are a total of 13 districts in the two regions of Coastal Andhra and Rayalaseema. The new river-front capital in between Vijayawada and Guntur of the state was named as Amaravati, which is under the jurisdiction of APCRDA. The capital of the state is Hyderabad being the common capital of both Andhra Pradesh and Telangana. It shares borders with states like Tamil Nadu, Orissa, Telangana and Karnataka. The official language of the state is Telugu.

54. **Target Population Details:** As of 2011 Census of India, the state had a population of 49,386,799 with a population density of 308/km^2. The total population constitutes 70.4% of rural population with 34,776,389 inhabitants and 29.6% of urban population with 14,610,410 inhabitants. Visakhapatnam district has the largest urban population of 47.5% and Srikakulam district with 83.8%, has the largest rural population, among others districts in the state. Spread over an area of 160,205 km^2, the state has a population density of 308 as against 277 in 2001 Census, which is below the national average. Registered growth rate of the population is 11.10 as against 14.59 recorded in the 2001 census. Literacy rate in 2011 was 67.77% as against 60.47% recorded in 2001 census. It is an increase of 7.19%. Andhra Pradesh ranks tenth of all Indian States in the Human Development Index scores with a score of 0.416. The National Council of Applied Economic Research district analysis in 2001 reveals that Krishna, West Godavari and Chittoor are the three districts in rural AP with the highest Human Development Index scores in ascending order.

55. **Economic Profile of Andhra Pradesh:** Andhra Pradesh has a very diverse geography which led to a very diverse economy. As many as 9 of the 13 districts have sea coast along the Bay of Bengal, which has created manufacturing and export centric industry. The fertile river plains in the delta regions of major peninsular rivers of Godavari and Krishna are rich with agriculture-based industries and the mineral deposits found in the districts of Rayalaseema, Eastern Ghats and neighboring states has led to large-scale ore exports. Visakhapatnam is an important commercial hub of the state and also IT hub of Andhra Pradesh.

56. The gross state domestic product (GSDP) of Andhra Pradesh was Rs 1.45 lakh crore in the previous fiscal year 2014-15. AP targets 18.2% GSDP in 2015-16 i.e., Rs 1.65 lakh crore Andhra Pradesh government targets to achieve 18.2 per cent Gross State Domestic Product (GSDP) in the current fiscal by focusing on agriculture and allied sectors. Though AP has been facing many financial constraints post bifurcation, AP has managed to achieved one per cent higher Gross Domestic Product (GDP) in the last financial year than the national average. In 2015-16 financial year, the state aims to achieve 18.2 per cent GSDP to Rs.1.65 lakh crore from 1.45 lakh crore in the previous fiscal. Agriculture and its allied sectors in the state alone contribute 27 per cent of GSDP. The industrial sector of the state include some of the key sectors like pharma, automobile, textiles etc. Sricity located in Nellore district is an integrated business city which is home to many multinational firms.

57. Andhra Pradesh is one of the storehouses of mineral resources in India. Andhra Pradesh with varied geological formations, contain rich and variety of industrial minerals and building stones. The state is well connected to other states through road and rail networks. It is

also connected to other countries by means of airways and seaports as well. With a long seacoast along the Bay of Bengal, it also has many ports for sea trade. The state has one of the largest railway junctions at Vijayawada and one of the largest seaports at Visakhapatnam. Roads in Andhra Pradesh consist of National Highways and state highways with district roads as well. NH 5, with a highway network of around 1,000 km in the state, is a part of Golden Quadrilateral Project undertaken by National Highways Development Project. It also forms part of AH 45 which comes under the Asian Highway Network.

58. Andhra Pradesh has a railway network of 5,046 km and have played a significant role in boosting the economy of the state alongside developing the industrial and the tourism sectors. Visakhapatnam Airport, is the only airport in the state with international connectivity. The state has five domestic airports, Vijayawada Airport at Gannavaram, Rajahmundry Airport at Madhurapudi, Tirupati Airport at Renigunta, Cuddapah Airportand a privately owned, public use airport at Puttaparthi. There are also 16 small air strips located in the state.

59. Andhra Pradesh has one of the country's largest port at Visakhapatnam in terms of (cargo handling). The other famous ports are Krishnapatnam Port (Nellore), Gangavaram Port and Kakinada Port. Gangavaram Port is a deep seaport which can accommodate ocean liners up to 200,000–250,000 DWT. There are 14 notified non-major ports at Bheemunipatnam, S.Yanam, Machilipatnam, Nizampatnam, Vadarevu etc.

60. There are many auto component manufacturing companies in the state, manufacturing components such as grey-iron castings, precision aluminium castings, leaf springs, oils and lubricants, diesel fuel injection equipment, electronics and auto electronics and auto electrical, front axles, gears, forging, machined components, pressed metal components, pistons, cylinder liners, nozzles, delivery valves, starter motors, alternators, electronic regulators, high pressure die castings, clutch covers, fuel filters ,etc. The ideal places to locate companies in the Auto Sector are Visakhapatnam-Kakinada, Krishnapatnam-Tada-Sathiveedu and Vijayawada-Guntur corridors.

61. Andhra Pradesh is the second largest store house of Mineral Resources in India. The State has identified the Mining Sector as one of the growth engines for the overall development of industry and infrastructure. Andhra Pradesh has been producing good quality cotton with a comparatively higher output per hectare in India. The average production of medium and superior long staple cotton has crossed 2.6 million bales. With cotton in abundance, Textile Industry in the State is flourishing. Andhra Pradesh has a significantly growing IT industry.

62. **Cultural and Archaeological Resources:** The following are the major cultural and archaeological resources in AP that are ascertained as protected areas by the Archaeological Survey of India, and hence of national importance.

63. **Climate change impacts:** AP is highly dependent on agriculture for livelihood and thus, vulnerable to climate change. Some of the projected climate risks for AP are increase in natural disasters such as cyclones, maximum and minimum temperatures, changes in spatial and temporal distribution of monsoon, increase in frequency and intensity of rains, loss of rainy days, extended summers etc. Climate change will not only affect the natural resources but would also impact upon human health and availability of safe habitats in the future. These climate change risks may affect the envisioned sustainable development of AP.

64. **Land use pattern.** According to the land use pattern of 1995, residential area constitutes 52.62 percent of the total developed area of 358.07 Ha. The core area of town is overcrowded and very congested as a result; new extension areas are forming in the peripheral areas of the town. The commercial and industrial establishments occupy 4.36 percent and 4.50 percent of the total developed area of the town. About 11 percent of the developed area is under park and playgrounds, which indicates that the town has good recreational places. The circulation pattern of the town occupies about 12 percent of the developed area. The local planning area has about 32.53 Ha of vacant land for future development.

65. **Physical or cultural heritage.** No physical or cultural heritage was observed in the municipality limits that may be impacted by the subproject. Water supply lines are proposed along the roads of densely built up areas of City. The city limit is well developed and there are no environmental hotspots along the proposed areas. There is no prohibited area or archaeological area from where water supply line is passing through. The minimum road width in the entire project area is 3 meters and total closure of road is not anticipated during construction works.

V. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Introduction

66. Potential environmental impacts of the proposed water supply subproject 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.

67. Screening of potential environmental impacts are categorized into three categories. Design impacts related to the pre-construction phase, construction phase impacts and operations and maintenance phase impacts.

(i) **Design impacts** include impacts arising from 24X7 water supply program design, including technology used, scale of operation/throughput, waste production, discharge specifications, pollution sources and ancillary services.

(ii) **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.

(iii) **O&M impacts** include impacts arising from the operation and maintenance activities of the water supply system. These include routine management of operational waste streams, and occupational health and safety issues.

68. 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).

69. This section of the IEE reviews possible subproject-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.

70. The ADB Rapid Environmental Assessment Checklist was used to screen the project for environmental impacts and to determine the scope of the IEE investigation. The completed Checklist is given in **Appendix 7.**

71. In the case of this subproject (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 involves site clearing, excavation and earth movements; and (iii) being located in the city, will not cause direct impact on biodiversity values. The project will be in the areas under jurisdiction and access to the project location is thru public rights-of-way and existing roads hence, land acquisition and encroachment on private property will not occur.

B. Pre-Construction Impacts

72. **Design of the Proposed Components.** The Central Public Health and Environmental Engineering Organization (CPHEEO) manual suggests a design period of 15/30 years[5] in general while designing the system for water supply components. Since, the packages are proposed to be implemented sequentially; theoretically, each of the system components should have a different design year.

73. However, in order to maintain unanimity in the design period and design population, it is proposed to consider 2041 as the design year for all the system components. Accordingly, 2011 shall be the base year and 2026 the intermediate year to cross check the designs pertaining to intermediate demand. The rate of supply has been taken as 135 lpcd for 100% population.

74. **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 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.

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

(i) Consult and 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.

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

76. **Site selection of construction work camps, stockpile areas, storage areas, and disposal areas**. Priority is to locate these near the subproject 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 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 water bodies, swamps, or in areas which will inconvenience the community.

77. **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 . Priority would be sites already permitted by the authorized agency. If other 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 even if some distance from construction activities. It will be the construction contractor's responsibility to verify the suitability of all material sources and to obtain the approval of . If additional quarries will be required after construction is started, then the construction contractor shall use the mentioned criteria to select new quarry sites, with written approval of PIU.

C. Construction Impacts

78. The civil works for water supply projects include earth work excavation for pipeline trenches, pipe laying, installing valves, flow meters and data loggers, shifting of public utilities and providing house service connections. Earth work excavation will be undertaken by machine and include danger lighting and using sight rails and boning rods at every 100 mts., while pipe laying works will include laying pipes at required gradient, fixing collars, elbows, tees, bends and other fittings including conveying the material to work spot and testing for water tightness.

79. The excavation is done in such a way that there will be a minimum depth of 1 m. above the pipe line. 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. Once they are laid, pipes will be joined as per specification and then tested for any cracks of leakages. The minimum working hours will be 8 hours daily, the total duration of each stage depends on the soil condition and other local features. The total amount of soil excavated and disposal requirements will be calculated at the time of detailed design. This soil shall be used for filling if required or stored/ dumped in approved debris disposal site.

80. 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 city where there are a variety of human activities, will result to impacts to the environment and sensitive receptors such as residents, businesses, and the community in general. These anticipated impacts are temporary and for short duration.

81. 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.

82. **Sources of Materials**. Significant amount of gravel, sand, and cement will be required for this subproject. The construction contractor will be required to:

(i) The material sources permitted by government;
(ii) Verify suitability of all material sources and obtain approval of Program Management Unit (PMU); and
(iii) Submit to on a monthly basis documentation of sources of materials.

83. **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) but temporary and during construction activities only. To mitigate the impacts, construction contractors will be required to:

(i) Consult with PMU/ on the designated areas for stockpiling of, soils, gravel, and other construction materials;
(ii) Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather;
(iii) Use tarpaulins to cover sand and other loose material when transported by trucks; and
(iv) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly.

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

(i) Prepare and implement a spoils management plan (**Appendix 4**);
(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 PMU/ 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 surface quality inspection according to the Environmental Management Plan (EMP).

85. **Noise Levels**. There are no health facilities, scheduled or unscheduled historical, archaeological, paleontological, or architectural sites near the construction sites. However, construction works will be on settlements, along and near schools, and areas with small-scale businesses. The sensitive receptors are the general population in these areas. Increase in noise level may be caused by excavation equipment, and the transportation of equipment, materials, and people. Impact is negative, short-term, and reversible by mitigation measures. The construction contractor will be required to:

(i) Prepare a Traffic Management Plan (**Appendix 5**) and Plan activities in consultation with PMU/ so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
(ii) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
(iii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; and
(iv) Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s.

86. **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. These impacts are negative but 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 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 PMU/ to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.

87. **Surface and Groundwater Quality**. Another physical impact that is often associated with excavation is the effect on drainage and the local water table if groundwater and surface water collect in the voids. To ensure that water will not pond in pits and voids near project location, the construction contractor will be required to conduct excavation works on non-monsoon season to the maximum extent possible.

88. **Accessibility**. 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 5)
(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 with 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.

89. Where ever road width is minimal, there will be temporary loss of access during the laying of pipes. Under those circumstances, contractor can adopt following measures:

(i) Inform the affected local population two days 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.

90. **Socio-Economic – Income**. The project components will be located in government land and there is no requirement for land acquisition or any resettlements. 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 4);
(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 front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools;
(v) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and
(vi) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.
(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.

91. **Socio-Economic – Employment**. Manpower will be required during the 18-months construction stage. This can result to generation of contractual employment and increase in local revenue. Thus potential impact is positive and long-term. The construction contractor will be required to:

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

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

(i) Comply with all national, state and local core labor laws;
(ii) Develop and implement site-specific occupational health and safety (OH&S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment;

(c) OH&S Training[6] for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;

(iii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;

(iv) Provide medical insurance coverage for workers;

(v) Secure all installations from unauthorized intrusion and accident risks;

(vi) Provide supplies of potable drinking water;

(vii) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;

(viii) Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;

(ix) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;

(x) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;

(xi) Ensure moving equipment is outfitted with audible back-up alarms;

(xii) Mark and provide sign boards for hazardous areas such as energized electrical devices and 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

(xiii) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.

93. **Asbestos Materials.** Sections of distribution network are of asbestos cement (AC), and because of the health risks these will be left in situ and replaced by new pipes. Details will be obtained from the detailed design including nature and location of all water supply infrastructure, and planning pipeline alignments carefully to avoid any conflict or damage. Given the dangerous nature of this material for both workers and citizens, one additional measure should be taken to protect the health of all parties in the event (however unlikely) that AC pipes are encountered. This is that, prior to start of construction works water supply system, the design consultant in coordination with the will develop a protocol to be applied in any instance that AC pipes are encountered, to ensure that appropriate action is taken. This should be based on the approach recommended by the United States Environmental Protection Agency (USEPA),[7] and amongst other things, should involve:

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[6] 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.

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

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

94. **Community Health and Safety**. Hazards posed to the public, specifically in high pedestrian areas may include traffic accidents and vehicle collision with pedestrians. In most of the cases location of project sites at isolated area, hence health and safety risk to community is minimum. 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 PMU/ 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.

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

96. **Social and Cultural Resources**. For this subproject, 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 PMU/ or any authorized person with archaeological/historical field training to observe excavation;
(iii) Stop work immediately to allow further investigation if any finds are suspected; and
(iv) Inform PMU/ if a find is suspected, and take any action they require ensuring its removal or protection in situ.
(v) Adjacent to historic sites, undertake excavation and construction work in such a way that no structural damage is caused to the building.

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

(i) The said 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 surface water bodies[8].
(iii) No residential areas shall be located within 100 m downwind side of the site.
(iv) The site is minimum 250 m. away from sensitive locations like settlements, ponds/lakes or other water bodies.
(v) The local governing body and community shall be consulted while selecting the site.

D. Operation and Maintenance Impacts

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

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

100. Improper disposal of silt and debris removed from trenches could cause Inconvenience to public. Silt and debris shall be collected in trucks and transported to the Municipal Solid Waste Disposal Site and shall be used as covering material for the waste being landfilled.

101. 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. The operator of the water supply system needs to:

(i) Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;

[8] 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 GVMC.

(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.

102. The citizens of the North West will be the major beneficiaries of the improved water supply, as they will be provided with a constant supply of better quality water, piped into their homes. In addition to improved environmental conditions, the project will improve the over-all health condition of the town as diseases of poor sanitation (such as diarrhea and dysentery) will be reduced.

VI. CONSULTATION, INFORMATION DISCLOSURE, AND GRIEVANCE REDRESS MECHANISM

A. Public Consultation and Information Disclosure

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

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

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

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

107. A variety of approaches can be adopted. At minimum, stakeholders will be consulted regarding the scope of the environmental and social impact studies before work commences, and they will be informed of the likely impacts of the project and proposed mitigation once the draft EIA/IEE and resettlement plan reports are prepared. The report will record the views of stakeholders and indicate how these have been taken into account in project development (Annexure-5. Consultations will be held with a special focus on vulnerable groups.

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

(i) Project beneficiaries;
(ii) Elected representatives, community leaders, religious leaders, and representatives of community-based organizations;
(iii) local NGOs;
(iv) Andhra Pradesh Pollution Control Board
(v) local government and relevant government agency representatives, including local authorities responsible for land acquisition, protection, archaeological sites, religious sites, and other relevant government departments;
(vi) residents, shopkeepers, and business people who live and work alongside the roads which would be widened, where pipes will be laid and near sites where facilities will be built;
(vii) Custodians, and users of socially and culturally important buildings;
(viii) VCICDP PMU and consultants; and
(ix) ADB, Government of Andhra Pradesh and the Government of India.

109. Focused Group discussion with 36 persons (20 women) was conducted on 19.11.2015; 01.02.2016 and 02.02.2016. The identified stakeholders were apprised of the GVMS 24 X 7 subproject. Their views and feedback on environmental management issues were gathered during the meetings.

Table 9: Summary of Consultation Meetings and Focus Group Discussions

Sl. No.	Date	Location	No. of Participants	Topic	Issues/ Concern and Mitigation Measures
1	19.11.2015	Ramamurthy Pantulupeta	22	The participants were apprised about proposed GVMC 24x7 water supply subproject, its components and likely impacts that may accrue and also to understand concerns if any.	Concerns relating to traffic management during project implementation were expressed.
2	2 Feb 2016	Ramamurthy Pantulupeta	6	The participants were asked	Management of solid waste and adequate disposal needs to be

Sl. No.	Date	Location	No. of Participants	Topic	Issues/ Concern and Mitigation Measures
				if they had been consulted about proposed intervention on site under use by them, and their views and concerns.	ensured during project implementation.
3	1 Feb 2016	Kancharapalem	8	The participants were apprised about proposed Project, its components and their likely impacts that may accrue and also to seek the cooperation and support from the community.	The community expressed their willingness to provide support. Concerns about affordability of water tariff in case of increase expressed. An elderly lady from a BPL household indicated that current water tariff for BPL HHs is Rs. 60 per month, and willingness to pay is for a maximum of Rs. 100 per month. Others (middle income group) indicated willingness to pay Rs. 300 per month (Rs. 10 per day) for improved supply.

Photographs Of Consultations With Stakeholders At Gvmc 24 X 7 Subproject Locations


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AP39 BK 6409

B. Information Disclosure

110. Information is disclosed through public consultation and making relevant documents available in public locations. The following documents will be submitted to ADB for disclosure on its website:

For category B projects:

(i) final IEE;
(ii) a new or updated IEE and corrective action plan prepared during project implementation, if any; and
(iii) environmental monitoring reports.

For category C projects:

(i) A due diligence report (Annexure-5)
(ii) environmental monitoring reports; and
(iii) for projects involving facilities and/or business activities that already exist or are under construction, environmental audit report.

111. VCICDP PMU will send written endorsement to ADB for disclosing these documents on ADB's website. VCICDP PMU will also provide relevant safeguards information in a timely manner, in an accessible place and in a form and languages understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used.

C. Grievance Redress Mechanism

112. **Common Grievance Redress Mechanism.** Project grievance redress mechanism will be established to evaluate, and facilitate the resolution of APs' concerns, complaints, and grievances related to social and environmental issues of the project. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project.

113. A common GRM will be in place for social, environmental, or any other grievances related to the project. Every grievance shall be registered and careful documentation of process with regard to each grievance undertaken, as explained below. The PIU environmental and social safeguards officers will have the overall responsibility for timely grievance redress on environmental and social safeguards issues, including keeping and maintaining the complaint and redress records. Public awareness campaign will be conducted to ensure that awareness on the project and its grievance redress procedures is generated.

114. Affected persons will have the flexibility of conveying grievances/suggestions by sending grievance redress/suggestion in writing, through telephone call to Divisional Engineer (DE), GVMC/ AT Transco/ APRDC/ APIIC GVMC safeguard manager, or by filling forms for complaints/suggestion by email in the VCICD Project site to be installed under the AP Transco/ APRDC/ APIIC/ GVMC websites. The RF provides the sample grievance registration form. Careful documentation of the name of the complainant, date of receipt of the complaint, address/contact details of the person, location of the problem area, and how the problem was resolved will be undertaken. The GVMC' safeguard officers will have the overall responsibility for timely grievance redressal on environmental and social safeguards issues and for registration of grievances, related disclosure, and communication with the aggrieved party.

115. **Grievance Redressal Committee.** Grievance Redressal Committee (GRC) will be established at two-levels, one at PIU level and another at PMU level, to receive, evaluate and facilitate the resolution of displaced persons concerns, complaints and grievances. The GRC will provide an opportunity to the APs to have their grievances redressed prior to approaching the jurisdictional sub court. The GRC is aimed to provide a trusted way to voice and resolve concerns linked to the project, and to be an effective way to address affected person's concerns without allowing it to escalate resulting in delays in project implementation.

116. The GRC will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. The GRC is not intended to bypass the government's inbuilt redressal process, nor the provisions of the statute, but rather it is intended to address displaced persons concerns and complaints promptly, making it readily accessible to all segments of the displaced persons and is scaled to the risks and impacts of the project.

117. The PIU level GRCs will function out of each District where the subproject is being implemented. The GRC will be Chaired by Joint Collector and comprising of the Divisional Engineer acting as its member secretary and the following members: (i) RDO/Sub Collector of the division; (ii) Project Director, DRDA; (iii) Chief Executive Officer, Zilla Parishad; (iv) District Panchayat Officer; (v) District Education Officer; (vi) District Medical and Health Officer; (vii) District Level representative of DISCOM; and (viii) Superintendent, RWS Panchayat Raj Department.

118. The Project Director, PMU will be the appellate authority who will be supported by the PMSC and Safeguard Officer of PMU, and concerned GVMC to make final decisions on the unresolved issues.

119. **Grievance redress process.** In case of grievances that are immediate and urgent in the perception of the complainant, the contractor and PMSC on-site personnel will provide the most easily accessible or first level of contact for quick resolution of grievances. Contact phone numbers and names of the concerned Divisional Engineer, PIU safeguard officers and contractors will be posted at all construction sites at visible locations. The PIU safeguard officers will be responsible to see through the process of redressal of each grievance.

(i) **1st Level Grievance.** The phone number of the PIU office should be made available at the construction site signboards. The contractors, DE and PIU safeguard officers can immediately resolve on-site in consultation with each other, and will be required to do so within 7 days of receipt of a complaint/grievance.

(ii) **2nd Level Grievance.** All grievances that cannot be redressed within 7 days at field/ward level will be reviewed by the PIU level grievance redress committee (GRC) with support from PIU safeguard officers and PMSC environment and resettlement specialists. PIU level GRC will attempt to resolve them within 15 days.

(iii) **3rd Level Grievance.**The PIU safeguard officers will refer any unresolved or major issues to the PMU/State-level GRC, who in consultation with PIU will resolve them within 15 days.

120. Despite the project GRM, 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.

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

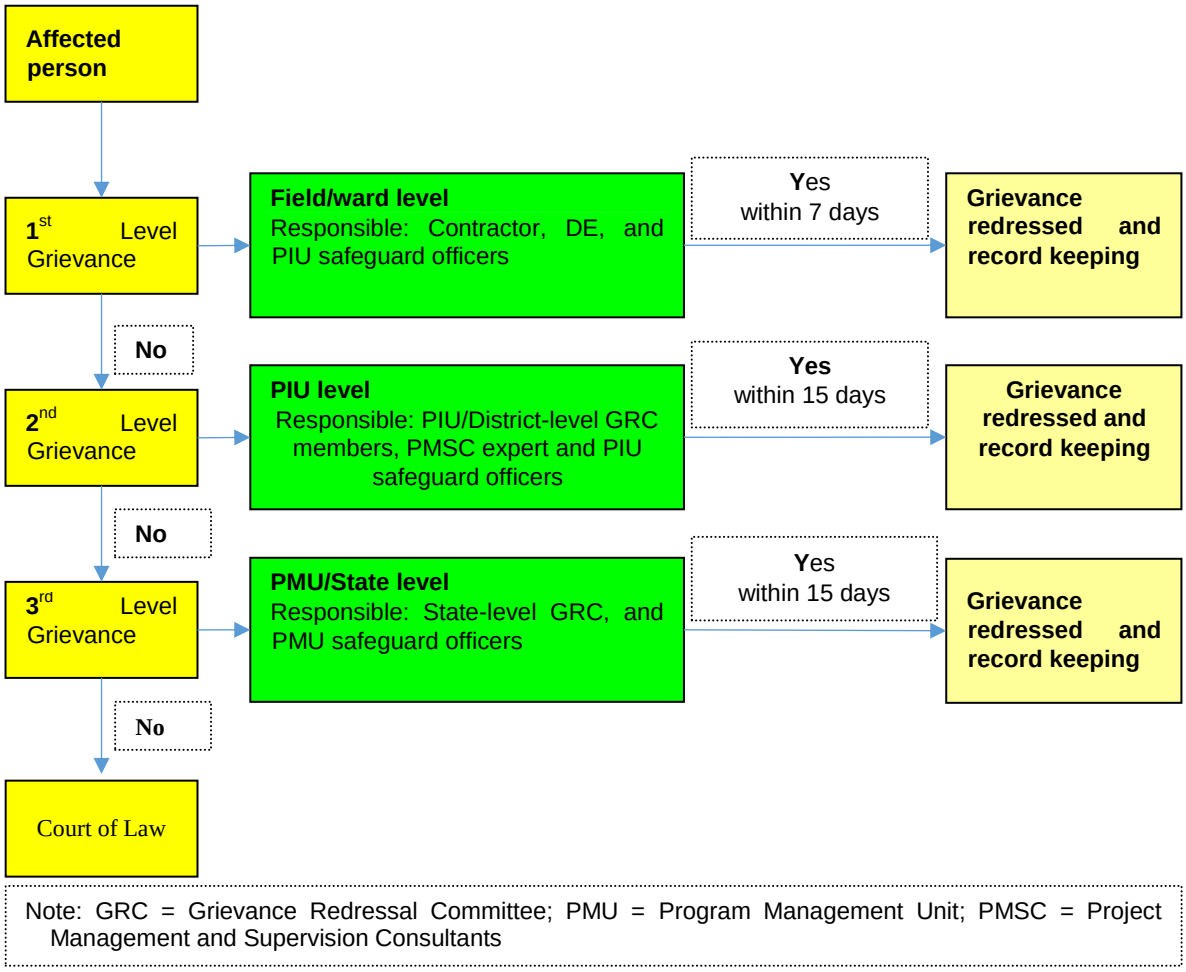
122. **Recordkeeping.** Records of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were effected and final outcome will be kept by PMU. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the PMU office, and on the web, as well as reported in the semi-annual social and environmental monitoring reports to be submitted to ADB.

123. Periodic review and documentation of lessons learned. The PMU, and GVMC, supported by the PMSC specialist will periodically review the functioning of the GRM and record information on the effectiveness of the mechanism, especially on the GVMC ability to prevent and address grievances.

124. **Costs.** All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the respective GVMC; while costs related to escalated grievances will be met by the PMU. Cost estimates for grievance redress are included in resettlement cost estimates. The grievance redress process is shown in Figure 1.

125. The GRCs will continue to function throughout the project duration.

Figure 3: GVMC Grievance Redress Mechanism



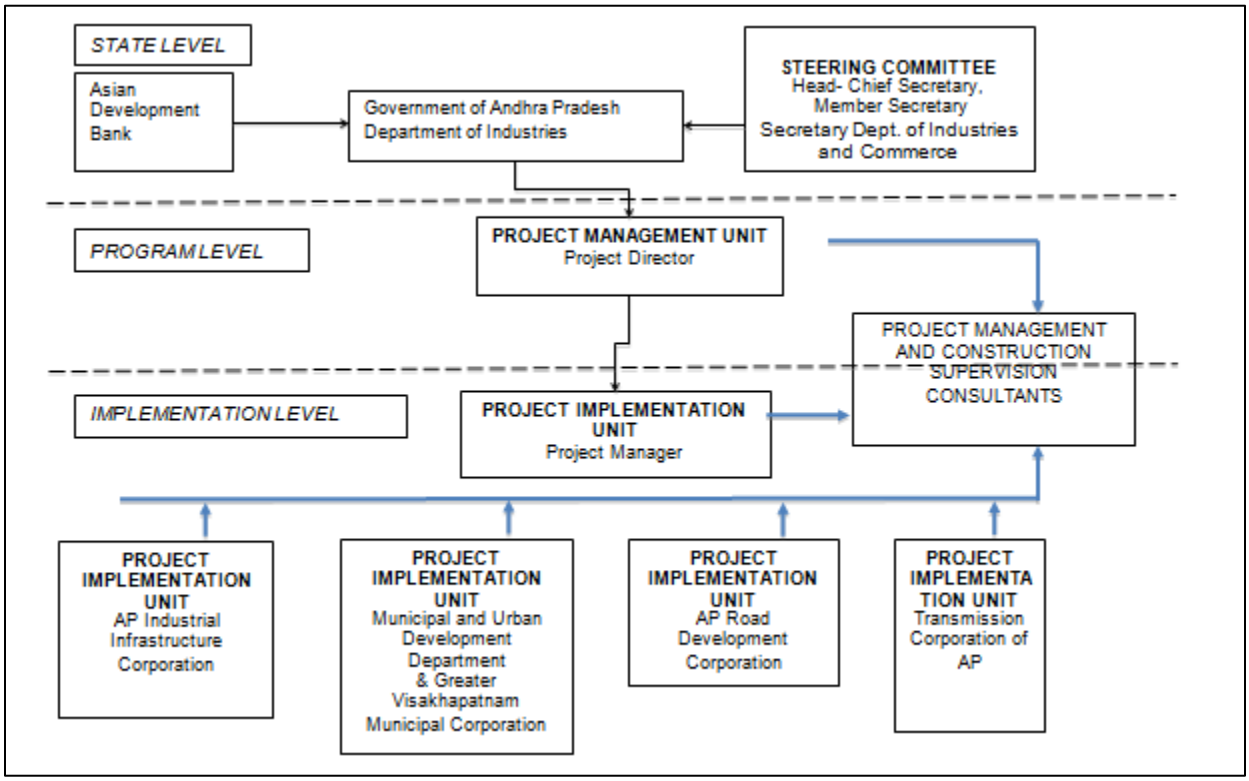
Note: GRC = Grievance Redressal Committee; PMU = Program Management Unit; PMSC = Project Management and Supervision Consultants

VII. INSTITUTIONAL ARRANGEMENTS AND RESPONSIBILITIES

126. DOI will be the executing agency. A PMU will be established within the Directorate of Industries, which is under the DOI, for planning, implementation, monitoring and supervision, and coordination with GVMC. GVMC will be responsible for implementing the subproject under the MFF. PMU will recruit PMSC to provide support in implementation of subproject under VCICDP.

127. PMU will support GVMC in implementation, management and monitoring of the project. PMU and GVMC will be assisted by PMSC respectively. GVMC will appoint construction contractors to build infrastructure. Once the infrastructure is built and commissioned, the GVMC will operate and maintain the infrastructure. At state-level a Project Steering Committee (PSC) will be established to provide overall policy direction for the implementation of VCICDP.

Figure 4: GVMC subproject under VCICDP - Implementation Arrangements



A. Safeguard Implementation Arrangement

128. **Project Management Unit.** The PMU structure is as provided in the Table 10 below. PMU will be supported by PSMC. PMU will appoint a safeguards coordinator as a part of the PMSC team to collect information and progress on environmental and social safeguards compliance.

Table 10: Tentative PMU Structure

Position	Tasks
Project Director	Overall Project Management
Project Director (Department of Industries)	Management of land-related issues
Procurement Officer	Procurement of consultants, civil works, goods, and NGOs, etc.
PMSC (Senior Engineer)	Technical officer with engineering background and preferably experience of multilateral projects
Institutional Coordination and Policy Reforms officer	Policy and Institutional support
Investment Promotion Officer	Coordination of VCICDP promotion, marketing
Monitoring and Evaluation Officer	Monitoring project results
PMSC (Environmental Safeguards Officer)	Environmental safeguards compliance
PMSC (Social Safeguards and Gender Officer)	Resettlement compliance, social, gender
Chief Accountant and Financial Management Officer	Project accounting, audit and reporting
Accountant	Accounting
Office Manager	Office management

129. Key tasks and responsibilities of the PMU environmental safeguards officer are as follows:

(i) confirm existing IEEs/EMPs are updated based on detailed designs and that new IEEs/EMPs are prepared in accordance with the EARF and subproject selection criteria related to safeguards;
(ii) confirm whether IEEs/EMPs are included in bidding documents and civil works contracts;
(iii) provide oversight on environmental management aspects of subprojects;
(iv) ensure SEMPs prepared by contractors are cleared by GVMC prior to commencement of civil works;
(v) establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the SEMPs;
(vi) facilitate and confirm overall compliance with all Government rules and regulations regarding site and environmental clearances as well as any other environmental requirements (e.g., Location Clearance Certificates, Environmental Clearance Certificates etc.), as relevant;
(vii) supervise and provide guidance to the GVMC to properly carry out the environmental monitoring and assessments as per the EARF;
(viii) review, monitor and evaluate the effectiveness with which the SEMPs are implemented, and recommend necessary corrective actions to be taken as necessary;
(ix) consolidate monthly environmental monitoring reports from GVMC and submit semi-annual monitoring reports to ADB;
(x) ensure timely disclosure of final IEEs/SEMPs in locations and in a form and language accessible to the public and local communities; and
(xi) address any grievances brought about through the Grievance Redress Mechanism (GRM) in a timely manner.

130. **Project Implementation Units.** In GVMC, the Deputy Engineer will be deputed/designated as safeguard compliance officer in addition to the environmental engineer.

Table 11: GVMC Environmental Safeguard Officer Tasks and Responsibilities

GVMC Environmental Safeguard Officer	**Tasks and Responsibilities**
Deputy Engineer Cum Compliance Officer - GVMC	(i) Coordinate with Safeguard Manager and ensure all social/environmental requirements are met.
Environmental Engineer - GVMC	(i) include IEEs/EMPs in bidding documents and civil works contracts; (ii) review and approve SEMPs prepared by contractors; (iii) oversee day-to-day implementation of SEMPs by contractors including compliance with all government rules and regulations; (iv) take necessary action for obtaining rights of way; (v) oversee environmental monitoring by contractors; (vi) take corrective actions when necessary; (vii) submit monthly environmental monitoring reports to PMU; (viii) conduct continuous public outreach and awareness building related to environmental management; (ix) address grievances brought about through the GRM in a timely manner; and (x) organize an induction course for the training of contractors in environmental management to be delivered by PMSC consultants

131. **Project Management and Supervision Consultants.** The PMU and GVMC will be assisted by PMSC which will be staffed with environmental and social safeguard specialists to provide required assistance and regular progress report on safeguards implementation. The environmental specialist will have overall responsibility in implementation of environmental safeguards, including appropriate monitoring and reporting responsibilities. Key tasks and responsibilities of the PSMC environmental specialists are as follows:

(i) Update the IEEs including site- and subproject-specific EMPs for the subproject;
(ii) Supervise EMP implementation;
(iii) Prepare a monitoring report of final site- and subproject-specific EMPs and communicate with the stakeholders, including ADB on the progress, of the subprojects including environmental safeguards compliance;
(iv) Prepare semi-annual environmental safeguards compliance reports; and
(v) Support the implementing agencies in preparing periodic financing requests and necessary environmental safeguard reports for subsequent tranches.
(vi) Establish a system to monitor environmental safeguards of the Project; prepare indicators for monitoring important parameters of safeguards;
(vii) Ensure all requisite approvals and no objection certificates are in place to allow implementation, and that these are renewed in a timely manner where required;
(viii) Ensure that provisions and conditions of all necessary permits, consents, NOCs, etc., are incorporated in the IEEs;
(ix) Take proactive action to anticipate the potential environmental impacts of the Project to avoid delays in implementation;
(x) Assist GVMC in the establishment of GRC for IEE implementation;
(xi) Support the GVMC and PMU in the GRM implementation to address any grievances submitted in a timely manner and establish record keeping system for complaint and redressal status of the project;
(xii) Assist the GVMC and PMU in the project GRM mechanism and complaint solution;
(xiii) Assist the GVMC and PMU for GRM record keeping for first tier complaint and redressed actions;
(xiv) Ensure that the relevant environmental mitigation measures specified in the updated EMP will be incorporated into bidding documents and approved by the ADB prior to the issuance of the invitation for bidding;
(xv) Closely monitor and supervise to ensure that all mitigation measures and monitoring requirements set out in the EMP are implemented and complied with throughout the project implementation, and when required, prepare or recommend necessary corrective actions to be taken and monitor its implementation;
(xvi) Provide on-the-job training programs to PIU staff involved in Project implementation for strengthening their capacity in managing and monitoring environmental safeguards; and
(xvii) Assist the GVMC' safeguards officer to sensitize the turnkey contractors on ADB SPS, IEE/EMP, and GRM during detailed design and civil works implementation.

132. **Civil works contracts and contractors.** EMPs are to be included in bidding and contract documents and verified by the GVMC and PMU. The contractor will be required to designate an Environment, Health and Safety (EHS) supervisor to ensure implementation of EMP during civil works. Contractors are to carry out all environmental mitigation and monitoring measures outlined in their contract.

133. The PMU and GVMC will ensure that bidding and contract documents include specific provisions 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 with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites.

Table 12: Institutional Roles & Responsibility: Environmental Safeguards

Phase	PMU / GVMC	PMSC	ADB
Appraisal stage of all Subprojects under the investment program	PMU / GVMC to review the REA checklists and draft EIA/IEE. PMU / GVMC to submit draft EIA/IEE to ADB for review and approval. PMU / GVMC to disclose on its website the approved EIA/IEE. PMU / GVMC to ensure disclosure of information throughout the duration of the subproject.	PMSC to conduct REA for each subproject using checklists and to prepare EIA/IEE	ADB to review the REA checklists and reconfirm the categorization. ADB will review and approve EIA reports (Category A) and IEE reports (Category B) subprojects. ADB to disclose on its website the submitted EIA/IEE report.
Detailed Design Phase of all Subprojects under the investment program	PMU / GVMC with the assistance of PMSC to incorporate the EMP, environmental mitigation and monitoring measures into contract documents. PMU / GVMC to obtain all applicable consents/permits/clearances PMU to submit to ADB final IEE for approval and disclosure at ADB website.	PMSC to revise the IEE and EMP in accordance with detailed design changes if warranted. PMSC to ensure incorporation of EMP in bid documents and contracts. PMSC to prepare inventory of utilities to be affected by the subproject.	ADB will review and approve updated EIA reports (Category A) and IEE reports (Category B) subprojects. ADB to disclose on its website updated EIA/IEE report.
Pre-construction Phase of all Subprojects under the investment program	PMU / GVMC to conduct public consultation and disclosure during IEE process and comments will be reflected in the IEE report. PMU / PIU to monitor the disclosure and public consultation. PIU and PMSC to approve contractor‘s proposed locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes. PMU to submit to ADB in prescribed format semi-annual Environment Monitoring Report 6 months after Loan effective	PMSC to ensure statutory clearances and permits from government agencies/other entities are obtained prior to start of civil works. PMSC to ensure disclosure of information prior to start of civil works and throughout the duration of the construction period. PMSC to approve contractor‘s site-specific environmental plan (such as traffic management plan, waste management plan, locations for camp sites, storage areas, lay	

Phase	PMU / GVMC	PMSC	ADB
	date.	down areas, and other sites/plans specified in the EMP). PMSC to conduct baseline environmental conditions and inventory of affected trees	
Construction Phase of all Subprojects under the investment program	PMU / GVMC will review 6-monthly monitoring and EMP implementation report including the status of Project compliance with statutory clearances and with relevant loan covenants and submit the 6-monthly report to ADB and seek permission to disclose the same in the investment program web site.	PMSC to monitor the implementation of mitigation measures by Contractor. PMSC to prepare monthly progress reports including a section on implementation of the mitigation measures (application of EMP and monitoring plan) PMSC (as per EMP) will conduct environmental quality monitoring during construction stage (ambient air and noise, and water quality). PMSC to prepare the six-monthly monitoring report on environment by focusing on the progress in implementation of the EMP and issues encountered and measures adopted, follow-up actions required, if any.	ADB to review the 6 monthly report, provide necessary advice if needed to the PMU and approve the same. ADB to disclose on its website environmental monitoring reports.
Pre-operation Phase (Commissioning and Defect Liability Period)	PMU / GVMC to review monitoring report of PMSC on post-construction activities by the contractors as specified in the EMP PMU / PIU to review applicable consents requirements	PMSC to apply for the CTOs prior to commissioning. PMSC to monitor and approve post-construction activities by the contractors as specified in the EMP.	
Operation Phase of all Subprojects under the investment program	GVMC to conduct monitoring, as specified in the environmental monitoring plan. APPCB to monitor the compliance of the standards regarding drinking water quality, ground water, ambient air, effluent quality from treatment plant, noise, as applicable.		

Notes: APPCB = Andhra Pradesh State Pollution Control Board, PMSC = Project Management Consultants, CTE = Consent to Establish, CTO = Consent to Operate, PMSC = Design and Supervision Consultant, EIA =

Environmental Impact Assessment, EMP = Environmental Management Plan, IEE = Initial Environmental Examination, PMU = Project Management Unit; GVMC = Greater Visakhapatnam Municipal Corporation; REA = Rapid Environmental Assessment

VIII. INSTITUTIONAL CAPACITY AND DEVELOPMENT

134. The PMSC environmental safeguards specialist will be responsible for training PMU and GVMC on environmental awareness and management in accordance with both ADB and government requirements. 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 13.

Table 13: Training Program for Environmental Management

Description	Contents	Schedule	Participants
Pre-construction stage			
Orientation workshop	Module 1 – Orientation - ADB Safeguard Policy Statement - Government of India Environmental Laws and Regulations	1/2 day (at Hyderabad) (50 persons)	PMU and GVMC officials involved in project implementation
Description	**Contents**	**Schedule**	**Participants**
	Module 2 – Environmental Assessment Process - ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements - Review of environmental assessment report to comply with ADB requirements - Incorporation of EMP into the project design and contracts	1/2 day (at Hyderabad) (50 persons)	PMU, and GVMC officials involved in project implementation.
Construction stage			
Orientation program/ workshop for contractors and supervisory staff	- Roles and responsibilities of officials/contractors/consultants towards protection of environment - Environmental issues during construction - Implementation of EMP - Monitoring of EMP implementation - Reporting requirements	1 day (at Subproject locations) (15 persons)	PMU GVMC Contractors

Description	Contents	Schedule	Participants
Experiences and best practices sharing	- Experiences on EMP implementation – issues and challenges - Best practices followed	1 day on a regular period to be determined by PMU, GVMC, and PMSC (at Hyderabad / Visakhapatnam) (50 persons)	PMU GVMC Contractors

ADB = Asian Development Bank; EMP = Environmental Management Plan; PIU = Project Implementation Unit; PMU = Project Management Unit; PMSC = Design and Supervision Consultant; APRDC=Andhra Pradesh Road Development Corporation; APIIC= Andhra Pradesh Industrial & Infrastructure Corporation; AP Transco=Andhra Pradesh Transmission Corporation; GVMC=Greater Visakhapatnam Municipal Corporation

A. Future Consultation and Disclosure

135. The public consultation and disclosure program will remain a continuous process throughout the project implementation and shall include the following:

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management and Monitoring Plan

136. The following tables show the potential environmental impacts, proposed mitigation measures and responsible parties.

137. 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.

138. A copy of the EMP must be kept on 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.

139. 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 a budget for compliance with these EMP measures, requirements and actions.

X. MONITORING AND REPORTING

140. DOI will monitor and measure the progress of EMP implementation. The monitoring activities will correspond with the project's risks and impacts. In addition to recording information

on the work and deviation of work components from original scope, PMU, PIUs, and PMSC will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome.

141. GVMC / PMSC will submit monthly monitoring and implementation reports to PMU, who will take follow-up actions, if necessary. DOI will submit semi-annual monitoring reports to ADB. The suggested monitoring report format is in Appendix 6. A construction site checklist is attached at Appendix 6, which is to be filled by the PMSC/GVMC supervising staff, and attached to monthly reports. Subproject budgets will reflect the costs of monitoring and reporting requirements. For projects likely to have significant adverse environmental impacts during operation, reporting will continue at the minimum on an annual basis. Monitoring reports will be posted in a location accessible to the public.

142. Compliance with loan covenants will be screened by the Department of Industries, Government of Andhra Pradesh.

143. ADB will review project performance against the DOI, GoAP, commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the project's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued. ADB will carry out the following monitoring actions to supervise project implementation:

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

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

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
Utilities	Telephone lines, electric poles and wires, water lines within 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 done in case of unintentional interruption of services. (iii) Require contractors to prepare spoils management plan (Appendix 4) and traffic management plan (Appendix 5)		(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 4), and traffic management plan (Appendix 5)	No cost required. Mitigation measures are part of TOR of PMU, design engineers, and supervising consultants.
Social and Cultural Resources	Ground disturbance can uncover and damage archaeological and historical remains	(i) Consult Archaeological Survey of India (ASI) or concerned dept. of Andhra Govt. to obtain an expert assessment of the archaeological potential of the site; (ii) Consider alternatives if the site is found to be of	PMU	Chance Finds Protocol	No cost required. Mitigation measures are part of TOR of PMU, design engineers, and supervising consultants.

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

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		agricultural land needs to be selected, written consent from landowners (not lessees) will be obtained; (b) debris disposal site shall be at least 200 m away from surface water bodies; (c) no residential areas shall be located within 50 m downwind side of the site; and (d) site is minimum 250 m away from sensitive locations like settlements, ponds/lakes or other water bodies.			
Sources of Materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.	(i) Prioritize sites already permitted by the authorized agency; (ii) If other sites are necessary, inform construction contractor that it is their responsibility to verify the suitability of all material sources and to obtain the approval of PMU and (iii) If additional quarries required after construction is started, inform construction contractor to obtain a written approval from PIU	PMU and to prepare list of approved quarry sites and sources of materials	(i) List of approved quarry sites and sources of materials; (ii) Bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary.	No cost required. Mitigation measures are part of TOR of PMU, design engineers, and supervising consultants.

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
Structural and seismic stability of storage reservoirs (OHTs or GLSRs) is to be ensured for the safety of people working in and living around these structures.	The failure of the storage structures can be catastrophic.	The design shall incorporate seismicity of the place and all other safety factors. All care shall be taken to ensure a safe and structurally sound construction.	PMU and PIU	Incorporated in final design and communicated to contractors.	No cost required. Mitigation measures are part of TOR of PMU, design engineers, and supervising consultants.
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, permits, clearance, NOCs, etc. prior to start of civil works. (ii) Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. (iii) Include in detailed design drawings and documents all conditions and provisions if necessary	PMU and PIU	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 PMU. Mitigation measures are part of TOR of PMU, design engineers, and supervising consultants.
Asbestos Cement Pipes	Health risk due to exposure to asbestos materials	(i) Obtain details from of the nature and location of all water supply infrastructure (ii) Develop an AC pipe protocol (iii) Require all personnel (including manual laborers) to undergo training as per AC pipe protocol	PIU and design engineers	(i) Detailed design drawings showing alignment of AC pipes (ii) AC pipe protocol (iii) Trainings as per AC pipe protocol	No cost required. Mitigation measures are part of TOR of PMU, design engineers, and supervising consultants.

Table 15: Environmental Management and Monitoring Plan of Anticipated Impacts during Construction

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
EMP Implementation Training	Irreversible impact to the environment, workers, and community	(i) Project manager and all key workers will be required to undergo EMP implementation including spoils management, Standard operating procedures (SOP) for construction works; occupational health and safety (OH&S), core labor laws, applicable environmental laws, etc	Construction Contractor	(i) Certificate of Completion (Safeguards Compliance Orientation) (ii) Posting of Certification of Completion at worksites (iii) Posting of EMP at worksites	Cost of EMP Implementation Orientation Training to contractor is responsibility of PMU. Other costs responsibility of contractor.
Air Quality	Emissions from construction vehicles, equipment, and machinery used for installation of pipelines resulting to dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons.	(i) Consult with PMU/ on the designated areas for stockpiling of clay, soils, gravel, and other construction materials; (ii) Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather; (iii) Use tarpaulins to cover sand and other loose material when transported by trucks; and (iv) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly.	Construction Contractor	(i) Location of stockpiles; (ii) Complaints from sensitive receptors; (iii) Heavy equipment and machinery with air pollution control devices; (iv) Certification that vehicles are compliant with Air Act	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
Surface water quality	Mobilization of settled silt materials, and chemical contamination from fuels and lubricants during installation of pipelines can contaminate nearby surface water quality.	(i) Prepare and implement a spoils management plan (Appendix 4) (ii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets; (ii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies; (iii) Place storage areas for fuels and lubricants away from any drainage leading to water bodies; (iv) Dispose any wastes generated by installation of pipeline in designated sites; and (v) Conduct surface quality inspection according to the Environmental Management Plan (EMP).	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 waterbodies due to civil works	Cost for implementation of mitigation measures responsibility of contractor.
Noise Levels	Increase in noise level due to earthmoving and excavation equipment, and the transportation of equipment, materials, and people	(i) Plan activities in consultation with PMU/ so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; (ii) Horns should not be used unless it is necessary to warn other road users or animals of the	Construction Contractor	(i) Complaints from sensitive receptors; (ii) Use of silencers in noise-producing equipment and sound barriers (iii) Equivalent day and night time noise levels.	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
		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.			
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 4); (ii) Avoid stockpiling of excess excavated soils; (iii) Coordinate with 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	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
		wreckage, rubbish, or temporary structures which are no longer required; and (vii) Request PMU/ to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.			
Existing Infrastructure and Facilities	Disruption of service and damage to existing infrastructure at specified project location	(i) Obtain from PMU/ 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 Forest Department; and (iii) Plant two native trees for every one that is removed.	Construction Contractor	PMU/ 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 subproject.	Not applicable	Not applicable	Not applicable
Accessibility	Traffic problems and conflicts near project locations and haul road	(i) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of	Construction Contractor	(i) Traffic route during construction works including number of	Cost for implementation of mitigation measures

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		delivery sites; (ii) Schedule transport and hauling activities during non-peak hours; (iii) Locate entry and exit points in areas where there is low potential for traffic congestion; (iv) Keep the site free from all unnecessary obstructions; (v) Drive vehicles in a considerate manner; (vi) Coordinate with Traffic Police for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; (vii) Notify affected sensitive receptors 2 days in advance by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints. (viii) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum. (ix) Provide pedestrian access in all the locations until normalcy is restored		permanent signage, barricades and flagmen on worksite (ii) Complaints from sensitive receptors; (iii) Number of signage placed at project location.	responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
Socio-Economic – Income.	Impede the access of residents and customers to nearby shops	(i) Prepare and implement spoils management plan (Appendix 4) (ii) Leave spaces for access between mounds of soil; (iii) Provide walkways and metal sheets where required for people; (iv) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools; (v) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and (vi) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	Construction Contractor	(i) Complaints from sensitive receptors (ii) Spoils management plan (iii) Number of walkways, signage, and metal sheets placed at project location.	Cost for implementation of mitigation measures responsibility of contractor.
Socio-Economic - Employment	Generation of contractual employment and increase in local revenue	(i) Employ at least 50% of the labour force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available; (ii) Secure construction materials from local market. (iii) Comply with core	Construction Contractor	(i) Employment records; (ii) Records of sources of materials (iii) Compliance to core labor laws	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
		labor laws			
Occupational Health and Safety	Occupational hazards which can arise during work	(i) Comply with all national, state and local core labor laws (ii) Develop and implement site-specific occupational health and safety (OH&S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment like helmet, gumboot, safety belt, gloves, nose musk and ear plugs; (c) OH&S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work related accidents; Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site; (iii) Provide medical insurance coverage for workers; (iv) Secure all installations from unauthorized intrusion	Construction Contractor	(i) Site-specific OH&S Plan; (ii) Equipped first-aid stations; (iii) Medical insurance coverage for workers; (iv) Number of accidents; (v) Supplies of potable drinking water; (vi) Clean eating areas where workers are not exposed to hazardous or noxious substances; (vii) Record of H&S orientation trainings (viii) Personal protective equipment (ix) % of moving equipment outfitted with audible back-up alarms; (x) 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. (xi) Compliance to	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
		and accident risks; (v) Provide supplies of potable drinking water; (vi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances; (vii) 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; (viii) 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; (ix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; (x) Ensure moving equipment is outfitted with audible back-up		core labor laws	

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		alarms; (xi) 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 (xii) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively			
Asbestos Cement (AC) Materials	Health risks associated with AC pipes	(i) Left AC pipes in-situ. (ii) Training of all personnel (including manual labourers) to enable them to understand the dangers of AC pipes and to be able to recognize them in situ; (iii) Reporting procedures to inform	Construction Contractor	(i) Site-specific OH&S Plan including AC pipe protocol record of OH&S orientation on AC Cement Materials Protocol (ii) personal protective equipment for AC materials (iii) sign boards	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
		management immediately if AC pipes are encountered; (iv) Development and application of a detailed OH&S procedure to protect both workers and citizens. This should comply with national and international standards for dealing with asbestos, and should include: (a) removal of all persons to a safe distance; (b) usage of appropriate breathing apparatus and protective equipment by persons delegated to deal with the AC material; and (c) Procedures for the safe removal and long-term disposal of all asbestos-containing material encountered.		for pipe alignment identified as AC pipes.	

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
Community Health and Safety.	Traffic accidents and vehicle collision with pedestrians during material and waste transportation	(i) Plan routes to avoid times of peak-pedestrian activities. (ii) Liaise with PMU/ in identifying high-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.	Construction Contractor	(i) Traffic Management Plan; (ii) Complaints from sensitive receptors	Cost for implementation of mitigation measures responsibility of contractor.
Work Camps and worksites	Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants Unsanitary and poor living conditions for workers	(i) Consult with PMU/ before locating project offices, sheds, and construction plants; (ii) Minimize removal of vegetation and disallow cutting of trees; (iii) Provide drinking water, water for other uses, and sanitation facilities for employees; (iv) Ensure conditions of livability at work camps are maintained at the highest standards possible at all times; (v) Prohibit employees from poaching wildlife and cutting of	Construction Contractor	(i) Complaints from sensitive receptors; (ii) Drinking water and sanitation facilities for employees	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		trees for firewood; (vi) Train employees in the storage and handling of materials which can potentially cause soil contamination; (vii) Recover used oil and lubricants and reuse or remove from the site; (viii) Manage solid waste according to the preference hierarchy: reuse, recycling and disposal to designated areas; (ix) Ensure unauthorized persons specially children are not allowed in any worksite at any given time.			

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

Table 16: Environmental Management and Monitoring Plan of Anticipated Impacts during Operation

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
Check for blockage and leakage problems reducing the	It may affect the water supply system	Effectiveness of leak detection and water auditing to reduce the water losses			cost
Field	**Anticipated Impact**	**Mitigation Measures**	**Responsible for Mitigation**	**Monitoring of Mitigation**	**Cost and Source of Funds**
water losses					
Asset managemen t	Reduction in NRW Increased efficiency of the system	Preparation of O & M Manual			cost

A. EMP Implementation Cost

107. 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 will be provided as part of their management of the project, so this also does not need to be duplicated here. Cost for the capacity building program is included as part of the project.

Table 17: Cost Estimates to Implement the EMP

	Particulars	Stages	Unit	Total Number	Rate (USD)	Cost (USD)	Costs Covered By
A.	Mitigation Measures						
1	Compensatory plantation measures		Per tree	To be confirmed during detailed design	50	1,000	Civil works contract
	Subtotal (A)					1,000	
B.	Monitoring						
	Measures						
	Air quality monitoring	Construction	Per location	20	100	2,000	Civil works contract
	Noise levels monitoring	Construction	Per location	20	50	1,000	Civil works contract
	Subtotal (B)					3,000	
C.	Capacity Building						
1.	Introduction and sensitization to environment issues	Preconstruction	lump sum			1,500	PMU
2.	EMP implementation	Construction	lump sum			4,500	PMU
3.	Training Plans and Protocols	Construction	lump sum			4,500	PMU
4.	Experiences and best practices sharing	Construction/ Post-Construction	lump sum			1,500	PMU

	Particulars	Stages	Unit	Total Number	Rate (USD)	Cost (USD)	Costs Covered By
5.	Contractors Orientation to Workers on EMP implementation (OH&S, core labor laws, spoils management, etc)	Prior to dispatch to worksite	Lumpsum % of EMP Cost or % of contingency			2,000	Civil works contract
	Subtotal (C)					13,500	
	Total (A+B+C)				USD	18,000	

XI. FINDINGS AND RECOMMENDATIONS

144. The process described in this document has assessed the environmental impacts of all elements of the 24x7 water supply sub-project. All potential impacts were identified in relation to pre-construction, construction, and operation phases.

145. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible; thus, environmental impacts as being due to the project design or location were not significant. However, the social impacts (access disruptions) due to construction activities are unavoidable, as the residential and commercial establishments exist along the project corridor. A resettlement plan has been developed in accordance with ADB SPS 2009 and Government of India laws and regulations.

146. Anticipated impacts during operation and maintenance will be related to detection and repair of leaks and pipe bursts. These are, however, likely to be minimal, as proper design and selection of good quality pipe material shall mean that leaks are minimal. Leak repair work will be similar to the pipe-laying work.

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

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

149. The EMP will assist the PMU, , 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 the implementing agency, project management unit, and contractors.

150. 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.

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

152. Therefore, as per ADB SPS, the project is classified as environmental category B and does not require further environmental impact assessment.

Appendix 1: National Ambient Air Quality Standards by CPCB

Sl No:	Pollutants	Time weighted average	Concentration in ambient air		Method of measurement
			Industrial, Residential, Rural & Other Areas	Ecologically Sensitive Areas	
1	Sulphur Dioxide (SO2) µg/m3	Annual 24 hours	50 80	20 80	Improved West and Geake-Ultraviolet fluorescence
2	Nitrogen Dioxide (NO2) µg/m3	Annual 24 hours	40 80	30 80	Modified Jacob & Hochheiser (Na-Arsenite) Chemiluminescence
3	Particulate Matter (Size less than 10 µm) or PM10 µg/m3	Annual 24 hours	60 100	60 100	Gravimetric -TOEM -Beta attenuation
4	Particulate Matter (Size less than 2.5 µm) or PM2.5 µg/m3	Annual 24 hours	40 60	40 60	Gravimetric -TOEM -Beta attenuation
5	Carbon Monoxide (CO) mg/m3	8 hours 1 hours	02 04	02 04	Non Dispersive Infra Red (NDIR) Spectroscopy

Appendix 2: National Ambient Air Quality Standards in Respect of Noise

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

Appendix 3: Salient Features of Major Labor Laws Including Amendments Issued from Time to Time Applicable to Establishments Engaged in Construction of Civil Works

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

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

(iii) Employees' PF and Miscellaneous Provisions Act, 1952 - The Act provides for monthly contributions by the employer plus workers @10 % or 8.33 %. The benefits payable under the Act are: (a) Pension or family pension on retirement or death as the case may be; (b) deposit linked insurance on the death in harness of the worker; (c) payment of PF accumulation on retirement/death etc.

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

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

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

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

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

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

Governments have reduced the employment size from 20 to 10 for the purpose of applicability of the Act.

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

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

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

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

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

(xv) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 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.

Appendix 4: Sample Outline Spoil Management Plan

I. Spoils information

   A. Materials type
   B. Potential contamination
   C. Expected volume and sources
   D. Spoil classification

II. Spoils management

   A. Transportation of spoil
   B. Storage of spoil
   C. Contaminated spoil
   D. Approved reuse and/or disposal sites

III. Records of reuse and/or disposal

Appendix 5: Sample Outline Traffic Management Plan

A. Principles for TMP around the Water Pipes 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 every 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

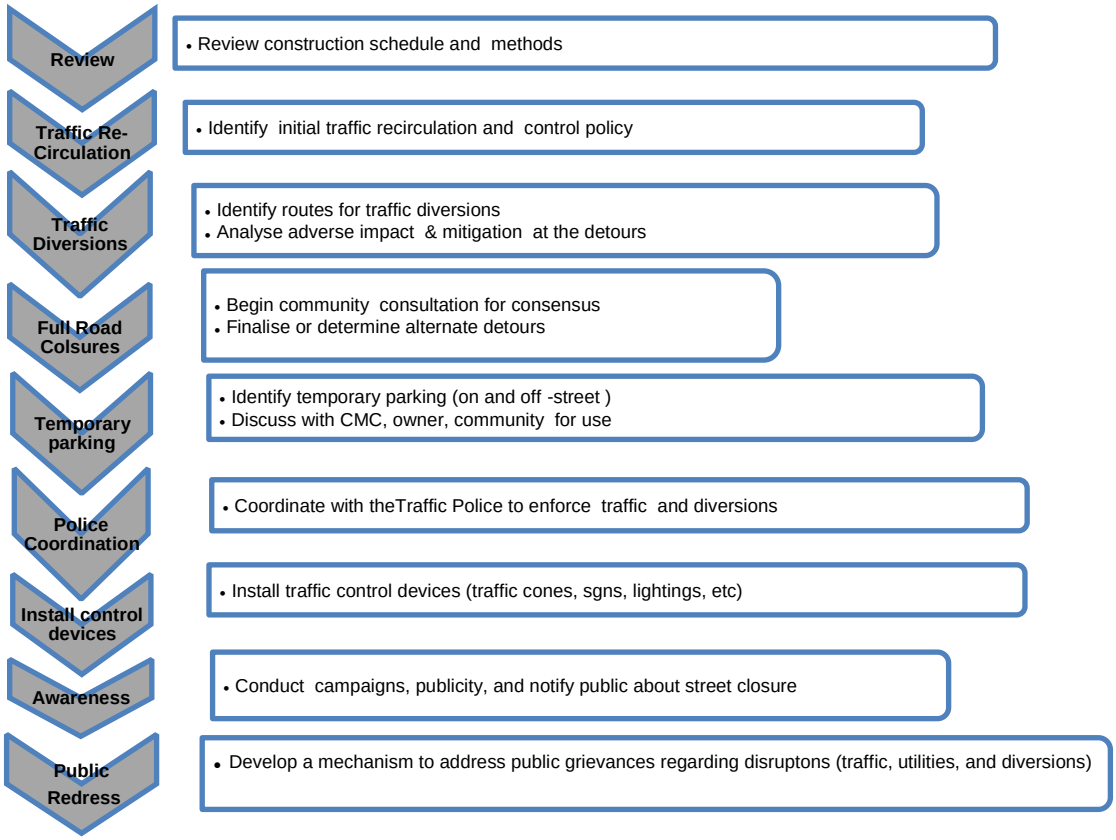
4. Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

(i) approval from the /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 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

5. 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:

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

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. Flagggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

15. 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 and shoulder or parking lane closed on divided road)

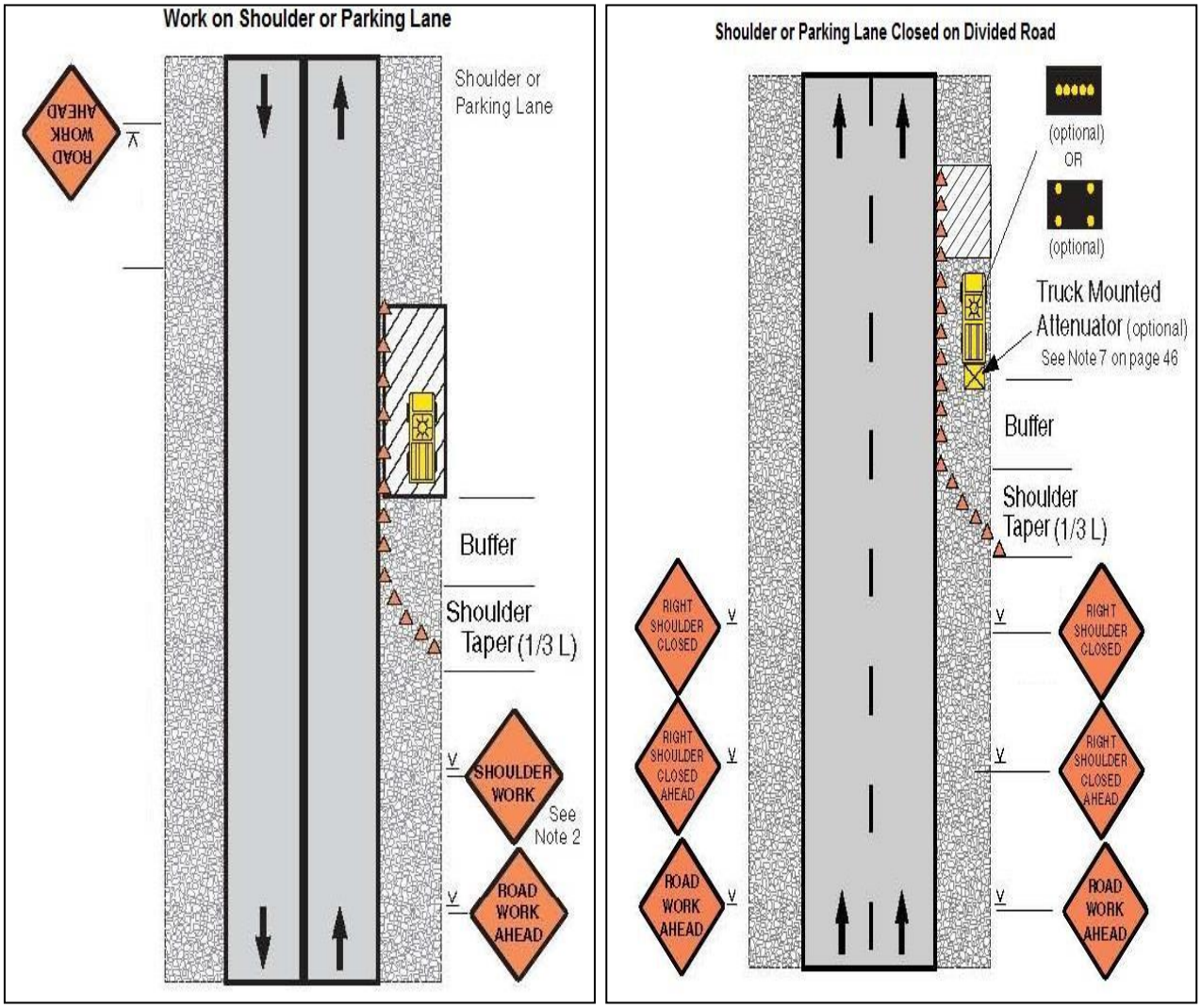


Figure A4 & A5: Work in Travel lane & Lane closure on road with low volume

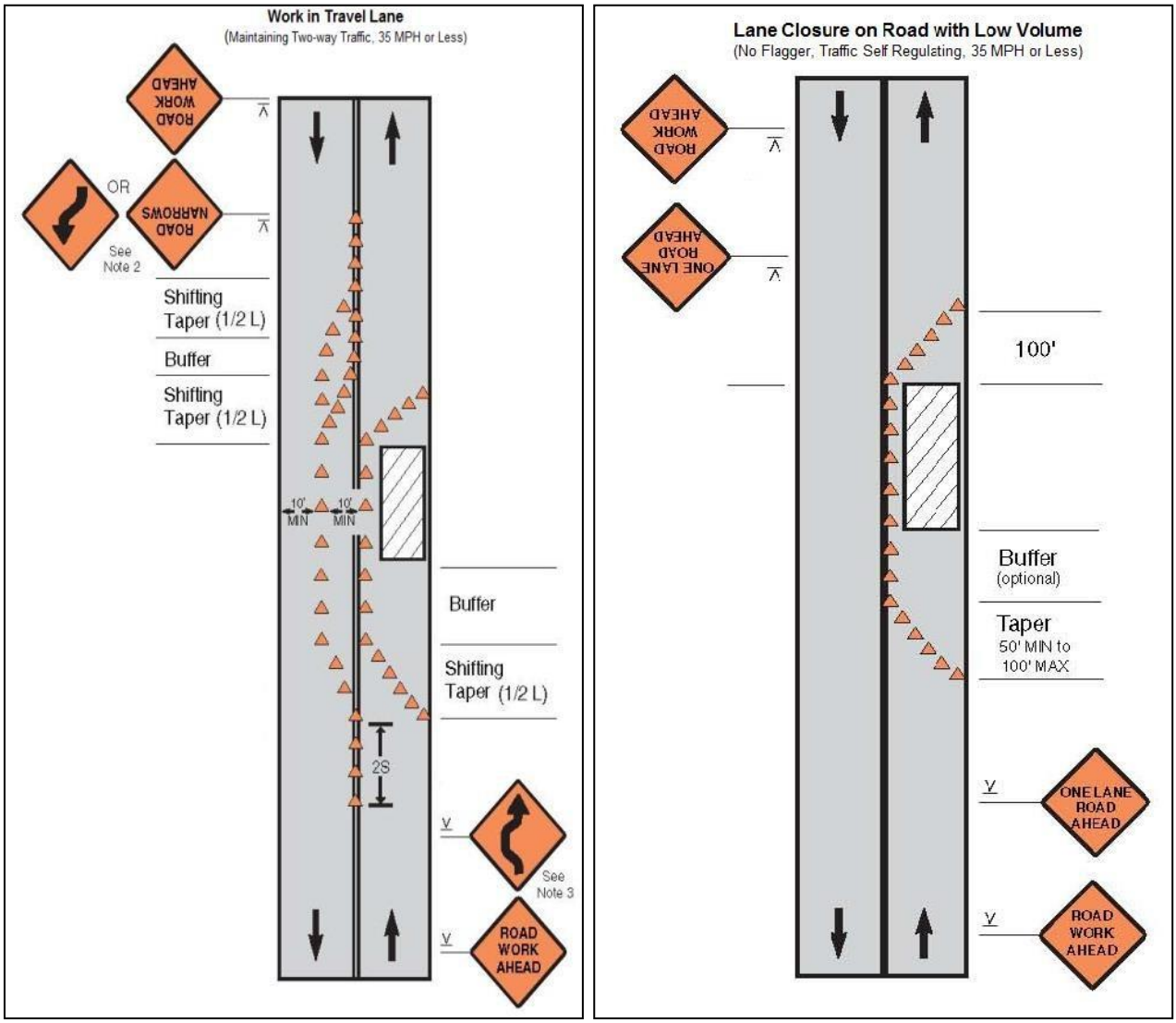
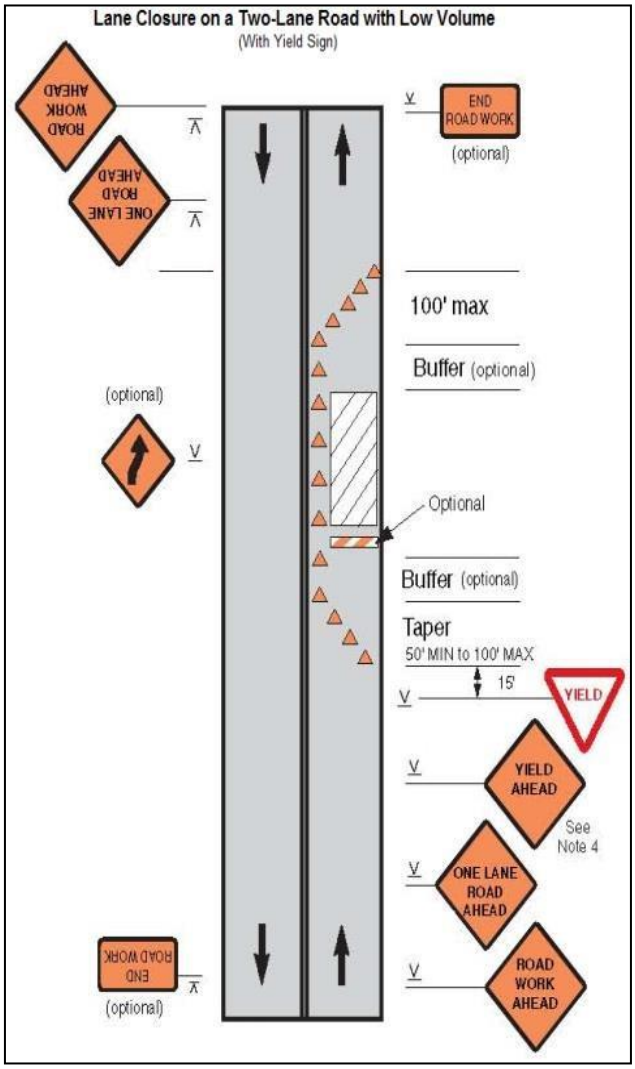


Figure A6 & A7: Lane closure on a two-line road with low volume (with yield sign) & Lane closure on a two-line road with low volume (one flagger operation)



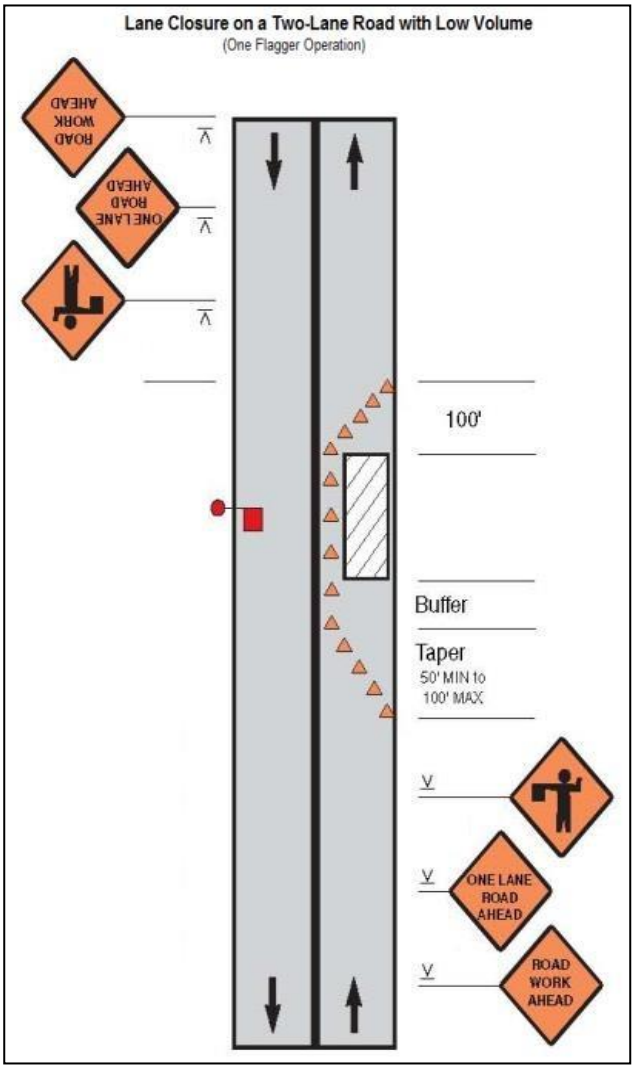


Figure A8 & A9: Lane Closure on a Two-Lane Road (Two Flagger Operation) & Lane Closure on a Four-Lane Undivided Road

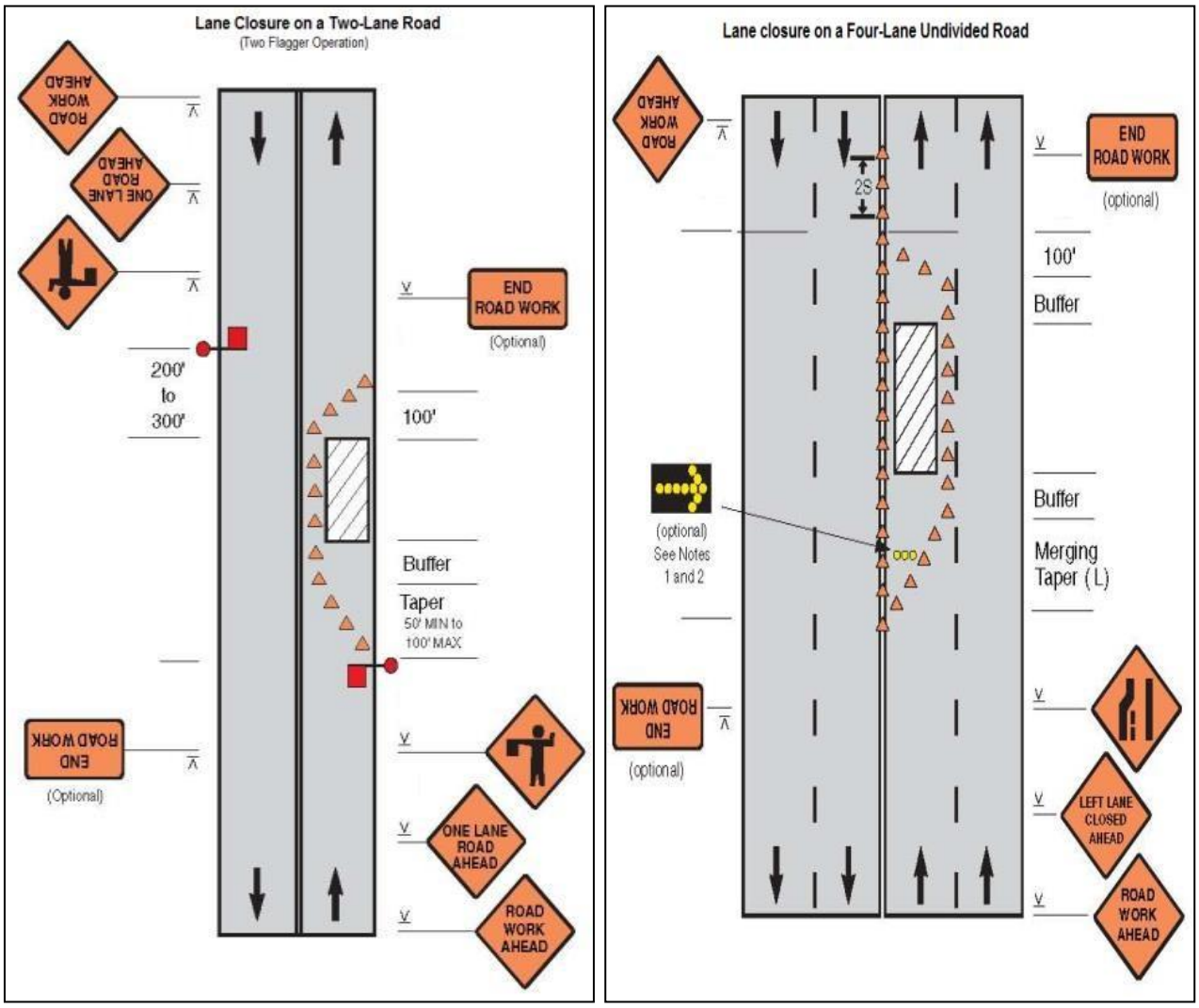


Figure A10 & A11: Lane Closure nn Divided Roadway & Half Road Closure On Multi-Lane Roadway

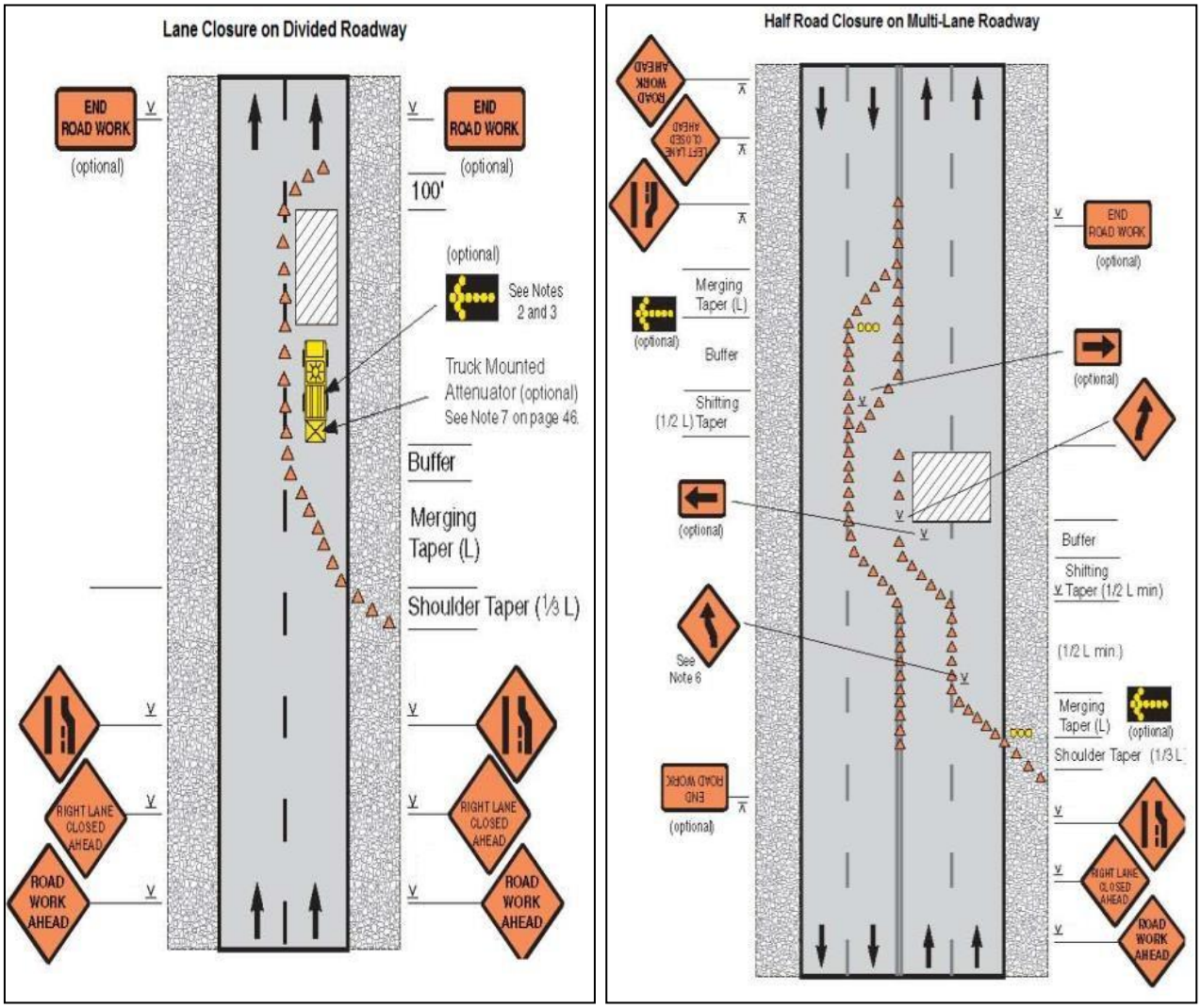
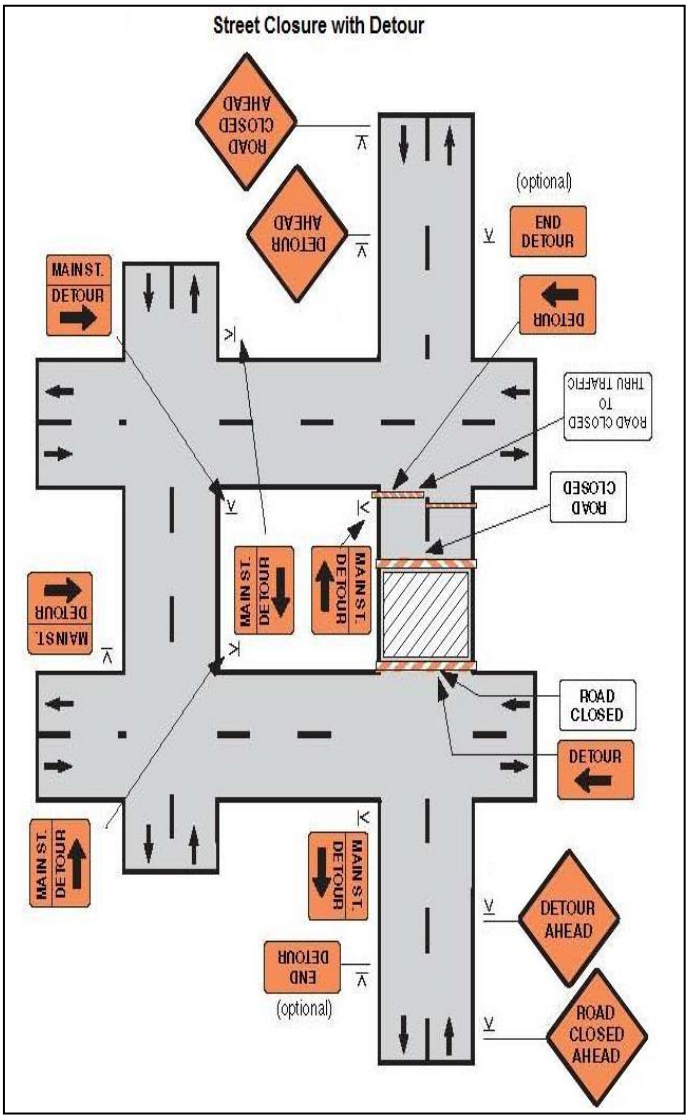


Figure A12: Street closure with detour



Appendix 6: Sample Monthly Reporting Format for PMSC Construction Supervision Specialist

This template must be included as an appendix in the EIA/IEE that will be prepared for the project. It can be adapted to the specific project as necessary.

I. Introduction

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

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

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

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

III. Compliance status with environmental loan covenants

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

IV. Compliance status with the environmental management and monitoring plan

- Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.
- There should be reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the

semi-annual report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:

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

V. Summary Monitoring Table

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

VI. 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

VII. Approach and methodology for environmental monitoring of the project

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

VIII. 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 (Government Standards)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Water Quality Results

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

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

Noise Quality Results

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

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

IX. SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

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

X. APPENDIXES

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

SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT

Project Name
Contract Number

NAME: _____ DATE: _____
TITLE: _____ DMA: _____
LOCATION: _____ GROUP: _____

WEATHER CONDITION:
_____

INITIAL SITE CONDITION: _____

CONCLUDING SITE CONDITION:

Satisfactory _____ Unsatisfactory _____ Incident _____ Resolved _____ Unresolved _____

INCIDENT:
Nature of incident:
_____

Intervention Steps:
_____

Incident Issues

Resolution

Inspection

Project Activity Stage		
	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Emissions	Waste Minimization
Air Quality	Reuse and Recycling
Noise pollution	Dust and Litter Control
Hazardous Substances	Trees and Vegetation

Site Restored to Original Condition	Yes		No	

Signature
_____

Sign off

_____ _____

Name **Name**
Position **Position**

SAMPLE CHECKLIST FOR CONSTRUCTION SAFETY

Sl. No.	Safety Issues	Yes	No	Non-Compliance	Corrective Action	Penalty	Remarks
1	Appointment of qualified construction safety officers						
2	Approval for construction safety management plan by the SC						
3	Approval for traffic management/control plan in accordance with IRC: SP: 552001						
4	Maintenance of the existing road stretches handed over to the contractor.						
5	Provision of temporary traffic barriers/barricades/caution tapes in construction zones						
6	Provision of traffic signboards						
7	Provision for flags and warning lights						
9	Providing plastic crash barrier						
10	Provision of adequate staging, form work, and access (ladders with handrail) for works at a height of more than 3 m						
11	Provision of adequate shoring/ bracing/barricading/lighting for all deep excavations of more than 3 m depth.						
12	Demarcations (fencing, guarding, and watching) at construction sites						
13	Provision for sufficient lighting, especially for nighttime work						
14	Arrangements for controlled access and entry to construction zones						
15	Safety arrangements for road users/pedestrians						
16	Arrangements for detouring traffic to alternate facilities						
17	Regular inspection of work zone traffic control devices by authorized contractor personnel						
18	Construction workers' safety - Provision of personnel protective equipment						

19	A. Helmets						
	B. Safety shoes						
	C. Dust masks						
	D. Hand gloves						
	E. Safety belts						
	F. Reflective jackets						

Sl. No.	Safety Issues	Yes	No	Non-Compliance	Corrective Action	Penalty	Remarks
	G. Earplugs for labor						
20	Workers employed on bituminous works, stone crushers, concrete batching plants, etc. provided with protective goggles, gloves, gumboots, etc.						
21	Workers engaged in welding work shall be provided with welder protective shields						
22	All vehicles are provided with reverse horns.						
23	All scaffolds, ladders, and other safety devices shall be maintained in safe and sound condition.						
24	Regular health checkup for labor/ contractor's personnel						
25	Ensuring sanitary conditions and all waste disposal procedures and methods in the camps.						
26	The contractor shall provide adequate circuit for traffic flow around construction areas, control speed of construction vehicles through road safety and training of drivers, provide adequate signage, barriers, and flag persons for traffic control						
27	Provision of insurance coverage for the contractor's personnel						

Contractor: _____

Consultant: _____

Appendix 7: Rapid Environmental Assessment (REA) Checklist – water supply

Instructions:

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

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

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

Country/Project Title: 24 X 7 GVMC WATER SUPPLY SUB PROJECT

Sector Division: SOUTH ASIA URBAN AND WATER DIVISION

Screening questions	Yes	No	Remarks
A. Project siting Is the project area…			
• Densely populated?	✓		The population distribution shows that the project area is densely populated.
• Heavy with development activities?	✓		
• Adjacent to or within any environmentally sensitive areas?			No protected areas/ecologically sensitive areas within 10 km radius of the subproject.
• Cultural heritage site		✓	
• Protected area		✓	
• Wetland		✓	
• Mangrove		✓	
• Estuarine		✓	
• Buffer zone of protected area		✓	
• Special area for protecting biodiversity		✓	
• Bay		✓	
B. Potential environmental impacts Will the project cause…			
• Pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?		✓	Not applicable.
• Impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	Not applicable. There are no historical/cultural monuments/areas within or adjacent to subproject sites.
• Hazard of land subsidence caused by excessive ground water pumping?		✓	Not applicable.
• Social conflicts arising from displacement of communities?		✓	No displacements required. Subproject sites are government-owned. Temporary

Screening questions	Yes	No	Remarks
			impacts to businesses may occur during pipelaying works and are to be addressed through specific measures in the EMP. Any involuntary resettlement impacts identified will be addressed in the subproject RP.
• Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		✓	Not applicable.
• Unsatisfactory raw water supply (e.g. Excessive pathogens or mineral constituents)?		✓	Periodic monitoring and analysis conducted by GVMC on raw water from the sources indicate water quality parameters are within prescribed limits.
• Delivery of unsafe water to distribution system?		✓	Subproject includes rehabilitation of existing and construction of distribution network. Any distributed water will be treated and ensured to comply with the National Drinking Water Quality Standards.
• Inadequate protection of intake works or wells, leading to pollution of water supply?		✓	Not applicable.
• Over pumping of ground water, leading to salinization and ground subsidence?		✓	Not applicable.
• Excessive algal growth in storage reservoir?		✓	Storage reservoirs are only for treated water. The water is chlorinated and the reservoirs covered to prevent algal growth.
• Increase in production of sewage beyond capabilities of community facilities?		✓	Not anticipated.
• Inadequate disposal of sludge from water treatment plants?		✓	Not applicable.
• Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		✓	GVMC will include design considerations to minimize noise and other nuisances in infrastructure to be located in areas with sensitive receptors.
• Impairments associated with transmission lines and access roads?		✓	Not anticipated. Road closures are not required during pipelaying works. A section-wise approach will limit impairments to traffic and businesses during construction. The EMP ensures measures are included to mitigate the impacts.
• Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.		✓	Not applicable.
• Health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project		✓	Not applicable.

Screening questions	Yes	No	Remarks
construction and operation?			
• Dislocation or involuntary resettlement of people?		✓	No involuntary resettlement impacts envisioned. Lands for the subproject are government-owned. Any involuntary resettlement impacts identified will be addressed in the RP.
• Disproportionate impacts on the poor, women and children, indigenous peoples or other vulnerable groups?		✓	Not anticipated. The contractor will be encouraged to hire local workers from the local labor force.
• Noise and dust from construction activities?	✓		Anticipated during construction activities. Temporary increase in noise level and dusts may be caused by excavation equipment, and the transportation of equipment, materials, and people. The impacts are negative but short-term and site-specific within a relatively small area. and reversible through mitigation measures. Good construction practices will mitigate noise and dust, and will be specified in the EMP.
• Increased road traffic due to interference of construction activities?	✓		Anticipated during construction activities. The impacts are negative but short-term and site-specific within a relatively small area and reversible through mitigation measures. Traffic management will be specified in the EMP.
• Continuing soil erosion/silt runoff from construction operations?	✓		Due to excavation and run-off from stockpiled materials. The impacts are negative but short-term and site-specific within a relatively small area and reversible through mitigation measures. Good construction practices will mitigate soil erosion and silt runoff and will be specified in the EMP.
• Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?		✓	Not applicable.
• Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		✓	The project will include development of O&M manuals to ensure facilities are kept in working condition, including checking and maintenance of distribution network. Any distributed water must comply with the National Drinking Water Quality Standards.
• Accidental leakage of chlorine gas?		✓	Not applicable. Chlorine gas will not be used.
• Excessive abstraction of water affecting downstream water users?		✓	Not applicable.
• Competing uses of water?		✓	

Screening questions	Yes	No	Remarks
• Increased sewage flow due to increased water supply		✓	Not applicable.
• Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant		✓	
• Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Improved management systems through capacity building and institutional development will ensure reduced burden on services and infrastructure.
• Social conflicts if workers from other regions or countries are hired?		✓	Priority in employment will be given to local residents.
• Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?		✓	Not applicable. Construction will not involve use of explosives and 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?	✓		Work areas will be clearly demarcated with signage and safety barriers, and access will be controlled. Only workers and project concerned members will be allowed to visit the operational sites.

A Checklist for Preliminary Climate Risk Screening

Country/Project Title:

Sector :

Subsector:

Division/Department:

Screening Questions		Score	Remarks[10]
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	
	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	

[10] 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.

Screening Questions		Score	Remarks[10]
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)?	1	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	1	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

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

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

Other Comments:_____
_____

Prepared by: _____