

GOVERNMENT OF ASSAM

Guwahati Development Department

And

Urban Development Department

**Environmental Assessment and Review
Framework**

Revised August 2013 (June 2011)

**IND: Assam Urban Infrastructure Investment
Program (AUIIP)
ADB Loan No. 2806-IND**

ABBREVIATIONS

ADB	-	Asian Development Bank
APCB	-	Assam Pollution Control Board
AUIIP	-	Assam Urban Infrastructure Investment Program
BRT	-	Bus Rapid Transit
BSR	-	Basic Schedule of Rates
CDTA	-	Capacity Development Technical Assistance
CFE	-	Consent for Establishment
CFO	-	Consent for Operation
CMS	-	Convention on Migratory Species of Wild Animals
CPR	-	Common Property Resources
CTSL	-	City Transport Services Limited
DMB	-	Dibrugarh Municipal Board
DPR	-	Detailed Project Report
DSC	-	Design and Supervision Consultants
EAC	-	Environmental Appraisal Committee
EARF	-	Environmental Assessment and Review Framework
EIA	-	Environmental Impact Assessment
EMP	-	environmental management plan
FAM	-	Facility Administration Memorandum
FFA	-	Framework Financing Agreement
GDD	-	Guwahati Development Department
GMA	-	Guwahati Metropolitan Area
GMDA	-	Guwahati Metropolitan Development Authority
GRC	-	Grievance Redress Committee
GRM	-	Grievance Redress Mechanism
JNNRM	-	Jawaharlal Nehru National Renewal Mission
LAA	-	Land Acquisition Act
MFF	-	Multi-tranche Financing Facility
MoEF	-	Ministry of Environment and Forest
MOU	-	Memorandum of Understanding
NOC	-	No Objection Certificate
PIU	-	Public Implementation Unit
PMC	-	Project Management Consultants
PMU	-	Program Management Unit
REA	-	Rapid Environmental Assessment
SCM	-	Safeguards Compliance and Monitoring
SEIAA	-	State Environmental Impact Assessment Authority
SPS	-	Safeguard Policy Statement
UDD	-	Urban Development Department
UFF	-	Unaccounted for Water
ULB	-	Urban Local Body

WEIGHTS AND MEASURES

cm	–	centimeter
dbA	–	decibels
dia.	–	diameter
ha	–	Hectare
kg	–	kilogram
km	–	kilometer
l	–	liter
m	–	Meter
m ²	–	square meter
m ³	–	cubic meter
mg/l	–	Milligrams per liter
ml	–	Milliliter
MLD	–	million liters per day
mm	–	millimeter
sq. km.	–	square kilometers
sq. m.	–	square meters
µg/m ³	–	micrograms per cubic meter

NOTE

In this report, "\$" refers to US dollars.

This environmental assessment and review framework is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

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

CONTENT

ENVIRONMENTAL ASSESSMENT AND REVIEW FRAMEWORK

	Page
I. INTRODUCTION	1
A. Overview of the Project	1
B. Purpose of EARF	2
C. Project Components	2
II. ASSESSMENT OF LEGAL FRAMEWORK AND INSTITUTIONAL CAPACITY	5
A. Applicable Legislations	6
B. Environmental Assessment Requirements	6
C. National Legal Requirements	7
D. State Legal Requirements	10
E. Applicable International Environmental Agreements	10
III. ANTICIPATED ENVIRONMENTAL IMPACTS	15
IV. ENVIRONMENTAL ASSESSMENT FOR SUBPROJECTS AND COMPONENTS	17
A. Environmental Guidelines for Subproject Selection	17
B. Environmental Assessment Procedures for Subprojects	21
V. CONSULTATION, INFORMATION DISCLOSURE, AND GRIEVANCE	25
REDRESS MECHANISM	
A. Public Consultation and Information Disclosure	25
B. Grievance Redress Mechanism	27
VI. INSTITUTIONAL ARRANGEMENTS AND RESPONSIBILITIES	30
A. Implementation Arrangements	30
B. Institutional Capacity Development Program	31
C. Staffing Requirement and Budget	34
VII. MONITORING AND REPORTING	35
 APPENDIXES	
1. Details of the AUIIP Components for EARF Consideration	37
2. Central Pollution Control Board Applicable Environmental Standards	39
3. Summary of Process for Obtaining Forest Clearance Diversion of Forest Lands to Non-Forest Use	47
4. Sample Grievance Registration Form	50
5. Environmental Monitoring Format	52

I. INTRODUCTION

A. Overview of the Project

1. The Assam Urban Infrastructure Investment Program (AUIIP Program) is a key urban infrastructure initiative of the Government of Assam, and aims to improve the urban environment and quality of life in the cities of Guwahati and Dibrugarh through the delivery of improved water supply, sanitation, solid waste management (SWM), drainage infrastructure, and a sustainable urban transport system such as a Bus Rapid Transit (BRT) corridor.¹ The project uses a Multi-tranche Financing Facility (MFF) modality and will be implemented over a 6-year period from 2012 to 2017 (December). Investments under the MFF will be delivered in two tranches. In accordance with *ADB’s Safeguard Policy Statement (SPS, 2009)* all MFF programs require the preparation of an Environmental Assessment and Review Framework (EARF).²

2. The major outputs of the Project include: (i) for Guwahati, improved water supply, sanitation, and urban transport through a BRT corridor; and (ii) for Dibrugarh, improved drainage, and comprehensive SWM. A summary of the Project urban infrastructure and services improvement components and associated tranche for EARF consideration are shown in **Table 1**.

Table 1: Summary of Infrastructure and Tranches

Project	Component	Details
Tranche 1		
Guwahati	Water Supply	Construction of (i) River intake, (ii) WTP(including site filling and river protection works), (iii) pumping mains, (iv) service reservoir
	Urban Transport	Design and preparatory works for the bus rapid transit subproject (BRT).
Dibrugarh	Drainage	Construction of DTP Drain, Box Culverts and allied Works in Dibrugarh from Chainage 0 to 9500 M
	Solid Waste Management	(i) Supply of equipment and vehicles for solid waste collection and transportation; (ii) construction of garage/workshop for solid waste management vehicles and equipment; (iii) Construction of treatment and disposal site including all civil, mechanical and electrical works
Tranche 2		
Guwahati	Water Supply	(i) Distribution pipelines in South-East zone,

¹ The Project will also contribute to achieving Millennium Development Goal 7, Target 10, which calls for halving, by 2015, the proportion of people without access to safe drinking water and improved sanitation.

² The preparation of safeguard frameworks aim to clarify safeguard principles and requirements governing screening and categorization, environmental assessment, and preparation and implementation of environmental plans of subprojects to be prepared after MFF approval.

Project	Component	Details
		and (ii) supply of water meters
	Sewerage	Zone 1A (South East) (Sewage treatment plant and sewer networks to serve Guwahati1 A South East
	Urban Transport	Construction of Bus Rapid Transport Corridor and allied works
Dibrugarh	Drainage	Main outlet channel rehabilitation and allied works and secondary drainage

Notes: BRT = Bus Rapid Transit, DTP= Dibrugarh Town Protection, STP = Sewage treatment plant

B. Purpose of EARF

3. This EARF aims to provide guidance on safeguard screening, assessment, institutional arrangements, and processes to be followed for subprojects, where design takes place after Board approval. The purpose of this EARF is to do the following: (i) describe the proposed subprojects in Tranches I and II; (ii) explain the general anticipated environmental impacts of the subprojects to be financed under the proposed MFF; (iii) specify the requirements that will be followed in relation to subproject screening and categorization, assessment, and planning, including arrangements for meaningful consultation with affected people and other stakeholders and information disclosure requirements and, where applicable, safeguard criteria that are to be used in selecting subprojects and/or components; (iv) assess the adequacy of the client's capacity to implement national laws and ADB's requirements and identify needs for capacity building; (v) specify implementation procedures, including the budget, institutional arrangements, and capacity development requirements; (vi) specify monitoring and reporting requirements; and (vii) describe the responsibilities of the client and of ADB in relation to the preparation, implementation, and progress review of safeguard documents of subprojects. The subproject selection shall be in accordance with the environmental subproject selection criteria as outlined in this EARF and in Schedule 4 of the framework financing agreement (FFA).

4. This EARF is prepared based on (i) *ADB's Safeguard Policy Statement (2009)*, and (ii) the *Gol Environment (Protection) Act Environment (Protection) Rules* and amendments. All environmental assessment is required to follow the procedures outlined in this EARF. Any component included in the Project shall comply with the environmental requirements of the Government of India, the Government of Assam, and ADB. All environmental documents will be endorsed and approved by the executing agency and cleared by ADB as required by ADB policy and national law.³

5. The EARF ensures that all subprojects under the MFF, in the entirety of their project cycle, will not deteriorate or interfere with the environmental sensitivity of a subproject area but rather improve environmental quality through development of infrastructure facilities.

C. Project Components

³ Under Tranche II, the government and ADB may engage co-financing to support the BRT component. A single social and environmental assessment and planning process and unified safeguard documentation, consultation, and disclosure requirements will be agreed to satisfy the safeguard principles and requirements of ADB and the co-financiers. The agreement or MOU between ADB and the co-financiers explains how the responsibilities of ADB and the co-financiers for monitoring and supervising safeguard implementation are allocated.

6. The Project will consist of two parts. Part A covers urban infrastructure and services improvement including the rehabilitation, improvement and expansion of: (i) water supply; (ii) sewerage; (iii) urban transport; (iv) solid waste management, and (v) drainage and flood protection. Part B covers provision of project management support, institutional development, capacity building and project administration. A detailed description of each component is presented in **Appendix 1**.

I. Part A – Urban Infrastructure and Services Improvement Components

7. **Water supply.** In Guwahati, only 40% of the population has access to central piped water supply system while totally absent in Dibrugarh. Both cities get their water not only from the central piped water supply systems operated by Public Health Engineering Departments (PHEDs) and urban local bodies (ULBs), but also from wells, springs, rivers, rainwater, tankers and vendors. Both cities are on the banks of the River Brahmaputra and experience a tropical monsoon climate, with rainfall of around 2000 mm per year. Lack of adequate water supplies is causing inconvenience and hardship in Guwahati while water requirement in Dibrugarh is met through pumping ground water. The key issues pertaining to the present systems can be summarized as follows: (i) limited coverage of the system, and dependence on non-potable water sources; (ii) non-uniform distribution, both in terms of quality and quantity of water supplied; (iii) high levels of unaccounted-for -water (UFW), and leakages in the distribution system; and (iv) low levels of cost recovery. Improvement in the water supply system in the uncovered areas in the South Guwahati East Zone⁴ is considered for implementation in the Project.

8. **Sewerage.** In both project cities, the dominant mode of sanitation is a septic tank or soak pit for toilet wastes. Wastewaters percolate into the soil usually overflow to the nearest drain or stream, while sullage water is drained directly to the nearest drain or stream.

9. The Guwahati Metropolitan Area (GMA) does not have an integrated sewerage system except for certain establishments having their own independent systems such as colonies managed by the railway and defense authorities and the Indian Oil Corporation. In the absence of an organized system, septic tanks with or without soak pits are the most prevalent mode. Given the high subsoil water table in all but the hilly portions of the GMA, the soak pits are non-functional, thereby polluting the groundwater. In the low income areas, specifically in the 26 designated slum areas, most of the wastewater is discharged into the Bharalu River which finally drains into the Brahmaputra River. Given that substantial incremental wastewater will be generated from the water supply subproject, sewerage improvement in the area roughly corresponding to the South Guwahati East water supply zone⁵ is considered for implementation in the Project.

10. **Urban transport.** Over two decades, rapid economic and population growth have resulted in significantly increased motorization rates and vehicular traffic in the streets of Guwahati. The road

⁴ The city has been divided into four distribution zones (i) North Guwahati Zone (ii) South Guwahati West Zone (iii) South Guwahati Central Zone and South Guwahati East Zone. Jawaharlal Nehru National Renewal Mission (JNNURM) is financing the south-west zone, JICA is providing funding assistance for the north and south-central zone. The proposed AUIP will develop the south-east zone. The different zones are well defined and that there would be no duplication of effort.

⁵ Consistent with the water supply zones, Guwahati is divided into three main sewerage catchments: one on the north side of the Brahmaputra River and two on the south. On the southern side of the river, one catchment roughly corresponds to the water supply west zone. The other covers the central and east water supply zones serving a combined projected 2025 population of nearly 1,500,000.

network has rapidly deteriorated, and the absence of proper traffic management has severely affected mobility. Lack of an efficient, reliable and safe public transport system in the city has worsened this situation and congestion, air pollution and road accidents are increasing, impairing Guwahati's further economic development. Recognizing the need to solve this issue, the Government of Assam's Guwahati Development Department (GDD), through the Guwahati Metropolitan Development Authority (GMDA), is planning to create a more sustainable urban transport system to meet the accessibility needs and mobility requirements of the city. As part of this exercise, the Master Plan for Guwahati Metropolitan area (2025) has been prepared by GMDA that envisions a "planned, clean and beautiful city by the year 2025," and includes a comprehensive mobility plan including developing several corridors for implementation of an effective and reliable mass-transportation system.⁶ The financing of an urban transport through a BRT corridor in Guwahati is considered for implementation in the Project.

11. **Solid waste management.** According to the *Municipal Solid Wastes (Management and Handling) Rules of 2000* (MSW Rules), the ULBs are mandated to manage solid wastes. Conformance to the MSW Rules is non-existent in the project cities. Only 30-50% of wastes are collected and disposed by open dumping with a substantial proportion of households regularly dumping wastes in the nearest open space or drain. The problems of solid waste management are magnified in low income areas and designated slum pockets.

12. Guwahati is currently implementing its Integrated Solid Waste Management Project under Jawaharlal Nehru National Renewal Mission (JNNURM). The project comprises of improvements in collection, transportation, treatment and disposal of wastes by establishment of sanitary landfill sites and compost plants. In Dibrugarh, designing and implementing a similar comprehensive solid waste management system are considered for implementation under the Project.

13. **Drainage and flood protection.** Guwahati and Dibrugarh are vulnerable to recurrent flooding. Dibrugarh, located on the south bank of Dibru River, a tributary of the Brahmaputra River, is vulnerable to recurrent flooding. To protect the city, an 8.62 kilometer (km) dyke called the Dibrugarh Town Protection (DTP) dyke was constructed in 1955 which closed all the drainage channels resulting in rain water inundation in the town and its adjoining area. To get rid of the drainage congestion, a 22.40 km long drainage channel was constructed from Jalan nagar (now Paltan Bazar) to the outfall in Brahmaputra River. However, the huge sediment load of Brahmaputra River has resulted in continuous deposition of silt in its bed resulting to significant raised level. This has worsened the drainage system because at present, the level of Dibrugarh town is 1.5 meter (m) below the bed level of Brahmaputra River. Drainage and flood protection interventions in Dibrugarh are considered for implementation in the Project.

14. **Tranche 1 Subprojects.** Tranche 1 is categorized as Category B in accordance with ADB's SPS, 2009. During project preparation for Tranche 1, IEEs/EMPs were prepared for each subproject covering (i) Guwahati water supply works (construction of river intake; water treatment plant, service reservoirs, primary transmission mains for the South Guwahati East Zone); (ii) Dibrugarh solid waste management works (supply of equipment and vehicles for solid waste collection and transportation, construction of treatment and disposal site, capping of existing

⁶ One corridor was prioritized for the first phase and for the implementation of Bus Rapid Transit (BRT) routes. A detailed project report (DPR) was prepared for the BRT corridor, and a more detailed feasibility study (i.e., an updated DPR) and design of the corridor will occur under the Project with construction envisaged under Tranche 2.

dumpsite; and (iii) Dibrugarh drainage improvement works (desilting and lining of DTP dyke drain, construction of household drains, internal common drains and roadside drains, and renovation of box culvert at the drainage crossings).

15. The IEEs concluded that the subprojects would have only small-scale, localized impacts on the environment which are readily mitigated; therefore no significant environmental impacts are anticipated. Mitigation measures and monitoring plans were proposed in the Environmental Management Plans (EMP) which form part of the IEE reports.

II. Part B – Project Management and Capacity Building Components

16. While the Project will involve provision of urban infrastructure and services in the capital cities, long-term sustainability of the assets created, and effective planning and management of urban basic services in general, requires that key urban management issues be addressed by the Program.

17. Management of the implementation of the Project will be undertaken by the Program Management Unit (PMU) and the Project Implementation Units (PIUs) in each city. Provision is made under the Project for funding the costs of PMC and PIUs, as well as the cost of consultants⁷ to provide assistance in project management and related capacity building. Such support is considered essential to the implementation of the Project, particularly in light of the lack of experience of the proposed executing and implementing agencies with projects this large, implemented through separate design and construction contracts.

18. The PMC and DSC will have safeguards staff with expertise in environmental assessment and management to train, build capacity, and monitor the safeguards work overseen under the PMU and PIUs. Environmental management training programs with specific modules focusing on ADB and government environmental assessment procedures and monitor.

19. Moreover, effective and sustained delivery of urban services will require that the existing ULBs be strengthened and new ULBs be created, that water supply, sewerage and solid waste management operations be operated in a much more effective and efficient manner, that own source funding of all urban services be very substantially enhanced and that urban land management be improved. These will require a variety of actions which are expected to range from conduct of community consultations and institutional surveys to preparation and implementation of legislation and regulations, reorganization of departments, modernization of human resource management systems and improvement of financial management systems. Some of the measures, such as creation of a new ULB or a new water supply and sanitation agency, involve major changes and these will have to be conducted over a longer period of time. Support will be provided under the project for the necessary measures.⁸

II. ASSESSMENT OF LEGAL FRAMEWORK AND INSTITUTIONAL CAPACITY

⁷ Project Management Consultants (PMC) and Design and Supervision Consultants (DSC)

⁸ The proposed project management and capacity development for each city include: (i) safeguards compliance studies; (ii) community awareness programs, (iii) compost marketing studies; (iv) non-revenue reduction programs, power and water audits; (v) support for migration to a double entry accounting basis system in ULB; (vi) support for preparation of a GIS-based property tax system; (vii) private sector participation opportunities studies; (viii) water utility reform program focusing on asset management improvement.

A. Applicable Legislations

20. The implementation of subprojects proposed under the Program will be governed by the Government of India's environmental acts, rules, policies, and regulations. These regulations impose restrictions on the activities to minimize/mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure subprojects are consistent with the legal framework, whether national, state or municipal/local. In addition, subprojects shall also be consistent with ADB's SPS. The following are applicable to the Project:

- I. Environmental (Protection) Act of 1986 and its amendment;
- II. Environmental (Protection) Rules of 1986;
- III. Environmental Impact Assessment (EIA) Notification of 2006;
- IV. Water (Prevention and Control of Pollution) Act of 1974, its Rules, and amendments;
- V. Air (Prevention and Control of Pollution) Act of 1981, its Rules and amendments;
- VI. Central Pollution Control Board (CPCB) Environmental Standards;
- VII. Wildlife (Protection) Act of 1972, its Rules and amendments;
- VIII. Indian Forest Act of 1927;
- IX. Forest (Conservation) Act of 1980, its amendments;
- X. Forest (Conservation) Rules of 1981 and its amendments;
- XI. Assam Forest Regulation of 1891;
- XII. Assam Forest Policy of 2004;
- XIII. Guidelines for Diversion of Forest Lands for Non-Forest Purpose under the Forest (Conservation) Act of 1980;
- XIV. Ancient Monuments and Archaeological Sites and Remains Rules of 1959; and
- XV. Land Acquisition Act of 1894 and as amended in 1985.

21. Key standards include those related to drinking water quality, air quality, effluent discharge, and protected areas. Compliance is required in all stages of the project including design, construction, and operation and maintenance.

B. Environmental Assessment Requirements

22. The Government of India has a comprehensive and clearly formulated environmental assessment system in place. The EIA Notification requires environmental clearance for certain defined activities/projects. This Notification classifies the projects/activities that require environmental clearance into 'A' and 'B' categories (and further into B1 and B2) depending on the impact potential and/or scale of project. For both category projects, prior EC is mandatory before any construction work, or preparation of land except for securing the land, is started. Clearance provisions are as follows:

- (i) Category 'A' projects requires prior environmental clearance from the Government

of India's Ministry of Environment and Forest (MoEF);⁹

- (ii) Category 'B' projects require prior environmental clearance from the State Environmental Impact Assessment Authority (SEIAA).¹⁰

23. This Notification provides that, any project or activity specified in Category 'B' will be treated as Category A, if located in whole or in part within 10 km from the boundary of: (i) protected areas notified under the Wild Life (Protection) Act, 1972, (ii) critically polluted areas as notified by the Central Pollution Control Board from time to time, (iii) notified eco-sensitive areas, (iv) inter-state boundaries and international boundaries. Also, in the case where a SEIAA does not exist, Category B project will be reviewed by the MoEF and reclassified as Category A.

24. Consequently, the only relevant subproject under the Investment Program listed in the EIA Notification's "Schedule of Projects Requiring Prior Environmental Clearance" is solid waste management. Municipal solid waste management facilities qualify as Category B projects and are thus reviewed by the SEIAA. In state of Assam SEIAA recently formed and environmental clearance process was initiated for Dibrugarh town. Accordingly, an accredited EIA consultant, as required by the MoEF/SEIAA, will prepare an EIA in accordance with the Government of India's EIA Notification for obtaining the Environmental Clearance from the SEIAA in Guwahati, Assam.

C. National Legal Requirements

25. **Water (Prevention and Control of Pollution) Act of 1974.** Any component of the Program having potential to generate sewage or trade effluent will come under the purview of the Water (Prevention and Control of Pollution) Act of 1974. Such projects have to obtain Consent for Establishment (CFE) under Section 25 of the Act from Assam Pollution Control Board (APCB) before starting implementation and Consent to Operate (CTO) before commissioning. The Water Act also requires the occupier of such subprojects to take measures for abating the possible pollution of receiving water bodies. Under the Water (Prevention and Control of Pollution) Act of 1974 the following subprojects require CFE and CFO from APCB:

- (i) New or augmentation of WTPs
- (ii) New or augmentation of STPs; and
- (iii) Solid waste composting and landfills

26. **Air (Prevention and Control of Pollution) Act of 1981.** The subprojects having potential to emit air pollutants into the atmosphere have to obtain (CFE under Section 21 of the Air (Prevention and Control of Pollution) Act of 1981 from APCB before starting implementation and CTO before commissioning the project. The occupier of the project/facility has the responsibility to adopt necessary air pollution control measures for abating air pollution. Under the Air (Prevention and Control of Pollution) Act of 1974 the following subprojects require CFE and CFO from APCB:

- (iv) Diesel generators; and

⁹ For Category A projects, based on the preliminary details provided by the project proponent, the Expert Appraisal Committee (EAC) of MoEF, determines a comprehensive Terms of Reference (TOR) for the environmental impact assessment (EIA) studies. This TOR will be finalized within 60 days. On the recommendation of the EAC based on EIA studies, MoEF provides the EC.

¹⁰ The B category projects will be further divided by the State Level Environmental Assessment Committee (EAC) into 'B1' – that require EIA studies and 'B2' – no EIA studies. The State Level EAC will determine TOR for EIA studies for B1 projects within 60 days. On the recommendation of the State Level EAC based on EIA studies, SEIAA provides the EC.

- (v) Hot mix plants, wet mix plants, stone crushers etc, if installed for construction

27. **CPCB Standards.** Emissions and discharges shall comply with standards notified by the CPCB. **Appendix 2** provides applicable standards for effluents, receiving water bodies, air quality, water quality, and noise levels.

28. **Forest Legislations.** Forest legislation in India dates back to enactment of the Indian Forest Act of 1927. The Act allows government control over forest lands¹¹ and lands not being the property of the government. For reserved forests and village-forests, activities like (i) clearing or breaking up of any land for cultivation or for any other purpose, (ii) damage to vegetation/trees, and (iii) quarrying or removing any forest produce are prohibited. For protected forests, with the provision of the Act, the government makes rules to regulate activities like: (i) cutting of trees and removal of forest produce, (ii) clearing or breaking up of land for cultivation or any other purpose, and (iii) for protection and management of any portion of protected forest.

29. Government of India's Forest (Conservation) Act of 1980 (amended in 1988) restricts the deforestation of forests for use of non-forest purposes. According to the Act, the government requires prior approval of MoEF for the use of forest land for non-forest purposes (means the breaking up or clearing of any forest land) or for assigning lease to any private person or agency not controlled by government. The Forest (Conservation) Rules issued under this Act, provide specific procedures to be followed for obtaining Forest Clearance in conversion of forest land for non-forest purposes (**Appendix 3**). Compensatory afforestation is one of the most important conditions stipulated for diversion of forest land. For obtaining approval involving 5 hectares (ha), cost of 10 times the number of trees to be removed, subject to maximum of 2500 trees per ha shall have to be paid. In case of plain areas, the area of the land required for compensatory afforestation, shall be equal to that of the affected forest land. In case of hills, the area of land required for compensatory afforestation shall be twice or double the area of the affected forest land.

30. The subprojects under this MFF, notably water supply require acquisition of forest lands for the service reservoirs.¹² The water supply transmission mains may traverse forest lands. The forest land conversion will follow the "Guidelines for Diversion of Forest Lands for Non-Forest Purpose" under Forest (Conservation) Act. The following proposals for conversion will be forwarded by the government to MoEF:

- (i) Forest land involving up to 5 ha will be cleared by the Regional Office of the MoEF;
- (ii) Forest land involving more than 5 ha and up to 40 ha will be cleared by the Regional Office after referring the case to MoEF;
- (iii) Conversion of forest land (a) having density above 0.4 irrespective of the area involved, and (b) of more than 40 ha, irrespective of density, will be cleared by MoEF;

¹¹ The term 'forest land' mentioned in Section 2 of the Act refers to reserved forest, protected forest or any area recorded as forest in the Government records. Lands which are notified under Section 4 of the India Forest Act would also come within the purview of the Act (Supreme Court's Judgment in the National Thermal Power Corporation's case). It would also include "forest" as understood in the dictionary sense (Supreme Court order dated 12.12.1996 in WP No. 202/1995-Annexure-I). All proposals for diversions of such areas to any non-forest purpose, irrespective of its ownership, would require the prior approval of the Central Government.

¹² Although the proposed sites are officially designated as forest lands, field visits to the sites confirm that there are a limited number of trees on the site, and tree-cutting is therefore limited for construction of the water reservoirs

- (iv) Compensatory afforestation is compulsory for conversion;
- (v) Afforestation will be done over an equivalent area of non-forest land;
- (vi) As far as possible, the non-forest land for compensatory afforestation shall be identified contiguous to or in the proximity of a Reserved Forest or Protected Forest. If non-forest lands are not available in the same district, other non-forest land may be identified elsewhere in the state; and
- (vii) Where non-forest lands are not available, compensatory afforestation may be carried out over degraded forest twice in extent to the area being diverted.

31. Conversion of forest lands that are part of National Parks/Sanctuaries and Tiger Reserve areas (notified under Indian Wildlife (Protection) Act) is not permitted. In exceptional case, the government requires consent of the Indian Board of Wildlife for obtaining approval of the State Legislature for de-notification of the area as a sanctuary.

32. Municipal Solid Waste (Management and Handling) Rules of 2000. The Government of India notified MSW Rules in exercise of the powers conferred by Sections 3, 6, and 25 of the Environment (Protection) Act with the objective of regulating the management and handling of the municipal solid waste. Under the MSW Rules, the municipal authority is required to:

- (i) Take all steps to ensure that the municipal solid wastes generated in their jurisdiction are handled and disposed of without causing any adverse impact on human health or environment;
- (ii) Obtain authorization for setting up waste processing and disposal facility (including landfills) from the Assam Pollution Control Board (APCB) ; and
- (iii) Meet design and operation specifications/standards specified for solid waste processing and landfills. These include site and facility design specifications, output compost characteristics, pollution control and monitoring programs, and closure of landfill site and post-care.

33. Ancient Monuments and Archaeological Sites and Remains Rules, of 1959. The Rules designate areas within a radius of 100 m and 300 m from the “protected property” as “protected area” and “controlled area” respectively. No development activity (including mining operations and construction) is permitted in the “protected area” and all development activities likely to damage the protected property are not permitted in the “controlled area” without prior permission of the Archaeological Survey of India (ASI). Protected property includes the site, remains, and monuments protected by ASI or the State Department of Archaeology.

34. Under the Investment Program, subproject activities within Archaeologically Protected Areas will be avoided. If activities are to be done in the controlled area of protected properties, then the executing and implementing agencies and the line department will take the necessary NOCs from ASI and other relevant state agencies.

35. Land Acquisition Act (LAA) of 1894 (amended in 1985). Private land acquisition is guided by the provisions and procedures in this LAA. The District Collector or any other officer designated will function as the Land Acquisition Officer on behalf of the government. There is a provision for consent award to reduce the time for processing if the land owners are willing to agree on the price fixed by the Land Acquisition Officer. The option of acquiring lands through private negotiations is also available.

36. For the Project, land acquisition shall comply with all national and state laws and regulations including this Act. It will also comply with ADB SPS and for that reason, a Resettlement Framework has been developed to guide land acquisition and resettlement for the Program in accordance with both government and ADB policies.

D. State Legal Requirements

37. According to the Assam Forest Regulation of 1891 and Assam Forest Policy of 2004; cutting of trees¹³ in non-forest land, regardless of land ownership, also requires permission from the Assam Environment and Forest Department. Following the Forest (Conservation) Act and Rules, Assam Environment and Forest Department requires afforestation to the extent of two trees per each tree felled is mandatory.

E. Applicable International Environmental Agreements

38. In addition to national and state rules and regulations, international conventions such as the International Union for Conservation of Nature and Natural Resources (IUCN), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Migratory Species of Wild Animals (CMS) and Ramsar Convention on Wetlands of International Importance are applicable for selection and screening of subprojects under restricted/sensitive areas. India is a party to these conventions.

39. **International Union for Conservation of Nature and Natural Resources (IUCN).** The IUCN Red List of Threatened Species (also known as the IUCN Red List or Red Data List), founded in 1963, is a comprehensive inventory of the global conservation status of plant and animal species. The IUCN is an authority on the conservation status of species. A series of Regional Red Lists are produced by countries or organizations, which assess the risk of extinction to species within a political management unit. The IUCN Red List is set upon precise criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. The aim is to convey the urgency of conservation issues to the public and policy makers, as well as help the international community to try to reduce species extinction.

40. **Convention on Migratory Species of Wild Animals (CMS).** CMS was adopted in 1979 and entered into force on 1 November 1983. CMS, also known as the Bonn Convention, recognizes that states must be the protectors of migratory species that live within or pass through their national jurisdictions, and aims to conserve terrestrial, marine and avian migratory species throughout their ranges. Migratory species threatened with extinction are listed on Appendix I of the Convention. CMS Parties strive towards strictly protecting these species, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them. Migratory species that need or would significantly benefit from international cooperation are listed in Appendix II of the Convention, and CMS encourages the Range States to conclude global or regional agreements.

41. **Convention on International Trade in Endangered Species of Wild Fauna and Flora**

¹³ As defined in the Assam Forest Regulation, “tree” includes palms, bamboos, stumps, brushwood, and canes.

(CITES). It is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. CITES were first formed, in the 1960s. Annually, international wildlife trade is estimated to be worth billions of dollars and to include hundreds of millions of plant and animal specimens. The trade is diverse, ranging from live animals and plants to a vast array of wildlife products derived from them, including food products, exotic leather goods, wooden musical instruments, timber, tourist curios and medicines. Levels of exploitation of some animal and plant species are high and the trade in them, together with other factors, such as habitat loss, is capable of heavily depleting their populations and even bringing some species close to extinction. Many wildlife species in trade are not endangered, but the existence of an agreement to ensure the sustainability of the trade is important in order to safeguard these resources for the future. Because the trade in wild animals and plants crosses borders between countries, the effort to regulate it requires international cooperation to safeguard certain species from over-exploitation.

42. **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. The Ramsar Convention is an international treaty for the conservation and sustainable utilization of wetlands. The Ramsar Convention is the only global environmental treaty that deals with a particular ecosystem. According to the Ramsar list of Wetlands of International Importance, there are 25 designated wetlands in India which are required to be protected. Activities undertaken in the proximity of Ramsar wetlands shall follow the guidelines of the convention.

43. Under **Tranche 1**, there are no Ramsar designated wetlands reported within the subproject areas. In subsequent tranches if any floral and faunal habitation, listed under Ramsar, IUCN, CMS or CITES are reported within the subproject influence area then the responsibility for taking necessary actions in accordance with these international conventions will lie with the executing and implementing agencies.

44. A summary of Government and State environmental compliance requirements applicable to the Project is presented in **Table 2**.

Table 2: Summary of Environmental Compliance Requirements of the Project Components for EARF Consideration

Sr. No.	Component	Sub component	Applicable Legislation	Statutory Requirement	Authorizing Body	Action Required
1	Water Supply/ Sewerage	WTP, STP	1. Water (Prevention and Control) Act of 1984 2. Air (Prevention and Control) Act of 1984	1. CFE 2. CFO	APCB	Based on project review and site inspection the APCB provides CFE before construction. The disposal standards to be met during the operation will be stipulated. Subsequent to

Sr. No.	Component	Sub component	Applicable Legislation	Statutory Requirement	Authorizing Body	Action Required
						completion of construction, CFO is issued confirming compliance of CFE conditions, if any. CFE is obtained for WTP.
				Renewal of CFO during operation	APCB	Based on the performance of the WTP/ STP and its compliance with the disposal standards CFO will be renewed every year.
		All subcomponents that require forest land acquisition	1. Forest (Conservation) Act of 1980; and 2. Wildlife Act, 1972	Approval	Gol MoEF through GoA	1. Identification of non forest land 2. Formulation of afforestation program 3. Obtain Forest Clearance from Assam Environment and Forest Department
		All subcomponents that require cutting of trees	Forest (Conservation) Act of 1980	Approval	State Forest and Environment Department	1. Cutting of trees in non-forest land, irrespective of land ownership 2. Afforestation to the extent of two trees per each tree felled is mandatory
2	Urban Transport	All subcomponents that require forest land acquisition	1. Forest (Conservation) Act of 1980; and 2. Wildlife Act, 1972	Approval	Gol MoEF through GoA	1. Identification of non-forest land; 2. Formulation of afforestation program 3. Obtain Forest

Sr. No.	Component	Sub component	Applicable Legislation	Statutory Requirement	Authorizing Body	Action Required
						Clearance from Assam Environment and Forest Department
		All sub components that require cutting of trees	Forest (Conservation) Act of 1980	Approval	State Forest and Environment Department	1. Cutting of trees in non-forest land, irrespective of land ownership 2. Afforestation to the extent of two trees per each tree felled is mandatory
3	Solid waste management	Landfill, compost plant, and all associated facilities	MSW Rules	Authorization of proposed site	APCB	Based on land use and surrounding surface and groundwater conditions authorization is issued
			EIA Notification	EC	SEIAA/ MoEF	SEIAA is formed in Assam, EC will be obtained from SEIAA
			1. Water (Prevention and Control) Act of 1984 2. Air (Prevention and Control) Act of 1984	1. CFE 2. CFO	APCB	Based on project review and site inspection the APCB provides CFE before construction.
				Renewal of CFO during operation	APCB	Based on the performance of the landfill leachate treatment plant, composting plant and compliance with the disposal

Sr. No.	Component	Sub component	Applicable Legislation	Statutory Requirement	Authorizing Body	Action Required
						standards CFO will be renewed every year.
		All subcomponents that require cutting of trees	Forest (Conservation) Act of 1980	Approval	State Forest and Environment Department	1. Cutting of trees in non-forest land, irrespective of land ownership 2. Afforestation to the extent of two trees per each tree felled is mandatory.
4	Others	1. Diesel generators; and 2. Hot mix plants, wet mix plants, stone crushers etc, if installed for construction	Air (Prevention and Control) Act of 1984	1. CFE 2. CFO	APCB	Based on project review and site inspection the APCB provides CFE before construction. The emission standards to be met during the operation of the generators, hot mix and wet mix plants, stone crushers, and other potential sources of air pollution will be stipulated. Subsequent to completion of construction, CFO is issued confirming compliance of CFE conditions, if any
				CFO	APCB	If subproject will have standby diesel generator/s, CFO will be renewed every year.

Notes: STP = sewage treatment plant; CFE = Consent for Establishment; CFO = Consent for Operation; APCB =

Assam Pollution Control Board; Gol = Government of India; GoA = Government of Assam; MoEF = Ministry of Environment and Forest; MSW = Municipal Solid Waste; EIA = environmental impact assessment; EC = Environmental Clearance; SEIAA = State Environment Impact Assessment Authority

45. GoA with inputs from the PIUs, is responsible for the preparation of each subproject environmental assessment report and monitoring of safeguards issues with support from the consultants recruited to support them under the Program. Currently, GoA and the PIUs do not have any environmental staff and have very limited experience, resources, and equipment for environmental management and monitoring. The role of the Assam Pollution Control Board (APCB) in environmental monitoring of the subprojects is mostly limited to review of the monitoring reports to be submitted by GoA and PIUs.

46. All implementing agencies of the Project require capacity building measures for (i) a better understanding of the project-related environmental issues; and (ii) strengthen their role in implementation of mitigation measures and subsequent monitoring. Training programs are included in each subproject, a sample of which is provided in **Table 6**. The primary focus of the training is to enable staff to conduct impact assessments and carry out environmental monitoring and implement the environmental management plan (EMP). After participating in such training, the participants should be able to make environmental assessments for their respective subprojects, conduct monitoring of environmental plans, understand government and ADB requirements for environmental assessment, management, and monitoring (short and long term), and incorporate environmental features into future subproject designs, specifications, and tender/contract documents.

III. ANTICIPATED ENVIRONMENTAL IMPACTS

47. Preliminary lists of subprojects have been identified for Tranche 2 (see Section I). Environmental impacts during design, pre-construction, construction, and operation will be reviewed and assessed for each subproject. During subproject construction and implementation, impacts on the physical environment such as water, air, soil, noise; and on the biological environment, like flora and fauna and socio-economic environment will be carefully assessed by the project which includes environmental specialists.

48. For urban infrastructure and service improvement subprojects it is anticipated that impacts will be temporary and of short duration. In such cases, mitigation measures i.e. control of air, dust pollution, checking of water and noise pollution, protection of biological environment can address impacts. Other measures such as preparation and implementation of traffic management plans during laying of pipes shall also be done in coordination with consultant team, ULBs, local police, contractors, and the public. Safety measures, both occupational and social are will be considered and impacts and mitigation measures will be elaborated in the environmental management plans.

49. Anticipated environmental impacts for the Tranche 1 subproject are provided in the IEE reports. For subprojects in different Tranches, anticipated impacts during design, construction and operation are identified in **Table 3**.

Table 3: Anticipated Environmental Impacts Due to Project Implementation

Impact Field	Impact to Environment
Design Phase	
Environmental clearances	CFE and CFO are required from the APCB in order to implement the project. Land allotment letter required. If not pursued on timely basis, this can delay the Project.

Impact Field	Impact to Environment
Utilities	Telephone lines, electric poles and wires, water pipe (old) existing within right-of-way (ROW) require shifting without disruption to services
Water supply	Health risk due to closure of existing water supply such as community tankers, water stations and privately-owned small water pipes
Social and cultural resources	Ground disturbance can uncover and damage archaeological and historical remains. Impact on sites of cultural/religious importance during pipe laying.
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas	Disruption to traffic flow and sensitive receptors.
Land for STP, WTP, landfill	Land use impact, conversion of present land use (Faring, Salitoli{cultivable} and Jalduba{low lying } to landfill site
Traffic	Traffic will be disturbed during construction period requiring carefully planned traffic management plans.
Construction Phase	
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.
Air quality	Emissions from construction vehicles, equipment, and machinery used for excavation and construction resulting to dust and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons.
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.
Noise levels	Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, materials, and people.
Generated muck	Improper disposal of muck from cleaning of drainage canals causing environmental pollution.
Ecological resources	Felling of the trees–affect terrestrial ecological balance and affect terrestrial and aquatic fauna/wildlife.
Existing infrastructure and facilities	Disruption of service and damage to existing infrastructure located alongside roads, in particular water supply pipes.
Landscape and aesthetics	Solid wastes as well as excess construction materials create unacceptable aesthetic condition.
Accessibility	Traffic problems and conflicts in ROW. Roads/people/business may be disturbed by repeated trenching.
Socio-economic–Income	Impede the access of residents and customers to nearby shops. Shops may lose business temporarily
Socio-economic–Employment	Generation of contractual employment and increase in local revenue.
Occupational health and safety	Occupational hazards which can arise during project implementation. (e.g. deep trenching, falling objects, etc.)
Construction waste	Trenching will produce additional amounts of waste soil.

Impact Field	Impact to Environment
Community health and safety	Community hazards which can arise during construction (e.g., open trenches, air quality, noise, falling objects, etc.). Trenching on concrete roads using pneumatic drills will cause noise and air pollution. Traffic accidents and vehicle collision with pedestrians during material and waste transportation
Work camps	Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants.
Social and cultural resources	Risk of archaeological chance finds. Sites of social/cultural importance (schools, hospitals, religious place, tourism sites) may be disturbed by noise, dust, vibration and impeded access. Trenching on concrete roads using pneumatic drills will cause noise and air pollution.
Clean-up operations, restoration and rehabilitation	Impacts on social or sensitive receptors when post construction requirements are not undertaken, e.g. proper closure of camp, disposal of solid waste, and restoration of land after subproject construction.
Operation & Maintenance Phase	
Occupational health and safety	Exposure of workers to hazardous materials during drainage cleaning, operation of WTP/STP, operations of compost plant and landfill
Waste water quality	Deterioration of surface and groundwater quality from unmanaged leachate
Solid wastes–sludge	Environmental pollution–potential impact on soil, groundwater, and surface water nearby the disposal site
Hazardous chemicals	Release to nature from treatment plant causing air, water, and soil pollution
Air emissions	Air pollution from gaseous or volatile chemicals used for disinfection processes at WTP
General maintenance	May cause disturbance to sensitive receptors, dusts, increase in noise level
Community health and safety	Leaking sewers can damage human health and contaminate soil and groundwater
Economic development	Impediments to residents and businesses
Social and cultural resources	Temporary disruption of activities
Land use pattern	Areas will be developed (conversion of agriculture/forest land to residential and commercial land) with better infrastructure facility like improved water supply, and sewerage and sanitation

Notes: APCB – Assam Pollution Control Board; CFE – Consent for Establishment; CFO – Consent for Operation; EC – environmental clearance; STP- Sewage Treatment Plant; ROW – right of way; WTP - Water Treatment Plant

IV. ENVIRONMENTAL ASSESSMENT FOR SUBPROJECTS AND COMPONENTS

A. Environmental Guidelines for Subproject Selection

50. Tranche 2 subprojects are not anticipated to have significant environmental impacts. Subprojects will be primarily designed to improve public and environmental health and quality of life for both poor and non-poor residents as well as visitors. Guidelines for subproject selection is shown in **Table 4** provide further guidance to avoid or minimize adverse impacts during the identification and finalization of Tranche 2 subprojects.

Table 4: Environmental Criteria for Subproject Selection

Sr. No.	Components	Environmental Selection Guidelines	Remarks
1	Overall Selection Guideline (applicable to all components)	Comply with all requirements of relevant national, state and local laws, rules and regulations	See Section II of this EARF
		Site selection process will avoid involuntary resettlement and impacts on vulnerable persons including indigenous peoples (If unavoidable the extent of impacts will be minimized.	See Resettlement Framework (RF) and Indigenous Peoples Planning Framework (IPPF).
		Site selection will not result in destruction and avoid being sited in protected areas, including notified reserved forests or biodiversity conservation hotspots (sanctuary/national park etc.)	Approval (NOC) from concerned authority if unavoidable
		Sub-project location should not result in destruction/disturbance to historical and cultural places/values	
		The subproject will avoid where possible, and minimize to extent feasible facilities in locations with social conflicts	
		The subproject will avoid where possible tree cutting and if any trees have to be removed, will plant two new trees for every one that is lost.	
		It will reflect inputs from public consultation and disclosure for site selection	
		Retain mature roadside trees, and if any trees have to be removed, plant two new trees for every one that is lost.	
2	Water Supply	Comply with all requirements of relevant national and state law, including the Water (Prevention and Control of Pollution) Act 1974	
		Avoid environmentally sensitive locations including sites with national or international designation (e.g. for ecological/biological conservation i.e. reserved and protected forest, historical or cultural importance sites, etc.)	
		Site selection will not result in excessive abstraction of water affecting downstream water uses and other beneficial water uses for surface and ground water Utilize water sources at sustainable levels of abstraction only (i.e. without significant reductions in the quantity or quality of the source overall)	For this water availability data/water reserve status of the subproject area is required
		Not to utilize raw water of very poor quality evidenced by presence of high levels of pathogens/mineral contents	
Avoid using water sources that may be polluted by upstream users	In case of planning of water withdrawal from river/stream, If any polluting sources like sewage channel, thermal power plant discharge or other industrial discharge in		

Sr. No.	Components	Environmental Selection Guidelines	Remarks
			upstream nearby the intake site that source should be avoided Review of surface water quality data of intake point is necessary for designing and environmental assessment
		Avoid water-use conflicts by not abstracting water that is used for other purposes (e.g. irrigation)	
		Locate all new facilities (WTP, PS etc.) at least 50m from houses, shops or any other premises used by people, thus establishing a buffer zone to reduce the effects of noise, dust and the visual appearance of the site	Distance restriction may be reviewed depending on the technology adopted, land availability and buffer zone planning
		Ensure location of water treatment plant will take into account the present and future demands, direction and rate of growth of the service area and potential deterioration of source quality in the future	
		Locate intake, WTP at sites where there is no risk of flooding or other hazards that might impair functioning of the plant or present a risk of damage to the plant or its environs	Flood statistics data of the project area needs to be reviewed
		Locate pipelines within ROW of other linear structures (roads, irrigation canals), to reduce the acquisition of new land	Minimize land acquisition
		Ensure that pipeline routes do not require the acquisition of land from individual farmers in amounts that are a significant proportion of their total land holding (>10%)	
		Ensure that improvements in the water supply system are combined with improvements in sewerage and drainage to deal with the increased discharge of domestic wastewater	
		Ensure occupational safety measures for the safe handling of chlorine, including wash area, as well as proper handling as not to result in inadequate/poor treatment and chlorination	
		Include treatment of all backwash and sludge resulting from water treatment plants and acceptable to discharge standards of the Assam Pollution Control Board before disposal	
3	Sewerage and Sanitation	Comply with all requirements of relevant national and state law, including the Water (Prevention and Control of Pollution) Act 1974	
		Locate Sewage Treatment Plants (STP) preferably 250 m from any inhabited areas, in locations where no urban expansion is expected in the next 20 years, so that people are not affected by odour or other nuisance from the plant	Distance restriction may be reviewed depending on the technology adopted for the treatment of waste water, site availability
		Avoid locating sewage pumping stations and wet wells	

Sr. No.	Components	Environmental Selection Guidelines	Remarks
		within 50m of any inhabited areas, and within 100m of sensitive sites such as hospitals, schools, temples, etc, to minimize nuisance impacts from odour, rodents, etc.	and buffer zone planning
		Locate STP at sites where there is a suitable means of disposal for the treated wastewater effluent (e.g. into a natural water course or irrigation canal) or provide a means of disposal (e.g. new irrigation canal) as part of the scheme	
		Locate STP at sites where there is no risk of flooding or other hazards that might impair functioning of the plant and present a risk of damage to the plant or its environs	Flood statistics data of the project area needs to be reviewed
		Subproject will be implemented only with consent of Assam Pollution Control Board	
		Lay new sewerage pipes within existing roads to avoid land acquisition and involuntary resettlement impacts	See Resettlement Framework
		Technology selection should meet national wastewater discharge standards	See Appendix 2 for CPCB Environmental Standards
		Ensure that no wastewater is discharged into a water course in which it could be a hazard to downstream users (e.g. a waterway that is used for as a source of water for domestic or municipal supply)	
		Locate sewage pipelines within the right of way (ROW) of roads wherever feasible, to reduce the acquisition of new land	
		Ensure that routes of sewage mains do not require the acquisition of land from individual farmers in amounts that are a significant proportion of their total land holding (10%)	
		Include measures to ensure the safe disposal of sewage sludge without causing an environmental hazard, and if possible to promote its safe and beneficial use as an agricultural fertilizer	
4	Urban Drainage	Continue the established practice of laying new drains within existing roads to avoid land acquisition and involuntary resettlement	See Resettlement Framework
		Include measures to ensure the safe disposal of canal dredge without causing an environmental hazard.	
		Retain mature roadside trees, and if any trees have to be removed, plant two new trees for every one that is lost.	
5	Urban Transport	Develop urban transport schemes and components with traffic and pedestrian safety measures	
		Avoid land acquisition and involuntary resettlement impacts where possible and ensure compliance with the Resettlement Framework.	See Resettlement Framework
		Prioritize the widening of existing roads over construction of new roads and to extent possible conduct widening within the existing ROW to avoid the need to acquire new land.	

Sr. No.	Components	Environmental Selection Guidelines	Remarks
		Include the provision of new or improved drainage to remove the increased runoff caused by increasing the road surface area	

Notes: EIA – Environmental Impact Assessment; NOC – No Objection Certificate, ROW – right of way; STP – sewage treatment plant; WTP – water treatment plant

B. Environmental Assessment Procedures for Subprojects

51. Subprojects must comply with national and state legislation (Section II) and ADB's Safeguard Policy Statement (2009). For subproject processing, the steps to be followed are shown in **Table 5**.

Table 5: Environmental Procedures for Subproject Processing

Project Stage	ADB Procedure	GOI
Sub-project Identification	REA checklist submitted to ADB by PMU for review	Categorization (A or B) according to Schedule and General/Specific Conditions in GoI EIA Notification, 2006, Amended in 2009
	Categorization (A/B/C) submitted to ADB by PMU for review	Application for Prior Environmental Clearance (EC) after the identification of the prospective site, or before commencing any construction, or land preparation. Category A requires EC from MOEF. Category B requires EC from SEIAA. In the absence of SEIAA or SEAC, Category B treated as Category A and will be cleared from MoEF.
	ADB to review REA checklists to ensure subprojects meet subproject selection criteria in EARF and Schedule 4 of FFA	Screening (for Category B) subject by SEAC. Categorized as B1 (requires full EIA) or B2 (does not require full EIA).
Detailed Design	IEE/EIA (with EMP) based on detailed design	Scoping and TOR for EIA (A or B1) with scrutiny by EAC. TOR (or rejection of EC) finalized by EAC or SEAC within 60 days. Approved TOR posted on MOEF or concerned SEIAA website.
	Public Consultation: Consultation will be carried out in a manner commensurate with the impacts of affected communities. The consultation process and its results are to be documented and reflected in the environmental	Public Consultation for Category A and B1 projects and consists of two components: (i) public hearing conducted by APCCB within 45 days of a request from the applicant, and (ii) Obtain written responses.

Project Stage	ADB Procedure	GOI
	<p>assessment report.</p> <p>Disclosure: For <i>Category A</i>: Disclosure on ADB’s website of a draft full EIA (including the draft EMP) at least 120 days prior to the ADB Board consideration, and/or EARF before project appraisal where applicable; the final EIA; updated EIAs and corrective action plans; and environmental monitoring reports.</p> <p>For <i>Category B</i>: Disclosure on ADB’s website of the final IEE; updated IEEs and corrective action plans; and environmental monitoring reports.</p> <p>EARF: Disclosure of EARF before project appraisal.</p> <p>Government to send written endorsement of all EIAs/IEEs to ADB for disclosure to ADB website. In addition for all categories, environmental information in an accessible place and in a form or language understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used.</p>	<p>Draft EIA publicized widely before hearing. Notice of public hearing within 7 days of date. 30 days for public responses. Incorporate concerns expressed into the draft EIA and EMP.</p> <p>Draft EIA publicized widely before hearing. Notice of public hearing within 7 days of date. 30 days for public responses. Incorporate concerns expressed into the draft EIA and EMP.</p>
	Mitigation measures specified in IEE/EIA study incorporated in project design.	
	Identify and incorporate environmental mitigation and monitoring measures (including the EMP) into bid/contract documents.	
Appraisal	EMP and other environmental covenants are incorporated into the Facility Framework	Appraisal of application completed by EAC or SEAC within 60 days of receipt of

Project Stage	ADB Procedure	GOI
	Agreement, Loan/Project Agreement, and Facility Administration Memorandum (FAM)	final EIA report.
Approval	ADB to review and clear EIA/IEE prior to approval and issuance of tender documents during detailed design stage.	Appraisal of application completed by EAC or SEAC within 60 days of receipt of final EIA report
Contract Award	No contract award until: a. Environmental clearances required by the Government have been obtained. b. EIA/IEE has been finalized, disclosed to public. c. Confirm that the safeguard requirements are included in bidding documents and civil works contracts. EMP implementation reflected in FAM.	Necessary EC obtained prior to commencing any construction, or land preparation. NOCs, CFE and CFO from APCB; and Forest clearances (if any) from DFO
Implementation	Contractors submit Environmental Implementation Plans (EIP) based on EIA/IEE findings to be incorporated into bidding documents and civil award contracts. Semiannual monitoring report from Project Management Unit submitted to ADB for review and posting on ADB's website.	As per EIA Notification Item 10 paras (i) and (ii): Project must submit half-yearly compliance monitoring reports on 1 st July and 1 st January. All compliance reports are public documents and displayed on website of concerned regulatory authority Certificate for Operation required for WTPs and STPs

Notes: APCB – Assam Pollution Control Board; CFE – Consent for Establishment, CFO – Consent for Operation, DFO – Divisional Forest Officer, DSC – Design and Supervision Consultant, EAC - Environmental Appraisal Committee, EARF – Environmental Assessment and Review Framework, EC – Environmental Clearance, EIA – Environmental Impact Assessment, EMP – Environmental Management Plan, FAM – Facility Administration Memorandum, IEE – Initial Environmental Examination, MoEF – Ministry of Environment and Forest, NOC – No Objection Certificate, REA – Rapid Environmental Assessment, SEAC – State Environment Assessment Committee, SEIAA – State Environment Impact Assessment Authority, STP – sewage treatment plant, TOR – Terms of Reference

1. Screening and Classification/Categorization

52. ADB screening and categorization procedures will be followed for the Program. For MFFs, only individual tranches are categorized. Tranche 1 has been categorized as environmental category B as no significant impacts to the environment or human health are envisioned. After Board Approval, project design should avoid and/or minimize to extent possible any Category A type subprojects.

53. Subproject screening and categorization is done at the earliest stage of project preparation when sufficient information is available for this purpose. Screening and categorization is undertaken to

(i) Reflect the significance of potential impacts or risks that a project might present; (ii) identify the level of assessment and institutional resources required for the safeguard measures; and (iii) determine disclosure requirements.

54. A subproject's category is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts in the subproject's area of influence. Each proposed subproject is scrutinized as to its type, location, scale, and sensitivity and the magnitude of its potential environmental impacts. Subprojects are assigned to one of the following four categories:

- a. **Category A.** Subproject components that are projected to have potentially significant adverse environmental impacts. An environmental impact assessment (EIA) is required;
- b. **Category B.** Subproject components that are projected to have some adverse environmental impacts, but they are expected to be less significant than those associated with category A projects. An IEE is required to determine whether an EIA is warranted. If an EIA is not needed, the IEE is regarded as the final environmental assessment report; and
- c. **Category C.** Subproject components that are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are still reviewed.

55. The ADB Rapid Environmental Assessment (REA) Checklists¹⁴ for sewerage and sanitation, roads and highways (for urban transport), shall be accomplished during screening. Basic environmental information relating to subproject location and project preliminary design needs to be collected for completing the checklist.

2. Preparation of Environmental Assessment Report

56. After subproject categorization, the environmental assessment requirement can be determined. For subprojects projected to have potentially significant adverse environmental impacts (categorized as A) an EIA will be prepared. Subprojects with some adverse environmental impacts, but are expected to be less significant than those of Category A projects, an IEE is required. Annex 1 to Appendix 1 of the *ADB Safeguards Policy Statement (2009)* provides the specific outlines and contents to be followed while preparing EIAs/IEEs. Also, the IEEs prepared in Tranche I provide good samples which can be followed for preparation of environmental assessments in subsequent tranches.

57. For preparing EIA and IEE relevant primary data will be generated and secondary data will be collected for project-influenced sites. An assessment of project impacts and risks on biodiversity and natural resources will also be undertaken. Issues regarding natural and critical habitats will be covered in the EIA/IEE report. In case of subprojects located within buffer zone of protected areas,

¹⁴ REA checklists are prepared to support the environmental categorization of a project. The checklists can be downloaded from http://adb.org/documents/Guidelines/Environmental_Assessment/eaguidelines002.asp

a review of management plans and consultation with concerned management staff of the protected area, local communities, and key stakeholders will be undertaken and reflected in EIA/IEE report. Pollution prevention for conservation of resources particularly technology for management of process wastes will be addressed in the EIA/IEE report. Occupational health safety and community health safety will be properly addressed in the EMP section of the EIA/IEE report. In case subprojects are likely to have adverse impacts on physical cultural resources, appropriate mitigation measures will to be planned and reflected in the EIA/IEE. EIA/IEE will also reflect meaningful consultation and disclosure process with a provision of grievance redress mechanism.

58. ADB requires that an EMP must be developed as part of the EIAs/IEEs. EMPs describe the environmental management measures that will be carried out to mitigate negative impacts or enhance the environment during implementation of a project, and the environmental monitoring to be conducted to ensure that mitigation is provided and is effective in reducing impacts, or to determine the long-term impacts of a project. EMPs shall outline specific mitigation measures, environmental monitoring requirements, and related institutional arrangements, including budget requirements for implementation. Where impacts and risks cannot be avoided or prevented, mitigation measures and actions will be identified so that the project is designed, constructed, and operated in compliance with applicable laws and regulations and meets the requirements specified in this document. The level of detail and complexity of the environmental planning documents and the priority of the identified measures and actions will be commensurate with the project's impacts and risks. Key considerations include mitigation of potential adverse impacts to the level of "no significant harm to third parties," the polluter pays principle, the precautionary approach, and adaptive management.

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

60. The Government of India requirements relating to national environmental laws and rules that apply to the subprojects are summarized in Section II. In terms of compliance, subprojects may be of three types: (i) subprojects that attract the EIA Notification; (ii) subprojects that require clearance/NOCs or consent from competent Government agencies; and (iii) subprojects that require no environmental authorization. **Table 5** provides the complete government procedures. Environmental assessment documents prepared under the Program should, to the extent possible, meet both ADB and GOI requirements in order to streamline the environmental procedures required by both ADB and government.

61. After documentation of EIA/IEE report the project approval follows the procedure as shown in **Table 5**.

V. CONSULTATION, INFORMATION DISCLOSURE, AND GRIEVANCE REDRESS MECHANISM

A. Public Consultation and Information Disclosure

62. Meaningful stakeholder consultation and participation is part of the project preparation and

implementation strategy. A Consultation and Participation (C&P) has been prepared for the Project and will be implemented with the assistance of a NGO. By addressing stakeholder needs, there is greater awareness of the benefits, and 'ownership' of the Project among stakeholders, which in turn contributes to project sustainability. The consultation process so far has solicited inputs from a wide range of stakeholders, including state- and ULB-level government officials, non-government organizations (NGOs), elected representatives, residents of project cities, marginalized/vulnerable beneficiary groups, and project affected persons (APs).

63. Consultation, participation and disclosure will ensure that information is provided and feedback on proposed subproject design is sought early, right from the project preparation phase, so that the views/preferences of stakeholders including potential beneficiaries and affected people can be adequately considered in project design, and continue at each stage of project preparation, processing, and implementation. Affected persons will be consulted at various stages in the project cycle to ensure: (i) incorporation of views/concerns of APs on compensation/resettlement assistance and environmental impacts and mitigation measures; (ii) inclusion of vulnerable in project benefits; (iii) identification of help required by APs during rehabilitation, if any; and (iv) avoidance of potential conflicts/smooth project implementation. It will also provide adequate opportunities for consultation/participation to all stakeholders and inclusion of the poor/vulnerable/marginalized and project-affected persons in the project process. Relevant information about any major changes to project scope shall be shared with beneficiaries, affected persons, vulnerable groups, and other stakeholders.

64. A variety of approaches can be adopted. At minimum, stakeholders shall be consulted regarding the scope of the environmental and social impact study before work is commenced and they shall be informed of the likely impacts of the subproject and proposed mitigation once the draft EIA/IEE, RP, and IPP reports are prepared. The reports shall record the views of stakeholders and indicate how these have been taken into account in project development. Consultations will be held with a special focus on vulnerable groups.

65. The key stakeholders to be consulted during subproject preparation, Environmental Management Plan implementation and project implementation include:

- (i) beneficiaries;
- (ii) elected representatives, community leaders, religious leaders and representatives of community based organizations;
- (iii) local NGOs;
- (iv) local government and relevant government agency representatives, including state and local authorities responsible for land acquisition, protection and conservation of forests and environment, archaeological sites, religious sites, and other relevant government departments;
- (v) residents, shopkeepers and business people who live and work alongside the roads where pipes will be lay and near sites where facilities will be built; custodians, and users of socially and culturally important buildings;
- (vi) PIU staff, implementing NGO and consultants, and
- (v) ADB and Gol.

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

- (i) For category A subprojects – draft EIA/, as applicable and RP/IPP including the

draft Entitlement Matrix, at least 120 days prior to ADB Board consideration, and/or environmental assessment and review frameworks before project appraisal, where applicable;

- (ii) For category B project – draft IEE;
- (iii) Final EIA/IEE and RP/IPP;
- (iv) A new or updated EIA/IEE and RP/IPP and corrective action plan prepared during project implementation, if any; and
- (v) Environmental and social monitoring reports.

67. The executing agency should send written endorsement to ADB for disclosing these documents on ADB's website. They will also provide relevant safeguards information in a timely manner, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used.

B. Grievance Redress Mechanism

A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate and facilitate the resolution of affected people's concerns, complaints and grievances about the social and environmental performance at the level of the Project. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. The grievance redress mechanism and procedure is depicted in **Figure 1** below. The project-specific GRM is not intended to bypass the government's own redress process; rather it is intended to address affected people's concerns and complaints promptly, making it readily accessible to all segments of the affected people and is scaled to the risks and impacts of the project.

68. The PMU and PIUs will make the public aware of the GRM through public awareness campaigns. Grievances can be filed in writing using the Complaint Register and Complaint Forms (**Appendix 3**) or by phone with any member of the PMU or PIU. The contact phone number of the respective PIUs and the PMU will serve as a hotline for complaints and will be publicized through the media and placed on notice boards outside their offices and at construction sites. The safeguard documents made available to the public in an accessible version will include information on the GRM and will be widely disseminated throughout the corridor by the safeguards officers in the PMU and PIUs with support from the NGO engaged to implement the C&P.

69. **First tier of GRM.** The PIU is the first tier of GRM which offers the fastest and most accessible mechanism for resolution of grievances. The Resettlement Officer and Environmental Officer in each PIU will be designated as the key officers for grievance redress. Resolution of complaints will be done within seven working (7) days. At this stage, the Resettlement Officer and Environmental Officer will inform the PMU's Safeguards Compliance and Monitoring Unit (SCMU) for additional support and guidance in grievance redress matters. Investigation of grievances will involve site visits and consultations with relevant parties (e.g., affected persons, contractors, traffic police, etc.). Grievances will be documented and personal details (name, address, date of complaint, etc.) will be included unless anonymity is requested. A tracking number will be assigned for each grievance, including the following elements:

- (i) Initial grievance sheet (including the description of the grievance) with an acknowledgement of receipt given to the complainant when the complaint is registered;

- (ii) Grievance monitoring sheet with actions taken (investigation, corrective measures); and
- (iii) Closure sheet, one copy of which will be handed to the complainant after he/she has agreed to the resolution and signed-off.

70. The updated register of grievances and complaints will be available to the public at the PIU office, construction sites, and other key public offices along the project corridor. Should the grievance remain unresolved it will be escalated to the second tier.

71. **Second Tier of GRM.** The Resettlement Officer and Environmental Officer in each PIU will activate the second tier of GRM by referring the unresolved issue (with written documentation) to the PMU's Safeguards Compliance and Monitoring Unit who will pass unresolved complaints upward to the Grievance Redress Committee (GRC).¹⁵ The GRC will be established by the PMU's SCMU before commencement of site works. A hearing will be called with the GRC, if necessary, where the affected person can present his/her concern/issues. The process will facilitate resolution through mediation. The local GRC will meet as necessary when there are grievances to be addressed. The local GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within fifteen (15) working days. The contractor will have observer status on GRC. If unsatisfied with the decision, the existence of the GRC will not impede the complainant's access to the Government's judicial or administrative remedies.

72. The PMU SCMU officers will be responsible for processing and placing all papers before the GRC, maintaining database of complaints, recording decisions, issuing minutes of the meetings and monitoring to see that formal orders are issued and the decisions carried out.

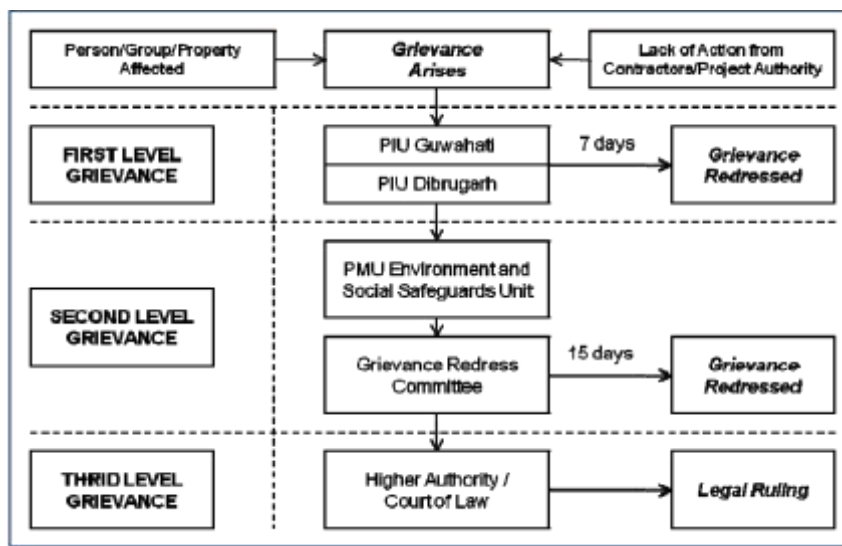
73. Third tier of GRM. In the event that a grievance cannot be resolved directly by the PIUs (first tier) or GRC (second tier), the affected person can seek alternative redress through the union Parishad or ward committees or in the appropriate court of law. The PIUs or GRC will be kept informed by the district, municipal or national authority.

74. The safeguard monitoring reports will include the following aspects pertaining to progress on grievances: (i) number of cases registered with the GRC, level of jurisdiction (first, second and third tiers), number of hearings held, decisions made, and the status of pending cases; and (ii) lists of cases in process and already decided upon may be prepared with details such as Name, ID with unique serial number, date of notice, date of application, date of hearing, decisions, remarks, actions taken to resolve issues, and status of grievance (i.e., open, closed, pending).

75. **Costs:** All costs involved in resolving the complaints (meetings, consultations, communication and reporting / information dissemination) will be borne by the PMU.

¹⁵ The GRC will consist of the following persons: (i) Project Director; (ii) representative of the affected person(s); (iv) representative of the local Deputy Commissioners office (land); and (v) representative of APCB (for environmental-related grievances). The functions of the local GRC are as follows: (i) resolve problems quickly and provide support to affected persons arising from various environmental issues and including dust, noise, utilities, power and water supply, waste disposal, traffic interference and public safety as well as social and resettlement related issues such as land acquisition (temporary or permanent); asset acquisition; and eligibility for entitlements, compensation and

Figure 1: Grievance Redress Mechanism



Assistance; (ii) reconfirm grievances of displaced persons, categorize and prioritize them and aim to provide solutions within a month; and (iii) report to the aggrieved parties about developments regarding their grievances and decisions of the GRC.

VI. INSTITUTIONAL ARRANGEMENTS AND RESPONSIBILITIES

A. Implementation Arrangements

76. The Government of Assam's Guwahati Development Department (GDD) will be the executing agency. A state-level PMU, headed by a full-time Project Director, will be established as the implementing agency which will be in-charge of overall execution and technical supervision, monitoring, and financial control of all activities under the project.

77. Project Implementation Units (PIUs) dedicated exclusively to the project would be set up in Guwahati and Dibrugarh. The PIUs will be headed by a senior technical officer and assisted by qualified and experienced officers seconded from ULBs, finance and other line departments. The PIUs will be responsible for the day-to-day activities of project implementation in the field and will be under the direct administrative control of the PMU. The PIU in Guwahati will have synergies and a coordination mechanism with the PIUs for JNNURM and JICA projects.

78. The PMU will have a Safeguards Compliance and Monitoring Unit (PMU SCMU) to ensure mitigation of any environmental and social impacts due to the subproject. The PMU SCMU will have a Safeguards Officer (PMU SO) who will have the following responsibilities: (i) address environmental and social safeguards issues; (ii) implement the EARF/RF/IPF; (iii) monitor physical and on-physical activities under the Project; (iv) monitor implementation of safeguards plans; (v) guide the PIUs as and when necessary; and (vi) endorse/submit periodic monitoring reports¹⁶ received from PMC to the PMU PD, who will then submit these to ADB. The PMU will seek Government of Assam's clearance for submission and disclosure of the environmental and social monitoring report to ADB. It will also coordinate with national and state agencies to resolve inter-departmental issues, if any.

79. The PMU will be assisted by PMC Safeguards Specialist (PMC SS). The PMC SS will (i) review and finalize all reports in consultation with the PMU SO; (ii) provide project management support, (iii) assure the technical quality of design and construction, (iv) prepare EIA/IEE/RP/IPP reports; and (iv) provide advice on policy reforms. In addition, the PMC ES will assist the PMU on the procurement needs and other project implementation aspects and shall play a central role in ensuring capacity building on environmental management of the PMU, contractors, and line departments through capacity development support and training.

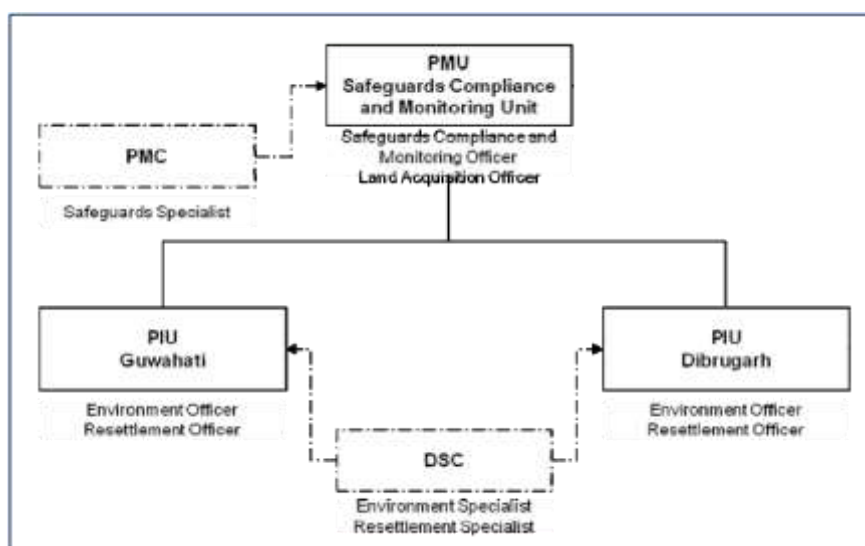
80. The PIUs will each have an Environment Officer and Resettlement Officer who will be responsible for implementation of the EMP in each EIA/IEE and the RP/IPP respectively. Both officers will undertake surveys and record their observations throughout the construction period to ensure that safeguards and mitigation measures are provided as intended. Both will be responsible for (i) implementing and monitoring safeguards compliance activities, public relations activities, gender mainstreaming activities and community participation activities; (ii) obtaining

¹⁶ The monitoring report will focus on the progress of implementation of the IEE/EIA and EARF, RP/RF and IPP/IPF, issues encountered and measures adopted, follow-up actions required, if any, as well as the status of compliance with subproject selection criteria, and relevant loan covenants.

statutory clearances and obtaining NOCs from government agencies/other entities and entering into agreements with them for use of their land; and (iii) coordinating for obtaining ROW clearances with related State and National agencies.

81. Environment Specialists will also be appointed as part of the DSC teams to (i) update the existing IEEs in the detailed design stage; (ii) assist in the monitoring of EMP during construction stage; and (iii) prepare EIAs/IEEs for new subprojects, where required to comply with national law and/or ADB procedure. **Figure 2** shows the implementation arrangement for environment and resettlement safeguards.

Figure 2: Safeguards Institutional Arrangement



B. Institutional Capacity Development Program

82. There is low capacity to implement projects in accordance with ADB safeguard requirements in both project cities. The ULBs do not have environmental/social safeguards personnel, capacity to handle environmental/IR/IP impacts, gender and vulnerability issues. The PMC will be responsible for training of PMU and PIUs staff on aspects such as environmental planning/resettlement planning/implementation, social protection and gender, including the specific recording, reporting and disclosure requirements.

83. The PMC safeguards specialist and DSC environmental specialist will provide the basic training required for environmental awareness and management in accordance with both ADB and government requirements. Specific modules customized for the available skill set shall be devised after assessing the capabilities of the target participants and the requirements of the Project. The entire training will cover basic principles of environmental assessment and management; mitigation plans and programs, implementation techniques, monitoring methods and tools. Typical modules that will be present for the training session would be as follows: (i) sensitization; (ii) introduction to environment and environmental considerations in urban development projects; (iii) review of IEEs and Integration into the subproject detailed design; (iv) improved coordination within Nodal

Departments; (v) monitoring and reporting system. The proposed training program along with the frequency of sessions is presented in **Table 6**.

Table 6: Training Program for Environmental Management

Program	Description	Participants	Form of Training	Duration/ Location	Conducting Agency
A. Pre-Construction Stage					
Sensitization Workshop	Introduction to Environment: <ul style="list-style-type: none"> ✓ Basic Concept of environment ✓ Environmental Regulations and Statutory requirements as per Government of India and ADB 	Secretaries, Chief Engineer, Superintendent Engineers of PWD, PHED and UDD, the Development Commissioner, Chairman, CEO of DMB and Project Director (PD) and PIUs Environmental Officers (EOs)	Workshop	½ Working Day	Project Management Consultant Safeguards Specialist (PMC SS) and DSC Environmental Specialist (DSC ES)
Session I					
Module I	Introduction to Environment: <ul style="list-style-type: none"> ✓ Basic Concept of environment ✓ Environmental Regulations and Statutory requirements as per Government of India and ADB 	Engineers of PWD, PHED and UDD, ULBs, PMU (Technical Unit) and PIUs EOs	Lecture	¼ Working Day	PMC SS and DSC ES
Module II	Environmental Considerations in Urban Development Projects: <ul style="list-style-type: none"> ✓ Environmental components affected by urban development in construction and operation stages ✓ Activities causing pollution during construction and operation stages ✓ Environmental Management Good Practices in Urban Infrastructure Projects 	Engineers of PWD, PHED and UDD, ULBs, PMU (Technical Unit) and PIUs EOs	Workshop	¼ Working Day	PMC SS and DSC ES

Module III	Review of IEE and its Integration into Designs: <ul style="list-style-type: none"> ✓ IEE Methodology ✓ Environmental Provisions in the EMPs ✓ Implementation Arrangements ✓ Methodology of Assessment of Pollution Monitoring ✓ Methodology for site selection of borrow areas, waste disposal areas etc. 	Engineers of PWD, PHED and UDD, ULBs, PMU (Technical Unit) and PIUs EOs	Lecture and Field Visit	½ Working Day	PMC SS and DSC ES
Module IV	Improved Coordination with other Departments: <ul style="list-style-type: none"> ✓ Overview of the Project ✓ Environmental and Social Impacts ✓ Statutory Permissions ✓ Procedural Requirements ✓ Cooperation and Coordination with other Departments. 	Engineers of PWD, PHED and UDD, ULBs, PMU (Technical Unit) and PIUs EOs	Lecture / Interactive Sessions	½ Working Day	PMC SS and DSC ES
Module V	Special Issues in the Project <ul style="list-style-type: none"> ✓ Bio-Diversity Assessment and Conservation ✓ Geomorphological Assessment and Slope Protection ✓ Statutory Permissions– Procedural Requirements ✓ Consultation and Counseling 	Engineers of PWD, PHED and UDD, ULBs, PMU (Technical Unit) and PIUs EOs	Lecture	½ Working Day	PMC SS and DSC ES
B. Construction Stage					
Session II					

Module VI	Role during Construction ✓ Roles and Responsibilities of officials/ contractors/ consultants towards protection of environment ✓ Implementation Arrangements ✓ Monitoring mechanisms	Engineers of PWD, PHED and UDD, ULBs, PMU (Technical Unit) and PIUs EOs	Lecture / Interactive Sessions	½ Working Day	PMC SS and DSC ES
Module VII	Monitoring and Reporting System	PMU (Technical Unit) and PIUs EOs	Lecture / Interactive Sessions	½ Working Day	PMC SS and DSC ES

Notes: APCB – Assam Pollution Control Board; CFE – Consent for Establishment, CFO – Consent for Operation, DFO – Divisional Forest Officer, DSC – Design and Supervision Consultant, EAC - Environmental Appraisal Committee, EARF – Environmental Assessment and Review Framework, EC – Environmental Clearance, EIA – Environmental Impact Assessment, EMP – Environmental Management Plan, FAM – Facility Administration Memorandum, IEE – Initial Environmental Examination, MoEF – Ministry of Environment and Forest, NOC – No Objection Certificate, PHED - Public Health Engineering Department, PIU - Public Implementation Unit, PMC - Project Management Consultants, PMU - Program Management Unit, PWD - REA – Rapid Environmental Assessment, SEAC – State Environment Assessment Committee, SEIAA – State Environment Impact Assessment Authority, STP – sewage treatment plant, TOR – Terms of Reference, UDD - Urban Development Department, ULB - Urban Local Body

C. Staffing Requirement and Budget

84. The costs for environmental safeguard activities which are responsibilities of the PMC and DSC are included in respective consultant packages. The cost of mitigation measures during construction stage will be incorporated into the contractor’s budgets. Thus remaining costs related to environmental safeguards cover the following activities:

- (i) Conducting government IEE or EIA studies, preparing and submitting reports and public consultation and disclosure;
- (ii) Application for Consent to Establish and Operate where required (currently STP and WTP);
- (iii) Implementation and monitoring of environmental management plans (EMP) (including tree re-plantation, long-term surveys/monitoring/ data generation, capacity building, etc.)

85. The costs of these various inputs are shown in **Table 7**.

Table 7: Indicative Cost of EARF Implementation

Item	Quantity	Unit Cost (US\$)	Total Cost (US\$)	Sub-total (US\$)	Source of
Government EIA	Tranche 1: Landfill	\$31,000	31,000	31,000	PMU
Public Consultations	Tranche 2 (2 cities)	\$3,000 per consultation	6,000	6,000	PMU
Consent for Establishment	Lump sum: 3 subprojects (WTP, STP, and Landfill)	\$7,000 per subproject	21,000	21,000	PMU

Consent for Operation	Lumpsum: 3 subprojects (WTP, STP, and Landfill)	\$7,000 per subproject	21,000	21,000	PMU
Monitoring Expenses during Construction	Tranche 1: air, noise and water quality monitoring	Quarterly for 36 months total construction @ \$1,000 per quarter	36,000	60,000	PMU
	Tranche 2: Air, noise and water quality monitoring	Quarterly for 24 months total construction @ \$1,000 per quarter	24,000		PMU
Tree planting	Tranche 1:	\$10,000	10,000	18,000	PMU
	Tranche 2: Lumpsum	\$8,000	8,000		PMU
Capacity Building – Workshop/Training Expenses	Tranche 1: One workshop per city @ 2 cities	\$500	1,000	2,000	PMU
	Tranche 2: One workshop per city @ 2 cities	\$500	1,000		PMU
Total				159,000	

VI. MONITORING AND REPORTING

86. The PMU will monitor and measure the progress of EMP implementation. The monitoring activities will be corresponding with the Project’s risks and impacts and will be identified in the EIAs/IEEs for the subprojects. In addition to recording information of the work, deviation of work components from original scope, the PMU and PIUs will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome.

87. DSC will submit monthly monitoring and implementation reports to PIU, who will take follow-up actions, if necessary. PIU will submit the quarterly monitoring and implementation reports to PMU who will then submit to the PD. The PMU will submit semi-annual monitoring reports to ADB. The suggested monitoring report format is in **Appendix 4**. Project 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.

88. For projects likely to have significant adverse environmental impacts, the EA will retain qualified and experienced external experts to verify its monitoring information¹⁷. The EA will

¹⁷ Experts not involved in day-to-day project implementation or supervision.

document monitoring results, identify the necessary corrective actions, and reflect them in a corrective action plan. The EA, in each quarter, will study the compliance with the action plan developed in the previous quarter. Compliance with loan covenants will be screened by the EA.

89. Furthermore, a Capacity Building Technical Assistance (CDTA) has been included under the ADB loan to assist GoA/ UDD/ GMDA in creating a suitable institutional and policy environment.

90. ADB will review project performance against the EA's 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 executing agency to ensure that adverse impacts and risks are mitigated as planned and as agreed with ADB;
- (iv) Work with executing agency to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the legal agreements, and exercise remedies to re-establish compliance as appropriate; and
- (v) Prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

Appendix 1

DETAILS OF THE AUIIP COMPONENTS FOR EARF CONSIDERATION

A. Water Supply

1. The proposed subcomponents for the Guwahati water supply subproject include, (i) Construction of transmission clear water supply pipe lines and allied works at Guwahati, (ii) Construction of storage reservoirs of various capacities at 6 locations at Guwahati, approach road and allied works, (iii) Design, Build and operation (DBO) of Intake works, Raw water rising man, 98 MLD WTP, clear water pumping station and associated works at Guwahati, (iv) Distribution pipelines in South-East zone, and (v) supply of water meters.

2. The primary source of water for Guwahati is the Brahmaputra River which has a flow of about 4,500 cubic meters per second. Raw water is drawn from various intake points along the river and supplied after treatment to the other zones. The civil works for the water intake and WTP will be limited on approximately 4.8 ha of land earmarked specifically for the subproject. The sites will be fenced and secured prior to construction work and no other further infrastructure development will be allowed to prevent encroachments.

3. The clear water reservoirs will be constructed on a maximum of 0.8 ha of land. Construction, sites have been selected for six numbers of Ground Level Service Reservoirs (GLSR) of different capacities (2.8 to 17 million litter) at Gopal Nagar, North Jyotinagar, Kenduguri, Jonaki Nagar, Naba Jyotinagar and Basistha. The sites will be fenced and secured prior to construction works. In addition, forest clearance from the Forest Department will be obtained and afforestation will be conducted to compensate for the conversion of forest lands to non-forest land use.

4. As far as possible, the transmission mains and feeder mains will follow the alignment within the existing ROWs of lanes/roads in densely populated areas. Pipelines following road alignment will be buried in trenches with minimum of 1 meter (m) clear cover within the ROW, on or adjacent to the road. The pipelines passing through forest lands will be laid above ground as much as possible to avoid the cutting of tree-roots. Forest clearance from the Assam Environment and Forest Department will be obtained and afforestation will be conducted to compensate for the impacts of using forest lands to non-forest land use.

5. Water distribution package will be considered in Tranche 2 to cover south east zone of Guwahati.

B. Sewerage

6. The proposed sub components for the Guwahati sewerage subproject include (i) collection system; (ii) pumping stations and allied works; and (iii) sewage treatment plant (STP).

7. Collection system. The collection system has been designed using parameters prescribed in the CPHEEO Manual and relevant Codes of Practice. The gravity sewers have been designed using Manning formula and based on this, reinforced concrete cement (RCC) pipes non-prSCMUre levels 2 and 3 (NP2/NP3) will be used. DI pipes of Class K9 will be used as pumping mains.

8. The laterals shall be of diameters from 150 mm to 400 mm and will be connected through manholes or connecting chambers. Laterals shall be of RCC NP2 pipes with inner cement mortar lining. The truck and main sewers shall be of diameters from 450 mm to 2400 mm using RCC NP3 pipes.

9. Manholes-cum-connecting chambers will be constructed on the sewer lines to facilitate house connections as well as inspection of sewer lines. Manholes will be provided at every junction, change of diameter, and for house connections. The manholes will be of brick masonry (with sulphate-resistant cement mortar and plaster) at all non-water logged area and RCC (with sulphate-resistant cement cast-in-situ structures) for water logged area.

10. Pumping stations. The pumping stations have been proposed in low lying areas at 3 different locations, 2 of which will be inside the sewage treatment plant (STP). Sewage from the low lying areas will be collected into the sumps and from there it will be pumped into the nearest gravity sewer. Sewage from the pumping stations will be pumped through DI rising mains into the nearest gravity sewers. All rising mains are DI pipes with a diameter of 700 mm. Locations are not yet finalized.

11. Sewage Treatment Plants. Two STPs will be constructed within the project but finalization of site yet to be done. The type of sewage treatment will be of conventional type. Sludge generated from various units of the STP will be treated through Up flow Anaerobic Sludge Blanket Reactor followed by activated sludge process.

C. Urban Transport

12. The proposed subcomponents for the Guwahati urban transport subproject include (i) assistance to the Guwahati Unified Metropolitan Transport Authority (UMTA), and the proposed Special Purpose Vehicle (SPV), in the name of Guwahati City Transport Services Limited (GCTSL), which will be created to implement, own, manage and operate the BRT routes with the private sector, (ii) capacity building program for the staff of the UMTA and GCTSL, (iii) preparation of the detailed design of the selected BRT line, and (iv) negotiation with the private sector for necessary reforms and restructuring of the bus industry to operate future BRT.

D. Storm Water Drainage

13. Poor drainage in Dibrugarh is an age-old problem. The entire drainage system is based on the Dibrugarh Town Protection (DTP) drain constructed in 1955-56. Encroachment and siltation of this primary drain plus dumping of garbage has made the drain incapable of effectively draining the town. With an ineffective primary drain, the connecting secondary and tertiary drainage systems become in-operative with resultant public health. DTP drain started at Jalan Nagar, it originally had an outfall

at Naharani/V Bogibeel area with a length of 22.4 km. But, due to siltation at the mouth of the drain it was later linked with the Laura Jamira drain which ultimately discharges to the Sessa river that eventually flows into the Brahmaputra. Total length of the drain, including the Laura Jamira drain, is 32 km.

14. Under AUIIP sub project “Construction of DTP Drain, Box Culverts and allied Works in Dibrugarh from Chain age 0 to 9500 M” has been considered under Tranche 1. In Tranche 2 Main outlet channel rehabilitation and allied works and secondary drainage will be considered.

E. Solid Waste Management

15. The proposed subcomponents for the Dibrugarh solid waste management subproject include: (i) supply of equipment and vehicles for solid waste collection and transportation; and (ii) construction of treatment and disposal site.

16. **Supply of equipment and vehicles for solid waste collection and transportation.** Solid wastes will be segregated at source and collection will be expanded to unapproachable areas and slums, commercial areas and markets. The collection efficiencies will be improved through setting up of program for house to house collection of waste, selection of agency for collection, and decision on charges.

17. **Solid waste treatment and disposal site.** In conformance to the MSW Rules, sanitary land filling will be adopted in Dibrugarh. The subproject will include a sanitary landfill, compost plant, and associated facilities such as weighbridge, administrative offices, collection bins, and garage/workshop facility. The landfill will be strictly for inerts and rejects from the compost plant. The proposed landfill site is a 30-ha land in Gora Mora Village while the garage/workshop is in a 0.5 ha land in DMB’s compound.

Appendix 2

**CENTRAL POLLUTION CONTROL BOARD (CPCB)
APPLICABLE ENVIRONMENTAL STANDARDS**

General Standards for Discharge of Environmental Pollutants: Effluents

SL.no	Parameter	Standards			
		Inland surface water	Public sewers	Land of irrigation	Marine/coastal areas
		(a)	(b)	(c)	(d)
1.	Colour and odour	remove as far as practicable			
2.	Suspended solids mg/l. max.	100	600	200	(a) For process waste water 100 (b) For cooling water effluent 10% above total suspended matter of influent.

3.	Particle size of suspended solids	shall pass 850 micron IS Sieve			(a)Floatable solids, max. 3mm. (b)Settable solids (max 850 micron)
4.	pH value	5.5. to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
5.	Temperature	shall not exceed 5 ⁰ C above the receiving water temperature			shall not exceed 5 ⁰ C above the receiving water temperature
6.	Oil and grease, mg./l, max.	10	20	10	20
7.	Total residual chlorine, mg/l. max.	1.0			1.0
8.	Ammonical nitrogen (as N.) mg/l max	50	50		50
9.	Total Kjeldahl Nitrogen (as NH ₃) mg/l. max	100			100
10.	Free ammonia (as NH ₃), mg/l.max	5.0			5.0
11.	Biochemical oxygen demand (3 days at 27 ⁰ C), mg/l. max.	30	350	100	100
12.	Chemical oxygen demand, mg/l,	250			250
13.	Arsenic (as As) mg/l, max.	0.2	0.2	0.2	0.2
14.	Mercury (As Hg), mg/l, max.	0.01	0.01		0.01
15.	Lead (as Pb) mg/l, max	0.1	1.0		2.0
16.	Cadmium (as Cd) mg/l. max	2.0	1.0		2.0

SL.no	Parameter	Standards			
		Inland surface water	Public sewers	Land of irrigation	Marine/coastal areas
17.	Hexavalent chromium (as Cr. +6). mg/l, max	0.1	2.0		1.0
18.	Total Chromium (as Cr) mg/l, max	2.0	2.0		2.0
19.	Copper (as Cu) mg/l, max	3.0	3.0		3.0
20.	Zinc (as Zn) mg/l, max	5.0	15		15
21.	Selenium (as Se) mg/l, max	0.05	0.05		0.05
22.	Nickel (as Ni) mg/l, max	3.0	3.0		5.0
23.	Cyanide (as CN) mg/l, max	0.2	2.0	0.2	0.2
24.	Fluoride (as F) mg/l, max	2.0	15		15
25.	Dissolved phosphates (as P) mg/l, max	5.0			
26.	Sulfide (as S) mg/l, max	2.0			5.0
27.	Phenolic compounds (as C ₆ H ₅ OH) mg/l, max	1.0	5.0		5.0
28.	Radioactive materials: (a)Alfa emitters microcurie/ml, max. (b)Beta emitters micro curie/ml,max.	10 ⁻⁷	10 ⁻⁷	10 ⁻⁸	10 ⁻⁷
		10 ⁻⁶	10 ⁻⁶	10 ⁻⁷	10 ⁻⁶

29.	Bio-assay test	90% Survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
30.	Manganese (as Mn)	2 mg/l	2 mg/l		2 mg/l
31.	Iron (as Fe)	3 mg/l	3 mg/l		3 mg/l
32.	Vanadium (as V)	0.2 mg/l	0.2 mg/l		0.2 mg/l
33.	Nitrate Nitrogen	10 mg/l			20 mg/l

These standards shall be applicable for industries, operations or process other than those industries operations or process for which standards have been specified in schedule of the Environment Protection Rules, 1989

CPCB Primary Water Quality Criteria

Designated-Best-Use	Class of	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	<ul style="list-style-type: none"> ❖ Total Coliform Organisms: MPN 50 per 100MI ❖ 6.5 pH 8.5 ❖ Dissolved Oxygen: 6 mg/L ❖ Biochemical Oxygen Demand (5 days @ 20°C): 2 mg/L
Outdoor bathing (organized)	B	<ul style="list-style-type: none"> ❖ Total Coliform Organisms: MPN 500 per 100mL ❖ 6.5 pH 8.5 ❖ Dissolved Oxygen: 5 mg/L ❖ Biochemical Oxygen Demand (5 days @ 20°C): 3 mg/L
Drinking water sources after conventional treatment and disinfection	C	<ul style="list-style-type: none"> ❖ Total Coliform Organisms: MPN 5000 per 100mL ❖ 6 pH 9 ❖ Dissolved Oxygen: 4 mg/L ❖ Biochemical Oxygen Demand (5 days @ 20°C): 3 mg/L

Propagation of wildlife and fisheries	D	<ul style="list-style-type: none"> ❖ 6.5 pH 8.5 ❖ Dissolved Oxygen: 4 mg/L ❖ Free ammonia (as N): 1.2 mg/L
Irrigation, industrial cooling, controlled waste disposal	E	<ul style="list-style-type: none"> ❖ pH 8.5 ❖ Electrical conductivity at 25°C: 2250 micro mhos/cm ❖ Sodium absorption ratio: Max 26 ❖ Boron: Max 2 mg/L

Indian Standards for Drinking Water - Specification (BIS 10500: 1991)

Sl.No	Substance or Characteristic	Requirement (Desirable Limit)	Permissible Limit in the absence of Alternate source
Essential characteristics			
1.	Colour, (Hazen units, Max)	5	25
2.	Odour	Unobjectionable	Unobjectionable
3.	Taste	Agreeable	Agreeable
4.	Turbidity (NTU, Max)	5	10
5.	pH Value	6.5 to 8.5	No Relaxation
6.	Total Hardness (as CaCo3) mg/lit.,Max	300	600
7.	Iron (as Fe) mg/lit,Max	0.3	1.0
8.	Chlorides (as Cl) mg/lit,Max.	250	1000
9.	Residual, free chlorine, mg/lit, Min	0.2	--
Desirable Characteristics			
10.	Dissolved solids mg/lit, Max	500	2000
11.	Calcium (as Ca) mg/lit, Max	75	200
12.	Magnesium (as Mg)mg/lit, Max.	30	100
13.	Copper (as Cu) mg/lit, Max	0.05	1.5
14.	Manganese (as Mn)mg/lit ,Max	0.10	0.3
15.	Sulfate (as SO4) mg/lit, Max	200	400
16.	Nitrate (as NO3) mg/lit, Max	45	100
17.	Fluoride (as F) mg/lit, Max	1.0	1.5
18.	Phenolic Compounds (as C 6 H5OH) mg/lit, Max.	0.001	0.002
19.	Mercury (as Hg)mg/lit, Max	0.001	No relaxation
20.	Cadmium (as Cd)mg/lit, Max	0.01	No relaxation
21.	Selenium (as Se)mg/lit,Max	0.01	No relaxation
22.	Arsenic (as As) mg/lit, Max	0.05	No relaxation
23.	Cyanide (as CN) mg/lit, Max	0.05	No relaxation
24.	Lead (as Pb) mg/lit, Max	0.05	No relaxation

25.	Zinc (as Zn) mg/lit, Max	5	15
26.	Anionic detergents (as MBAS) mg/lit, Max	0.2	1.0
27.	Chromium (as Cr ⁶⁺) mg/lit, Max	0.05	No relaxation
28.	Polynuclear aromatic hydro Carbons (as PAH) g/lit, Max	--	--
29.	Mineral Oil mg/lit, Max	0.01	0.03
30.	Pesticides mg/l, Max	Absent	0.001
31	Radioactive Materials		
	i. Alpha emitters Bq/l, Max	--	0.1
	ii. Beta emitters pci/l,Max	--	1.0
32	Alkalinity mg/lit. Max	200	600
33	Aluminium (as Al) mg/l,Max	0.03	0.2
34	Boron mg/lit, Max	1	5

Ambient Air Quality Standards

Pollutant	Time Weighted Average	Industrial, Residential, Rural and Other Areas	Sensitive Area (Notified by Central Govt.)	Method of Measurement
Sulphur Dioxide (SO ₂)	Annual Average * 24 hours Average**	50 µg / m ³ 80 µg/m ³	20 µg / m ³ 80 µg/m ³	<input type="checkbox"/> Improved West and Gaeke method <input type="checkbox"/> Ultraviolet Fluorescence
Oxides of Nitrogen (NO _X)	Annual Average * 24 hours Average**	40 µg / m ³ 80 µg/m ³	30 µg / m ³ 80 µg/m ³	<input type="checkbox"/> Jacobs and Hochheiser modified (NaOH – NaAsO ₂) method <input type="checkbox"/> Gas Chemiluminescence
Particulate Matter (PM ₁₀) (Size <10 µm)	Annual Average * 24 hours Average**	60 µg / m ³ 100 µg/m ³	60 µg / m ³ 100 µg/m ³	<input type="checkbox"/> Gravimetric <input type="checkbox"/> TOEM <input type="checkbox"/> Beta Attenuation
Particulate Matter (PM _{2.5}) (Size <2.5 µm)	Annual Average * 24 hours Average**	40 µg / m ³ 60 µg/m ³	40 µg / m ³ 60 µg/m ³	<input type="checkbox"/> Gravimetric <input type="checkbox"/> TOEM <input type="checkbox"/> Beta Attenuation
Ozone (O ₃)	8 hours average ** 1 hour **	100 µg/m ³ 180 µg/m ³	100 µg/m ³ 180 µg/m ³	<input type="checkbox"/> UV photometric <input type="checkbox"/> Chemiluminescence <input type="checkbox"/> Chemical method
Lead (Pb)	Annual Average * 24 hours Average**	0.5 µg / m ³ 1.0 µg / m ³	0.5 µg/m ³ 1.0 µg/m ³	<input type="checkbox"/> AAS method after sampling using EPM 2000 or equivalent filter paper
Carbon Monoxide (CO)	8 hours Average** 1 hour **	2.0 mg/ m ³ 4.0 mg/ m ³	2.0 mg/ m ³ 4.0 mg/ m ³	<input type="checkbox"/> Non Dispersive Infrared Spectroscopy
Ammonia (NH ₃)	Annual Average * 24 hours Average**	100 µg / m ³ 400 µg / m ³	100 µg / m ³ 400 µg / m ³	<input type="checkbox"/> Chemiluminescence <input type="checkbox"/> Indophenol blue method
Benzene (C ₆ H ₆)	Annual Average *	5 ng/ m ³	5 ng/ m ³	<input type="checkbox"/> Gas Chromatography continuous analyzer <input type="checkbox"/> Adsorption and desorption followed by GC analysis
Benzo(a)pyrene particulate phase only	Annual Average *	1 ng/ m ³	1 ng/ m ³	<input type="checkbox"/> Solvent extraction followed by GC/HPLC analysis
Arsenic (As)	Annual Average *	6 ng/ m ³	6 ng/ m ³	<input type="checkbox"/> AAS/ICP method after sampling using EPM 2000 or
Nickel (Ni)	Annual Average *	20 ng/ m ³	20 ng/ m ³	<input type="checkbox"/> AAS/ICP method after sampling using EPM 2000 or equivalent filter paper

(Source: Central Pollution Control Board, New Delhi, Notification dated 18th November 2009)

Notes:

1. * Indicate Annual Arithmetic Mean of Minimum 104 measurement in a year measured twice a week, 24 hourly

at uniform intervals

2. ** 24 hourly / 8 hourly/1 hourly values should be met 98% of the time in a year. However, 2% of the time, it may exceed by not on two consecutive days

Standards for Diesel Generator Sets: Stack Height

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

$$H = h + 0.2 \times \text{ÖKVA}$$

H = Total height of stack in metre

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

KVA = Total generator capacity of the set in KVA

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

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

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

Noise Standards

Noise limits for domestic appliances and construction equipments at the manufacturing stage in dB (A).

Window air conditioners of 1 -1.5 tonne	68
Air coolers	60
Refrigerators	46
Diesel generator for domestic purposes	85
Compactors (rollers), front loaders, concentrate mixers, cranes (movable), vibrators and saws	75

National Ambient Noise Standards The Noise Pollution (Regulation and Control) Rules, 2000

Area Code	Category of Area	Limit in dB(A) Leq*	
		Day Time	Night Time
A.	Industrial area	75	70
B.	Commercial area	65	55
C.	Residential area	55	45
D.	Silence	50	40

Note-1 Day time is reckoned in between 6 a.m. and 10 p.m.

Note-2 Night time is reckoned in between 10 p.m. and 6 a.m.

Note-3 Silence zone is an area comprising not less than 100 m around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority

Note-4 Mixed categories of areas may be declared as one of the four above mentioned categories by the competent

authority.

* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

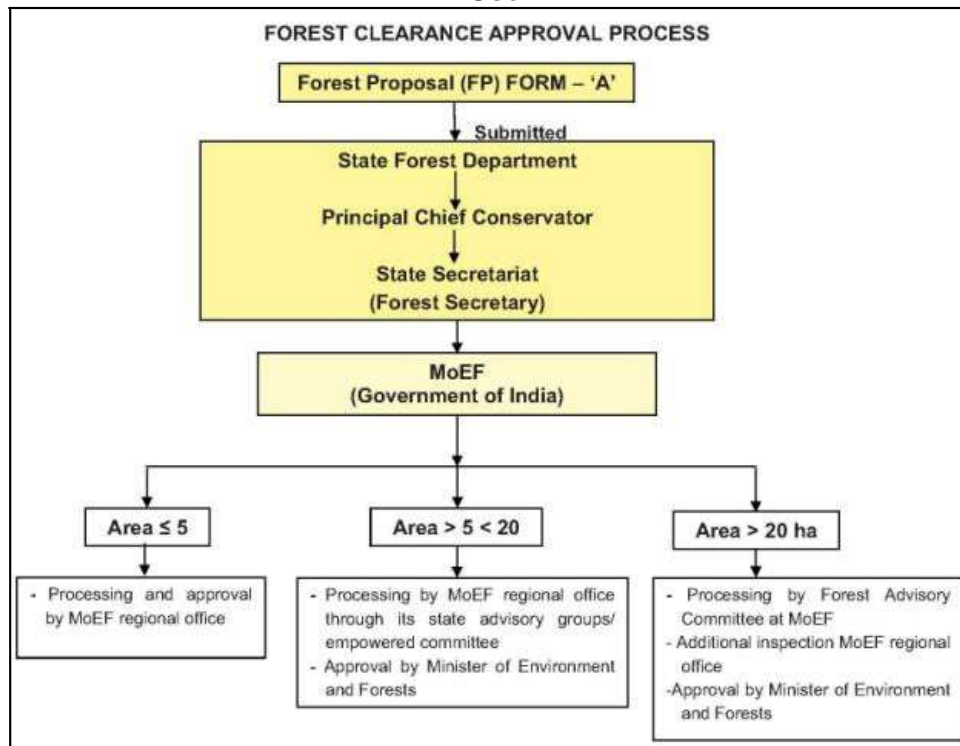
A “decibel” is a unit in which noise is measured.

“A”, in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

Leq: It is an energy mean of the noise level over a specified period.

Appendix 3

Summary of Process for Obtaining Forest Clearance Diversion of Forest Lands to Non-forest Use



Step	Action	Remarks
STEP 1	<p>Identification of Forest Area Involved (Location of Project)</p> <p>For selection of optimum proposal, the following criteria should be taken into consideration:</p> <p>a) any monument of cultural or historical importance is not affected by the project;</p> <p>b) the proposed alignment of the project line does not create any threat to the survival of any community with special reference to Tribal Community;</p> <p>c) the proposed alignment of the project does not affect any public utility services such as playgrounds, schools and other establishments;</p> <p>d) the alignment of the project does not pass through any sanctuaries, National Park, Biosphere reserves or eco- sensitive zones; and</p> <p>e) the alignment of the project does not infringe with area of natural resources.</p>	<p>Selection of forest area involved is undertaken in close consultation of the project proponent with representatives from the State forest departments and the Department of Revenue.</p>
STEP 2	<p>Submission of Application Form</p> <p>After finalization of forest area involved for project location, applicant submits details in prescribed proforma to the respective Divisional Forest Officer (DFO) /Nodal Officer (Forest) of concerned State Government.</p>	<p>Application Form to be prepared by project proponent.</p> <p>If the forest is rich in wildlife, then the Chief Wildlife Warden also gets a detailed assessment report prepared</p>
		<p>including measures to protect the wildlife, which is submitted with the proposal.</p>
STEP 3	<p>Formulation of Compensatory Afforestation</p> <p>DFO/Nodal Officer forwards the application form and details to the concerned DFO/Conservator of Forest. Applicant provides undertaking/ certificate to meet the cost of compensatory afforestation and the Net Present Value of forestland diverted.</p>	<p>Forest authorities survey the relevant forest area required for the construction of project under the possible alternatives. Then conduct a cost-benefit analysis to assess the loss of forest produce, loss to environment vis-à-vis benefits of project.</p>
STEP 4	<p>Project proponent provides undertaking/ certificate to meet the cost of compensatory afforestation and the Net Present Value of forestland diverted.</p>	

<p>STEP 5</p>	<p>Approval of Proposal</p> <p>The proposal is submitted to the state forest department and then forwarded to the principal chief conservator of forests in the state and finally to the state secretariat.</p>	<p>To facilitate speedy approval of forest proposal involving lesser area, Ministry of Environment and Forests had established Regional Offices in each region for processing and approving these proposals.</p> <p>As per the ammended Forest (Conservation) Rules in force now, the Regional Chief Conservator of Forests have the powers to decide proposals involving forest land upto 5 hectares. Proposals involving forest land between 5 to 40 hectares shall be processed by the Regional Chief Conservator consultation with a State Advisory Group consisting of representatives of the concerned State Government.</p>
---------------	---	--

Appendix 4 SAMPLE GRIEVANCE REGISTRATION FORM

(To be available in Hindi, Urdu and Other Local Language, if any)

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

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

Date	Place of registration				
Contact Information/Personal Details					
Name		Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female	Age	
Home Address					
Village / Town					
District					
Phone no.					
E-mail					
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) of your grievance below:					
If included as attachment/note/letter, please tick here:					
How do you want us to reach you for feedback or update on your comment/grievance?					

FOR OFFICIAL USE ONLY

Registered by: (Name of Official registering grievance)
If ver: <input type="checkbox"/> Note/Letter <input type="checkbox"/> E-mail

<input type="checkbox"/> Verbal/Telephonic	
Reviewed by: (Names/Positions of Official(s) reviewing grievance)	
Action Taken:	
Whether Action Taken Disclosed:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Means of Disclosure:	

Appendix 5

ENVIRONMENTAL MONITORING FORMAT

a. Work Details

Table 1: Work Details and Risks

Locations	Sub-projects Components (Package No.)	Name of the contractor	Listing of works under the package	Starting Date (land clearance) and schedule date of completion	What type of works continued at present	Progress Percentage	Expected changes from approved scope	Fulfillment of objectives- Type of remedial measures needed	Key assumptions and risks that affect attainment of the objectives

b. Implementation of Environmental Management Plan

Table 2: Status of Environment, Forest & Other Clearances

City/ Town	Work (Package No.)	Applicable Legislation/ Type of clearance	Clearance given by and date	Subject/ Issue	Remarks/ Action needed

Table 3: Compliance with Environmental Management Plan

Description of Impact	Mitigation measures Proposed	Implementati on status	Detail/ Remarks on implementation	Monitoring methods & frequency	Monitoring conducted by	Monitoring Remarks (Excellent/Satisfactory /Partially Satisfactory/Below Satisfaction/Poor/Very Poor)	Remarks and actions taken to improve implementation
Pre-Construction							
Construction							
Operation (Defect Liability Period)							

Table 4: Measurement of Pollutants

Components	Package/ Location	Period of monitoring	Parameters/Pollutants	Standard	Base line status	Monitoring result during project Implementation	Remarks
Noise							
Air Quality							
Water Quality							
Soil Quality							
Process Generated Sludge							