



Environmental Monitoring Report

Project Number: 42265-023
January 2018

Period: July 2016 – December 2016

IND: Assam Urban Infrastructure Investment Program - Tranche 1

Submitted by

Guwahati Development Department and Urban Development Department, Government of Assam

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Government of Assam

Assam Urban Infrastructure Investment Program (AUIIP)

Guwahati Development Department

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GM/AS.

No.ADB/AUIIP/IEE/178/2016/106

Date: 24.03.2017

From,

The Project Director,
Assam Urban Infrastructure Investment Program
Ganeshguri, Guwahati-05

To,

The Country Director,
India Resident Mission
Asian Development Bank

Sub: Submission of Semi Annual Environment Monitoring Report (Period July, 2016 to December, 2016)

Sir,

As per the subject cited above, the **Semi Annual Environment Monitoring Report (Period July, 2016 to December, 2016)** is enclosed herewith.

This is for favour of your kind information & necessary action.

Encl.: As Stated Above

Yours Faithfully,

Project Director
Assam Urban Infrastructure Investment Program

Project Director
Assam Urban Infrastructure Investment Program
Ganeshguri, Guwahati-5



soft copy recd. 31.03.17.

Semi-Annual Environmental Monitoring Report

ADB Loan Number 2806-IND

Period Covered: July to December 2016

**IND: Assam Urban Assam Urban Infrastructure
Investment Program – Project 1**

March, 2017

Prepared by Guwahati Development Department and Urban Development Department, Government of Assam
for Asian Development Bank

This Semi – Annual Environmental Monitoring Report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

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ABBREVIATIONS

ADB	-	Asian Development Bank
AUIIP	-	Assam Urban Infrastructure Investment Program
APCB	-	Assam Pollution Control Board
AUWSSB	-	Assam Urban Water Supply and Sanitary Board
BSR	-	Basic Schedule of Rates
BRTS	-	Bus Rapid Transit System
CDTA	-	Capacity Development Technical Assistance
CRZ	-	Coastal Regulation zone
CTE	-	Consent to Establish
CTO	-	Consent to Operate
DFO	-	Divisional Forest Officer
DMB	-	Dibrugarh Municipal Board
DSC	-	Design and Supervision Consultant
DTP	-	Dibrugarh Town Protection
EARF	-	Environmental Assessment and Review Framework
EC	-	Environmental Clearance
EIA	-	Environmental Impact Assessment
EM	-	Environment Monitoring
EMP	-	Environmental Management Plan
FHH	-	Female Headed Households
GAP	-	Gender Action Plan
GDD	-	Guwahati Development Department
GMC	-	Guwahati Municipal Corporation
GMDA	-	Guwahati Metropolitan Development Authority
GRM	-	Grievance Redress Mechanism
IEC	-	Information, Education and Communication
IEE	-	Initial Environmental Examination
ILRP	-	Income and Livelihood Restoration Program
IOCL	-	Indian Oil Corporation Ltd.
LOA	-	Letter of Acceptance
LOI	-	Letter of Intent
MFF	-	Multi Tranche Financing Facility
NABET	-	National Accreditation Board for Education and Training
NOC	-	No Objection Certificate
NTP	-	Notice to Proceed
PD	-	Project Director, AUIIP
PHED	-	Public Health Engineering Department
PIU	-	Project Implementation Unit
PMC	-	Project Management Consultants
PMU	-	Project Management Unit
PPMS	-	Project Performance Monitoring System
PSO	-	Project Support Office, Guwahati
PUC	-	Pollution Under Control
RP	-	Resettlement Plan
SM	-	Social Monitoring
SPPTS	-	Support project program and Technical Assistance
SPS	-	Safeguards Policy Statement, 2009
STP	-	Sewage Treatment Plant
SWM	-	Solid Waste Management
TL	-	Team Leader
TOR	-	Terms of Reference
DTL	-	Dy. Team Leader
UDD	-	Urban Development Department
WO	-	Work Order
WTP	-	Water Treatment Plant

I. INTRODUCTION

A. Overall Project Description

1. Asian Development Bank (ADB) has approved the Assam Urban Infrastructure Investment Program (AUIIP), a \$200 million Multi-Tranche Financing Facility (MFF), to improve water supply of South Guwahati East Zone¹ as well as drainage and solid waste management (SWM) of Dibrugarh.² AUIIP will also provide support for ongoing urban reforms and associated capacity development for improved service delivery, urban governance and financial management in Guwahati and Dibrugarh. AUIIP will be implemented in a period of 6 years³. The first tranche (**Project 1**) of the MFF became effective on 25 March 2012. The Tranche 1 contains three sub-projects which are (i) Water Supply System in South East Guwahati (ii) Storm Water drainage in Dibrugarh and (iii) Solid Waste Management in Dibrugarh Preparations for Tranche 2 projects are ongoing.

2. The executing agency is Guwahati Development Department (GDD) and the implementing agencies are Guwahati Metropolitan Development Agency (GMDA) and Dibrugarh Municipal Board (DMB). The Program Management Unit (PMU) in Guwahati and respective Programme Implementing Units (PIUs) have been established in Guwahati and Dibrugarh. The consultants (Project Management Consultants [PMC] and Design and Supervision Consultants [DSC]) of Project 1 were already operational in assisting the PMU and PIU⁴.

3. The primary objective of the program is to formulate and implement a roadmap that helps national and state-level targets for water supply, sewerage and SWM in Guwahati and Dibrugarh and for urban transport in Guwahati.

Outputs of the Project

The major key outputs are as follows:

- Improvement water supply infrastructure in Guwahati improved SWM infrastructure in Dibrugarh
- Improved drainage in Dibrugarh and Guwahati

¹Guwahati has been divided into four water supply zones; one north of the Brahmaputra river and three to the south. In south Guwahati, the west zone is being financed under Jawaharlal Nehru National Renewal Mission (JNNURM), the central zone by Japan International Cooperation Agency (JICA), and the east zone has been identified for ADB assistance.

²Dibrugarh suffers from prolonged local flooding during the annual monsoon. Because of the lack of sewerage and inadequate solid waste management much of the areas in the city's drainage system becomes choked and severely polluted with un-treated wastewater.

³From 01 March 2012 to 31 December 2017

⁴Government of Assam has engaged M/s Shah Technical Consultant (P) Ltd. in association with SMEC India (P) Ltd as DSC.

- Enhanced capacity building

OUTCOMES:

- Improved access to Urban infrastructure
- Reduced flooding
- Environmental sustainability
- Gender main streaming

B. Purpose of the Report

4. **Environmental Categorization.** AUIIP Project 1 has been categorized as ADB Category B for environment as per ADB Safeguard Policy (SPS 2009). Initial environmental examination reports (IEEs) were prepared for each subproject.

5. This report is the semi-annual environment monitoring report (SEMR) covering period **July to December 2016**. This SEMR describes the implementation of the environmental management plan (EMP) in each subproject IEE.

C. Environment Performance Indicators, if any

6. For effective monitoring, selected environmental parameters have been identified as indicators which may be qualitatively and quantitatively measured and compared over a period of time in order to assess/ ensure the compliance to the Environmental Management Plans (EMPs) of each subproject. The environmental performance indicators selected are physical, biological and social characteristics identified as most important in affecting the environment at critical locations all along the sub project corridors. The parameters identified as performance indicators are:

- ✓ Compliance with environmental management and monitoring plan;
- ✓ Compliance to State/ National environmental regulations; and
- ✓ Monitoring of ambient air quality, water quality and noise levels and comparison with baseline environmental quality and State/ National Standards.

II. IMPLEMENTATION PROGRESS

A. Status of Subprojects Project 1

7. The Tranche 1 contains three sub-projects which are (i) Water Supply System in South East Guwahati (ii) Storm Water drainage in Dibrugarh and (iii) Solid Waste Management in Dibrugarh. **Table 1** shows the subprojects under Tranche 1 and the works packages including the status of award of contracts as of 31st Dec 2016.

The package involving construction of 6 storage reservoirs and allied works in Guwahati; and another package involving construction of transmission main pipelines and allied works for water supply project in Guwahati, were awarded earlier had to be terminated on December 2015 due to poor performance of the contractor. The terminated contracts were repackaged into three packages and were rebid. Following which, new contractors were engaged for the Guwahati Sub-project. Shivam Transcon Pvt Ltd was engaged on 06.08.2016 for construction of water reservoirs and Tirupati Cement Products was engaged in October 2016 for the construction of clear water transmission mains pipeline and allied works. The design, build and operation of intake works, raw water rising main, water treatment plant, clear water pumping stations and allied works in Guwahati will be covered under Tranche 2.

The contract for the construction of DTP drain box culverts and allied works chainage 0 to 9 9500 m in Dibrugarh is already awarded. Works are currently in progress.

The Solid waste management (SWM) sub-project in Dibrugarh has three packages which are (i) The construction of Compound Wall for SWM: The Technical Bid Evaluation Report (TBER) for is submitted to ADB and is awaiting approval (ii) Construction of 100 MT Solid Waste Compost Plant & 60 MT Sanitary Landfill site: PBER is ready to be placed in TAC for approval and (iii) Procurement of equipment/transportation for primary and secondary collection system: TBER submitted to ADB for approval for re0bidding of the package. The Environment clearance has been obtained for SWM landfill site for Dibrugarh.

TABLE 1: PROJECT PROGRESS IN THE REPORTING PERIOD TILL 31ST DECEMBER, 2016

Sl. No.	Package Ref No.	General Description Goods or Works	Contract Signing Date	Name of the Contractor	Contract Value	Contract period in months/days
1	AUIIP/PR-1/GUW/WS/01	Constriction of Water supply, Transmission Main Pipelines and allied work in Guwahati	04.10.2016	M/s. Tirupati Cement Products	78.99 Crore	1095 days
2	AUIIP/PR-1/GUW/WS/02A	Gopal Nagar, Kenduguri & Northjyoti Nagar	06.08.2016	M/s. Shivam Transcon Pvt Ltd	37.11 Crore	1095 days
3	AUIIP/PR-1/GUW/WS/02B	Hengrabari, Nabajyotinagar & Basistha	01.09.2016	M/s. Shivam Transcon Pvt Ltd	30.80 Crore	730 days
4	AUIIP/PR-1/DIB/DR/01	Construction of DTP Drain	20.02.2014	M/s. Corsan Corvium Construction S.A	169.89 crore	1095 days Or 36 months
5	AUIIP/PR-1/DIB/SWM/01A	Construction of Compound Wall, River Protection etc.		Pre bidding evaluation is under process	12.02 Crore	
6	AUIIP/PR-1/DIB/SWM/01B	100 MT compost plant with 60 MT sanitary land fill site etc.		Price bid evaluation is under process	31.11 crore	
7	AUIIP/PR-1/DIB/SWM/02	Procurement of goods and equipment		TBER sent to PMU	11.88 Crore	

Table 2- Status of Compliance with EARF/ADB Procedure is shown in the following table:

Name & No. of Package	Environment Category	Status of preparation of IEE	Status of Approval by ADB	Date of Approval	Further Action needed For Compliance & Responsibility
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Gopal Nagar, Kenduguri & Northjyoti Nagar AUIIP/PR-1/GUW/WS/02A	B	Completed and approved	Approved	April-2015	Regular monitoring and reporting of the EMP
Hengrabari, Nabajyotinagar & Basistha AUIIP/PR-1/GUW/WS/02B	B	Completed and approved	Approved	April-2015	Regular monitoring and reporting of the EMP
Constriction of Water supply, Transmission Main Pipelines and allied work in Guwahati AUIIP/PR-1/GUW/WS/01	B	Completed and approved	Approved	April-2015	Regular monitoring and reporting of the EMP
Construction of DTP Drain AUIIP/PR-1/DIB/DR/01	B	Completed and approved	Approved	Nov-2015	Regular monitoring and reporting of the EMP
Construction of Compound Wall, River Protection etc. AUIIP/PR-1/DIB/SWM/01A	B	Completed and approved	Approved	Nov-2015	Regular monitoring and reporting of the EMP
100 MT compost plant with 60 MT sanitary land fill site etc AUIIP/PR-1/DIB/SWM/01B	B	Completed and approved	Approved	Nov-2015	Regular monitoring and reporting of the EMP
Procurement of goods and equipment AUIIP/PR-1/DIB/SWM/02	B	Completed and approved	Approved	Nov-2015	Regular monitoring and reporting of the EMP

Table 3: Summary of Subprojects under AUIIP Project 1

Town	Package No.	Components	Status- 31 st December 2016
1. Water Supply System Subproject			
Guwahati	AUIIP/PR-1/GUW/WS-01	Construction of transmission water supply pipelines and allied works in Guwahati <ul style="list-style-type: none"> Laying of 19.290 km length of mild 	Due to poor performance of the previous Contractor, the contract was terminated on 7 th December 2015. IFB was floated for fresh bid on

Town	Package No.	Components	Status- 31 st December 2016
		<p>steel pipe line of nominal internal diameter ranging from 1300mm to 800mm</p> <ul style="list-style-type: none"> Laying of 4.990 km length of gravity pipe line of ductile iron (Class K-9) of 500mm – 700 mm internal diameter. Locations- Water treatment plant to Gopal Nagar, then connecting all reservoirs 	<p>21st December 2015.</p> <p>Price bid was opened after obtaining concurrence from ADB.</p> <p>PBER report with the justification of the seriously unbalanced prices was prepared.</p> <p>TAC meeting was held on 14th June 2016 and it was decided to re-bid for the contract.</p> <p>M/s. Tirupati Cement Products has been engaged. The agency will start working from 1st of January 2017</p>
Guwahati	AUIIP/PR-1/GUW/WS-02A	<p>Construction of storage reservoirs of various capacities at three locations (Gopal Nagar, North Jyoti Nagar and Kenduguri), approach road and allied works in South East Guwahati Water Supply Project.</p> <p><u>Details: Locations</u></p> <p>Reservoirs:</p> <ul style="list-style-type: none"> ➤ Gopal Nagar – 17 Million Litter (ML) ➤ North Jyotinagar- 3.2 ML ➤ Kenduguri- 3.6 ML <p>Approach road:</p> <ul style="list-style-type: none"> ▪ Gopal Nagar – 460 m ▪ North Jyotinagar- 530 m ▪ Kenduguri-650 m 	<p>Due to poor performance of the previous Contractor, the contract was terminated on 7th December 2015. IFB was floated on 17th December 2015 for fresh bid.</p> <p>LOA was issued to the lowest evaluated bidder.</p> <p>M/S Shivam Transcon Ltd. MOU signed through vide Letter No ADB/AUIIP/LOA/157/2016/04 dated 05.05.2016. However, the work progress of M/s Shivam Transcon is not up to the mark.</p>
Guwahati	AUIIP/PR-/GUW/WS-02B	<p>Construction of storage reservoirs of various capacities at three locations (Basistha, Hengrabari and Nabajyoti Nagar), approach road and allied works in South East Guwahati Water Supply Project.</p> <p><u>Details: Locations</u></p> <p>Reservoirs:</p> <ul style="list-style-type: none"> ➤ Hengrabari)- 13 ML ➤ Nabajyoti Nagar Main Zone Reservoir- 3.2 ML ➤ Basistha- 5 ML <p>Approach road:</p> <ul style="list-style-type: none"> ▪ Hengrabari-170 m ▪ Nabajyoti Nagar- 855 m ▪ Basistha- 150 m 	<p>Due to poor performance of the previous Contractor, the contract was terminated on 7th December 2015.</p> <p>IFB was floated on 17th December 2015 for fresh bids.</p> <p>Two bids were received up to the deadline of submission of bid i.e. 2nd February 2016.</p> <p>Price Bid was opened on 25th February 2016 at 14.00 hrs after obtaining the approval from ADB.</p> <p>ADB's suggestion was discussed in the TAC meeting held on 14th June 2016 and TAC decided to keep the previous decision i.e. re-bidding of the contract.</p> <p>M/s. Shivam Transcon Pvt Ltd started working through vide letter No ADB/AUIIP/LOA/157/2016/50 dated 30.08.2016 but the progress is slow</p>

Town	Package No.	Components	Status- 31 st December 2016
2. Storm water Drainage Subproject			
Dibrugarh	AUIIP/PR-1/DIB/DR-01	Construction of Reinforced cement concrete RCC DTP drain, widening of culverts and allied works in Dibrugarh from chainage 0 to 9500 m	Selection of construction agency completed. Letter of Acceptance was issued on 13 th December.2013. Contract Agreement was signed on 20.02.2014 and NTP was issued on 25.03.2014. Work in progress – slow progress.
3. Solid Waste Management Subproject			
Dibrugarh	AUIIP/PR-1/DIB/SWM-01A	Construction of Compound wall, River Protection Wall, Access Roads, Security Guard Room and Allied Works of Landfill site at Dibrugarh	Detailed project report prepared. Environment Clearance was obtained from SEIAA, vide letter No-SEIAA.27/2015/EC/56/265 dated 21 st September 2015. This is valid for 5 years. Bidding process was started on 23th December2015. ADB did not approve the Technical Bid Evaluation Report of the first bid and recommended for a fresh tender. IFB for rebid has already been floated on 12 th May 2016 Tender was invited two times for this package, but due to less participation, Commissioner GDD has sought for rebidding of the package for one more time.
Dibrugarh	AUIIP/PR-1/DIB/SWM-01B	DBO of 100 MT processing plant and 60 MT sanitary land fill site and allied works at Dibrugarh	Detailed project report prepared. Environment Clearance obtained from SEIAA, vide letter No-SEIAA.27/2015/EC/56/265 dated 21 st September 2015. This is valid for 5 years. Bidding process was started on 23th December 2015 ADB did not approve TBER of the first bid and recommended for fresh tender. IFB was floated on 13 th June 2016. The deadline of submission of bids was29 th July 2016. Bidding process is completed and technical bid evaluation process completed and sent to ADB for concurrence. Second stage of bidding is under process.
Dibrugarh	AUIIP/PR-1/DIB/SWM-02	Procurement of equipment for primary, secondary collection and transportation vehicles for Municipal Solid Waste Management at Dibrugarh	ADB has approved the draft BID on 13 th June 2016. IFB was floated on 21 st June 2016. Bidding process is completed and evaluation price bidding is in

Town	Package No.	Components	Status- 31 st December 2016
			progress

8. **Appendix 1 and I** shows detailed implementation Schedule of Awarded Project 1 sub project packages.

9. **Appendix 2 and II** shows photo illustration of project locations related to environment safeguard.

Table 4: Status of Sub-project Awarded Under AUIP Project 1 (As of 31st December 2016)

Town	Package No.	Component	Start Date	Number of Days/Months to Complete Work	Target Schedule of Completion (Extended Date of Completion) ⁵	% Physical Progress as of 31 st December 2016	Works Completed as of 31 st December 2016
Dibrugarh	AUIP/PR-1/DIB/DR-01	<ul style="list-style-type: none"> Widening and construction of 9.5 km (chainage 0 - 9500 m) reinforced cement concrete (RCC) drain with linings; Construction of 17 nos. box culverts; and Construction of sillage pumping station. 	25 March 2014	1095 Days or 36 months	25 March 2017	12.38%	<p>Very slow progress. Works have started since Dec 2015, both at Site and at Precast Yard.</p> <p>Local Issues such as law and order situation, frequent Ban calls and disturbances from local miscreant in open drain portion during evening and late night work affecting Works.</p> <p>Frequent rains & high water level in the drain affecting works at Drain Site.</p> <p>✓ DTP Drain-</p> <ul style="list-style-type: none"> 330 M PCC Completed & laid only 80 nos. precast element (chainage-8,559.70 m to 9515 m); 13 M PCC completed (chainage 5,390 m to 5,480m) <p>✓ Construction of precast element at Lepetkata,</p>

⁵ "Extended date" in case of extension of completion date for slow progressed package

Town	Package No.	Component	Start Date	Number of Days/Months to Complete Work	Target Schedule of Completion (Extended Date of Completion) ⁵	% Physical Progress as of 31 st December 2016	Works Completed as of 31 st December 2016
							batching plant- Total nos. produced = 1586 i.e. 2.5 m wide = 210 nos. & 1.16 m wide = 1376nos ✓ De-siltation of DTP Drain – partially completed (chainage 0 to 6300 m) ✓ Demarcation of RoW- Concrete pillaring completed only 31 locations (o to 9515 m chainage)
Guwahati	AUIIP/PR-1/GUW/WS-01	Construction of transmission water supply pipelines and allied works in Guwahati <ul style="list-style-type: none"> Laying of 19.290 km length of mild steel pipe line of nominal internal diameter ranging from 1300mm to 800mm Laying of 4.990 km length of gravity pipe line of ductile iron (Class K-9) of 500mm – 700 mm internal diameter. Locations- Water treatment plant to Gopal Nagar, then connecting all reservoirs 	04.10.2016	1095 days	03.10.2018	Following activities were undertaken: <ul style="list-style-type: none"> NOC from NHAI; NOC from Railway Authority; NOC from Oil Authority; NOC from PWD: Joint verification completed; NOC from IOCL authority; 	Bidding process and contractor selection has been completed

Town	Package No.	Component	Start Date	Number of Days/Months to Complete Work	Target Schedule of Completion (Extended Date of Completion) ⁵	% Physical Progress as of 31 st December 2016	Works Completed as of 31 st December 2016
						Under process; <ul style="list-style-type: none"> • Alignment of transmission main completed; • QAP of MS Pipeline approved; • Permission from BSNL, APDCL: Under process; • Procurement of MS piped and specials: Under Process; • Third party inspection completed; • Setting up of contractor's office and land requirement for store yard/pipe stacking yard is completed 	
	AUIIP/PR-1/GUW/WS-02A	Construction of storage reservoirs of various capacities at three locations (Gopal Nagar, North Jyoti Nagar and Kenduguri), approach road and allied works in South East Guwahati Water	06.08.2016	1095	5.12.2018	3.13 %	Construction of 3 Reservoirs (WS02A and 2B):

Town	Package No.	Component	Start Date	Number of Days/Months to Complete Work	Target Schedule of Completion (Extended Date of Completion) ⁵	% Physical Progress as of 31 st December 2016	Works Completed as of 31 st December 2016
		Supply Project. <u>Details: Locations</u> Reservoirs: <ul style="list-style-type: none"> ➤ Gopal Nagar – 17 Million Litter (ML) ➤ North Jyotinagar- 3.2 ML ➤ Kenduguri- 3.6 ML Approach road: <ul style="list-style-type: none"> ▪ Gopal Nagar – 460 m ▪ North Jyotinagar- 530 m ▪ Kenduguri-650 m 					<ul style="list-style-type: none"> ✓ Construction of Retaining wall ✓ PCC and Boulder solining of foundation work under process
	AUIIP/PR-/GUW/WS-02B	Construction of storage reservoirs of various capacities at three locations (Basistha,Hengrabari, Nabajyoti Nagar), approach road and allied works in South East Guwahati Water Supply Project. <u>Details: Locations</u> Reservoirs: <ul style="list-style-type: none"> ➤ Hengrabari- 13 ML ➤ Nabajyoti Nagar Main Zone Reservoir- 3.2 ML ➤ Basistha- 5 ML Approach road: <ul style="list-style-type: none"> ▪ Hengrabari-170 m ▪ Nabajyoti Nagar- 855 m ▪ Basistha- 150 m 	01.09.2016	730	01.01.2019	Preliminary work such as topographical survey of Nabajyotinagar and Hengrabari reservoir and approach road completed and soil investigation is in process.	<ul style="list-style-type: none"> ✓ Allotment of the revenue land to GMDA for Northjyoti Nagar site is completed and tree cutting permission from Forest Dept.is awaited and is under process ✓ Alternate location of Basistha reservoir at Art College, Guwahati is finalized in place of previous location at forest land. Allotment of land is awaited. ✓ Jonakinagar reservoir site Upper Hengrabari area land demarcation and fencing work completed.

Town	Package No.	Component	Start Date	Number of Days/Months to Complete Work	Target Schedule of Completion (Extended Date of Completion)⁵	% Physical Progress as of 31st December 2016	Works Completed as of 31st December 2016
							✓ Final evaluation of Bids of DBO contract of Intake Head work & WTP of different systems 02B of water supply project

Note: 2 water supply packages at Guwahati terminated after awarding. Those package details are removed from this table. Re-bidding status of those packages shown in Table 1.

B. Compliance of Safeguard Loan Covenants

10. The loan agreement for AUIP Project 1 was signed in 2nd March 2012 and is available on ADB website (<http://www.adb.org/sites/default/files/project-document/59986/42265-02-ind-mlo1.pdf>). **Table 5** provides a summary of compliance to the loan covenants related to environmental safeguards.

Table 5: Compliance to Loan Agreements (Environmental Safeguards)

Serial No. as per Loan Agreement	AUIP Project 1 Specific Covenants	Status/Issues
Environment		
Schedule 5, para 14	The Borrower shall cause the State to ensure that the preparation, design, construction, implementation, operation and decommissioning of each Subproject comply with (a) all applicable laws and regulations of the Borrower relating to environment, health, and safety; (b) the Environmental Safeguards; (c) the EARF; and (d) all measures and requirements set forth in the relevant IEE and EMP, and any corrective or preventative actions set forth in the Environment Monitoring Report.	<p>Under compliance.</p> <ul style="list-style-type: none"> - Environmental safeguard documents⁶ are prepared in accordance with the requirements of relevant national and state laws, ADB SPS 2009 and EARF. - Draft IEEs prepared during project preparation finalized after the finalization of detailed design. The final IEEs were submitted to ADB for review and approval. No contracts were awarded until ADB's approval of the final IEEs. - For Guwahati Water Supply Subproject, re-bidding has been done for 2 packages - Updated IEE has been included in the bid and contract documents to ensure measures and requirements set forth in the IEE, specifically the EMP, will be implemented. - For Dibrugarh Storm water Drainage Subproject (only 1 package and that already awarded) - IEE has been included in the bid and contract documents to ensure measures and requirements set forth in the IEE, specifically the EMP, will be implemented. - For Dibrugarh SWM Subproject DPR prepared. Environment clearance done. IEE/EMP included in Bid document. In addition accepted EIA/EMP report will be included in agreement. <p>Corrective action plan prepared. Previous SEMRs submitted to ADB for review and disclosure in its website.</p>
Human and Financial Resources to Implement Safeguards Requirements		

⁶ Draft IEEs following ADB SPS were prepared based on preliminary design for all 3 AUIP Project 1 subprojects. An environmental impact assessment (EIA) following requirements of Government of India EIA Act and Rules, and Solid Waste Management and Handling Rules was prepared for Dibrugarh SWM Subproject in order to obtain the environmental clearance. Reports following Forest Act and Rules were prepared for subproject components to be located in forest lands and those requiring tree-cutting.

Serial No. as per Loan Agreement	AUIP Project 1 Specific Covenants	Status/Issues
Schedule 5, para 18	The Borrower shall cause the State to make available necessary budgetary and human resources to fully implement the EMPs, the RPs and any IPP,	<p>Partial compliance.</p> <ul style="list-style-type: none"> - As per implementation arrangement for environmental safeguards (see next section for detailed discussion), PMU has a dedicated Compliance and Safeguards Officer. - As per the implementation arrangement for environmental safeguards, project implementation units (PIUs) in Guwahati and Dibrugarh to have respective safeguard compliance & monitoring officers, however to date only one safeguard compliance & monitoring officer appointed in Dibrugarh - The Design and Supervision Consultant (DSC) assisting the PMU and PIUs has engaged an Environment Specialist who reports in its office in Guwahati on intermittent basis and in its office in Dibrugarh every month. - PMU and PIUs has allocated its counterpart funds to ensure implementation of subproject EMPs. The construction contractors has allocated necessary budgets to implement mitigation measures and monitoring program as required in the IEEs. <p>Tentative budget is attached as Appendix 3 and III</p>
Safeguards – Related Provisions in Bidding Documents and Works Contracts		
Schedule 5, para 19	The Borrower shall cause the State to ensure that all bidding documents and contracts for Works contain provisions that require contractors to: (a) comply with the measures and requirements relevant to the contractor set forth in the IEEs, the EMPs, the RPs and any IPP (to the extent they concern impacts on affected people during construction), and any corrective or preventative actions set out in a Safeguards Monitoring Report; (b) make available a budget for all such environmental and social measures; (c) provide the PMU with a written notice of any unanticipated environmental, resettlement or indigenous peoples risks or impacts that arise during construction, implementation or operation of the Project that were not considered in the IEEs, the EMPs, the RPs or any	<p>Under compliance.</p> <ul style="list-style-type: none"> - IEEs and specific provisions related to mitigation measures and environmental monitoring are included in the bidding and contract documents. -- For all Subprojects, the contractor has allocated 1.65 Million Rupees amount for environmental safeguards. - Upto Mar 2017: <ul style="list-style-type: none"> (i) corrective action plan prepared; (ii) No unanticipated environmental, resettlement or indigenous peoples risks or impacts as there are little or no construction work being conducted. <p>Partial compliance.</p> <ul style="list-style-type: none"> - Record of conditions of roads, agricultural land and other infrastructure for all the three packages are not yet submitted by the contractor

Serial No. as per Loan Agreement	AUIP Project 1 Specific Covenants	Status/Issues
	IPP; (d) adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction; and (e) Fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.	Not yet applicable. - Reinstatement of pathways, pathways, other local infrastructure, and agricultural land to at least their pre-project condition for all the three packages are not yet required as there is little or no construction work being conducted.
Safeguards Monitoring and Reporting		
Schedule 5, para 20	The Borrower shall cause the State to do the following: (a) submit semi-annual Safeguards Monitoring Reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission; (b) if any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project that were not considered in the IEEs, the EMPs, the RPs or any IPP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan; and (c) Report any breach of compliance with the measures and requirements set forth in the EMPs, the RPs or any IPP promptly after becoming aware of the breach.	Under compliance (i) Semi-annual Safeguards Monitoring Reports are being submitted to ADB for review and disclosure. - as of 30 th June 2016: (ii) corrective action plan prepared and included in monitoring report; (iii) No unanticipated environmental, resettlement or indigenous people's risks or impacts as there are little or no construction work being conducted.
Labor Standards		
Schedule 5, para 23	The Borrower shall cause the State to ensure that Works contracts follow all applicable labor laws of the Borrower and the State and that these further include provisions to the effect that contractors (i) carry out HIV/AIDS awareness programs for labor and disseminate information at worksites on risks of sexually transmitted diseases and HIV/AIDS as part of health and safety measures for those employed during construction; (ii) follow and implement all statutory provisions on labor (including not employing or using children as labor, equal pay for equal work), health, safety, welfare, sanitation, and working conditions; and (iii) maximize employment of women and local poor and	Under Compliance - IEEs include provisions on strict implementation of applicable labor laws in the EMPs. - H&S training has been made mandatory for workers prior to mobilization in worksites - Contractors are encouraged to employ women and local poor and disadvantaged persons - HIV/AIDs awareness programs conducted among the laborers during site specific training program in all sites by the contractor.

Serial No. as per Loan Agreement	AUIIP Project 1 Specific Covenants	Status/Issues
	disadvantaged persons for construction purposes, provided that the requirements for efficiency are adequately met. Such contracts shall also include clauses for termination in case of any breach of the stated provisions by the contractors.	

C. Implementation Arrangement

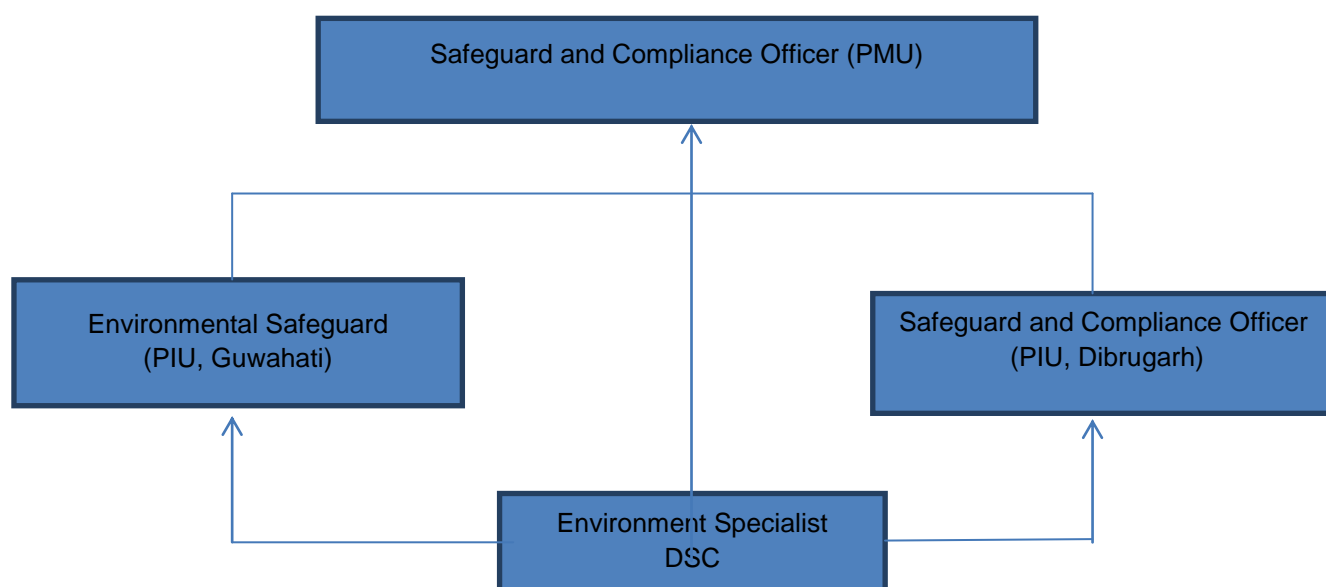
11. **Overall implementation arrangement.** The Government of Assam's GDD is the executing agency. PMU has been established to manage AUIIP through the Project Implementation Units (PIUs), one each in Guwahati and Dibrugarh. The PMU functions as the implementing agency for project administration and coordination and monitor all the project implementation activities with a focus on performance and achievement of results. PMU reports to the Empowered Committee (the Committee) of the Government of Assam headed by the Chief Secretary, who is responsible for the project results on behalf of Government of Assam. 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. **Table 6** shows the contact details of the PMU and PIUs.

Table 6: Details of AUIIP PMU and PIUs

Designation	Name and Contact Details
PMU, Project Director	Name: Mr. Ghanashyam Dass, IAS Office Address: Tripti Towers, 3 rd Floor, Ganeshguri, Guwahati-781005 Phone: 0361-2529824 Email: pdadbassam@gmail.com
PIU Guwahati, Additional Project Manager	Name: Mr. Dimbeswar Baruah Office Address: Tripti Towers, 3 rd Floor, Ganeshguri, Guwahati-781005 Phone: 0361-2529824 Email: piu.auiip@gmail.com
PIU Dibrugarh, Additional Project Manager	Name: Bhim B Chetri Office Address: 2nd floor, Aditya complex, Opp. Nova Furniture, K.C. Gogol Path, Khali Mary, Dibrugarh Phone: 9864076272 Email: piu.dibrugarh@gmail.com

12. **Safeguards implementation arrangement.** Figure 1 shows the implementation arrangement for environment and resettlement safeguards. It shows PMU includes a full-time Safeguard Compliance & Monitoring Officer while the PIUs to include respective Safeguard Compliance & Monitoring Officers. As of 30th June 2016, the position in PMU and PIU (Dibrugarh) are filled up.

Figure 1: AUIP Safeguards Implementation Arrangement



13. DSC is assisting PMU and has engaged a Safeguards Specialist (Environment) Guwahati Office in every month. DSC is assisting the PIUs and PMU and has engaged an Environment Specialist who reports in its office in Guwahati on continuous basis and in its office in Dibrugarh every month. Project Management Consultant has been terminated from 1st of September 2016. **Table 7** shows the details of the environmental safeguards team.

Table 7: Details of AUIP Environmental Safeguard Team

Designation	Name and Contact Details
PMU, Safeguard and Compliance Officer	Name: Mr. Chandan Bhadury Office Address: Tripti Towers, 3 rd Floor, Ganeshguri, Guwahati-781005 Phone: 09508248715 Email: c.bhadury@gmail.com
PIU Guwahati, Environmental Safeguard	Name: Mrs Deena Baruah Office Address: Tripti Towers, 3 rd Floor, Ganeshguri, Guwahati-781005 Phone: 9711099413 Email: deenabaruah.auiip@gmail.com
PIU Dibrugarh, Safeguard and Compliance Officer	Name: Ms Meenakshi Baruah Office Address: 2nd floor, Aditya complex, Opp. Nova Furniture, K.C. Gogol Path, Khaliarmacy, Dibrugarh Phone: 09435070575 Email: piu.dibrugarh@gmail.com
DSC, Environment Specialist	Name: Ranjan Kumar Mallick Office Address: Tripti Towers, 3 rd Floor, Ganeshguri, Guwahati-781005 Phone: 91-9438200113 Email: mallickdevelopment@gmail.com

III. ENVIRONMENTAL PROCEDURE REVIEW

A. Environmental Legal Requirement

14. **Table 8** provides a list of national and state laws, rules, policies and regulations applicable to AUIP Project 1.

Table 8: Environmental Legal Requirements Applicable to AUIP Project 1

Component	Applicable Legislation	Compliance	Action Required for AUIP Project 1 Subprojects
1. All components that require acquisition of forest land	Forest (Conservation) Act 1980; Wildlife (protection) Act 1972	Approval from State Principal Chief Conservator of Forest and Ministry of Environment, Forests and Climate change, Government of India	Tree felling permission
2. Water Treatment Plant (WTP) – Surface water and Sewage Treatment Plant (STP)	Water (Prevention and Control of Pollution) Act 1974	Consent to Establish (CTE) and Consent to Operate (CTO) from Assam Pollution Control Board (APCB), Government of Assam.	Based on project review and site inspection, APCB provides CTE before construction, and stipulates the disposal standards to be met during operation. After completion of construction, CTO is issued confirming compliance with the CTE conditions, if any
		Renewal of CTO during operation of WTP and STP	Based on the performance of the WTP and its compliance with the disposal standards CTO to be renewed every year.
3. All composting and landfill facilities	Municipal Solid Wastes (Management and handling) Rules 2000	Authorization of proposed site by APCB	Authorization to be issued based on land use in and around the site and groundwater condition.
4. Waste management facilities including composting, landfills and transfer stations	Environment (Protection) Act 1986: EIA Notification 2006, amended in 2009 Category B	Requires environmental clearance from State Environment Impact Assessment Authority (SEIAA)	Based on preliminary information and site visits, project will be categorized as B1 or B2. B1 projects require EIA study for approval.
5. Environmental Clearance for excavation and transportation of earth	EIA notification 2006 and its subsequent amendments issued under Environment Protection Act, 1986	Requires environmental clearance from District Environment Impact Assessment Authority (DEIAA)	Requisite Permission is under process
6. Earth cutting and transportation to WTP	Assam Minor Mineral Concession Rules, 2013	Permission from the District Magistrate; Kamrup Metropolitan (Magisterial Branch)	Requisite Permission is under process.

B. Compliance with Environmental Legal Requirements

15. **Table 9** provides the status of compliance of subprojects to national and state laws, rules, policies and regulations applicable to AUIP Project 1. Issued clearances and no objection certificates are attached as **Appendix 4 and IV**.

Table 9: Status of Compliance with National and State Legal Requirements

Town	Package No.	Components	National and State Legal Requirement	Status	Conditions of the Clearance/NOCs
1. Water Supply System Subproject					
Guwahati	AUIIP/PR-1/GUW/WS-01	<ul style="list-style-type: none"> Supplying, laying, jointing, testing and commissioning of about 19.29 km length of mild steel pipe line of nominal internal diameter ranging from 1300mm to 800mm. Supplying, laying, jointing, testing and commissioning of about 4.99 km length of gravity pipe line of ductile iron (Class K-9) of 500mm – 700 mm internal diameter. Earth work excavation, laying of bedding wherever specified, backfilling the trenches, and restoring and making good all surfaces which are damaged during excavation, Fixing and connecting all pipe line fixtures such as valves, bends, tees, blank flanges, tail pieces, flow meter etc., Construction of all appurtenant structures including construction of road crossings, drainage crossings, pedestals, 	Not required	-	-

Town	Package No.	Components	National and State Legal Requirement	Status	Conditions of the Clearance/NOCs
		supports, anchor/ thrust blocks, valve chambers, etc.			
Guwahati	AUIIP/PR-1/GUW/WS-02 A and AUIIP/PR-1/GUW/WS-02 B	<ul style="list-style-type: none"> Construction, testing and commissioning of 6 numbers of ground level service reservoirs (GLSR) at: <ul style="list-style-type: none"> (i) Gopal Nagar (17 ML) (ii) North Jyotinagar (3.2 ML) (iii) Kenduguri (3.6 ML) (iv) Jonaki Nagar (13 ML) (v) NabaJyoti Nagar (3.2 ML) (vi) Basistha (5 ML) Providing and erecting all auxiliary items pipe assembly work for inlet, outlet, over flow, bypass and wash out pipes with butterfly and sluice valves and RCC chambers, drainage pipes with manhole chambers, water level indicator, lightening arrestor, ventilation arrangement, stairs to roof slab, stairs for going inside, etc. Construction of retaining walls at all reservoir sites. Construction of approach road at all 	<p>Forest (Conservation) Act 1980- For tree felling</p> <p>EIA notification 2006 and its subsequent amendments issued under Environment Protection Act, 1986 for obtaining Environmental Clearance for excavation and transportation of earth</p> <p>Assam Minor Mineral Concession Rules, 2013 for permission of Earth cutting and transportation to WTP</p>	<p>Complied. Permission obtained for tree felling. Tree feeling at Gopal Nagar reservoir site is done</p> <p>For other sites NOC to be collected for tree felling. Application send</p>	<ul style="list-style-type: none"> Requirement of tree cutting at in Gopalnagar, Nabajyotinagar and Kenduguri Permission for cutting of trees at Gopal Nagar reservoir site obtained from DFO, Kamrup East Division on 13.08.2013. Tree felling done. Till December 31st no tree cutting activity was done in the sites. Environmental clearance and earth cutting and transportation of earth for the reservoir sites are under process. An amount of Rs. 2,19,273 is deposited by AUIIP to the Forest Department as valuation and operation cost of felling of trees. <p><i>Though initially (TA stage) forest land at Jonaki Nagar and Basistha were selected for construction of GLSR and process was initiated for forest clearance. Later due to delay in getting NOC, it was decided by project executing agency to find out alternate non forest land. Now at both sites (Jonaki Nagar and Basistha) Govt. land selected and transfer process for those land in favour of EA under process.</i></p>

Town	Package No.	Components	National and State Legal Requirement	Status	Conditions of the Clearance/NOCs
		reservoir sites			
Stormwater Drainage Subproject					
Dibrugarh	AUIIP/PR-1/DIB/DR-01	<ul style="list-style-type: none"> Widening and construction of 9.5 km (chainage 0 - 9500 m) reinforced cement concrete (RCC) drain with linings; Construction of 17 nos. box culverts; and Construction of sullage pumping station. 	Forest (Conservation) Act 1980 – Forest clearance for construction of drains CTE from Pollution Control Board for setting up Precast Batching plant	<p>Tree felling NOC - Tree felling estimation and approval for 147 nos. tree received from Divisional Forest officer, Dibrugarh on 6th August 2014 (revised estimation submitted by Forest dept. on 24th June 2016). Money deposited to Forest dept. by Dibrugarh Municipal Board and 90 nos. tree felling done</p> <p>Consent to establish for pre cast concrete block manufacturing unit was obtained from Pollution control board on 24th December 2015</p> <p>Consent to operate for pre cast concrete block manufacturing unit was obtained from Pollution control board on 26th February 2016, which valid upto 31st March 2017</p> <p>Consent to operate for Generator was obtained from pollution control board on 18th July 2016</p> <p>NOC from Dibrugarh Municipal Board (DMB) for disposal of drainage silt at landfill site was</p>	<ul style="list-style-type: none"> Application sent to forest dept. for getting NOC on tree felling along the drain Joint verification by forest dept., DMB and revenue dept. Completed Revised cost estimation for removal of 147 trees (5.44 lakh) sent by DFO, Dibrugarh division to project EA <p>All NOC, CTOs and CTE are attached as Appendix 4. Condition mentioned in CTO</p>

Town	Package No.	Components	National and State Legal Requirement	Status	Conditions of the Clearance/NOCs
				obtained on 25 th February 2016	
Solid Waste Management Subproject					
Dibrugarh	AUIIP/PR-1/DIB/SWM-01A & 01B	Construction of Compound wall, River Protection Wall, Access Roads, Security Guard Room and Allied Works of Landfill site at Dibrugarh DBO of 100 MT processing plant and 60 MT sanitary land fill site and allied works at Dibrugarh	EIA Notification 2006, amended in 2009 – Environmental Clearance for construction of landfill and composting facility	Environment clearance obtained from State Environment Impact Assessment Authority, Assam on 21 st September 2015 Consent to Establish obtained from Pollution control Board, Assam on 09.12.2016.	Environment Clearance (EC) obtained EC attached as Appendix 5 Compliance of EC is attached as Appendix 5 CTE attached as Appendix 4.
			No Objection Certificate (NOC) from Dibrugarh Airport	NOC (height clearance only) for construction of sanitary landfill project at Ghoramara, Dibrugarh was obtained from AAI on 28 June 2013 (NOC attached in Appendix 4) NOC is valid for 5 years i.e. upto 28 th June 2018 NOC attached as Appendix 4.	<ul style="list-style-type: none"> No Objection Certificate is issued on the express understanding that the site elevation, relative location of the proposed building/structure and its distance and bearing from the ARP/ Runway ends/ Runway centre line (whichever is applicable) as tendered by the applicant are correct. If, however, at any stage it is established that the actual data is different from the tendered data and which could adversely affect aircraft operations, the structure or parts thereof in respect of which this NOC is being issued will have to be demolished at the applicant's own cost as may be directed by the Airports Authority of India. No light or a combination of lights which by reason of its intensity, configuration or colour may cause

Town	Package No.	Components	National and State Legal Requirement	Status	Conditions of the Clearance/NOCs
					<p>confusion with the aeronautical ground lights of the airport shall be installed at the site at any time during or after the construction of the building.</p> <ul style="list-style-type: none"> • No Radio/ TV Antenna, lighting arrestors, staircase, overhead water tank and attachment or fixtures of any kind shall project above the height indicated in said NOC • Day & Nights marking with both main and standby power supply should be provided as per ICAO standard.
Dibrugarh	AUIIP/PR-1/DIB/SWM-02	Procurement of equipment for primary, secondary collection and transportation vehicles for Municipal Solid Waste Management at Dibrugarh	Not required		

IV. COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

16. At present only two packages, (AUIIP/PR-1/DIB/DR-1 and AUIIP/PR-1GUW/WS-02A and 02B) are under implementation. Progress of work is very slow. Site-specific EMP was prepared by the contractor and submitted to PMU for approval. Approval was given before starting of construction. Later with development of work EMP has been revised. The approved and revised site-specific EMP is attached as **Appendix6**.

17. As of 31st December 2016, only 12.38 %in Dibrugarh Drainage project and 3.13 % in Guwahati, water supply Project of the work is completed. The progress of project activity is slow.

18. PMU with assistance of DSC conducted periodic monitoring of EMP implementation thru desk review of contractor's records and site inspections. The findings are presented in **Table 10**. The overall compliance status of AUIIP/PR-1/DIB/DR-01 and AUIIP/PR-1GUW/WS-02A and 02Bon EMP implementation is satisfactory. Non-compliances/need for improvement during construction of Dibrugarh drainage and Guwahati Water supply site is include:

- No proper signages/information board at drainage worksite.
- Need to improve use of PPE by contractor's workers at all times.
- Need of properly use of caution tape at worksite along the drain and excavated area
- Regular air and noise quality monitoring

Table 10: Compliance to EMP of Dibrugarh Drainage Subproject Package No. AUJIP/PR-1/DIB/DR-01

	Field	Mitigation Activities and Method	Parameters monitored	Location	Responsible for Mitigation	Monitoring Method	Responsible for Monitoring	Date of Monitoring	Compliance Status/ Explanation
Pre Construction - Design phase									
1	Site clearance	Site preparation work completed including necessary clearance <ul style="list-style-type: none"> • Relevant NOC from line dept • Tree felling permission 	<ul style="list-style-type: none"> • Tree felling requirement – site environment plan • NOC – paper documents from line agency 	Along drainage alignment	DSC/PIU	Observation and document checking	DSC's Environment Safeguard Specialist	Continuous by PIU Quarterly by PMC, PMU	Done as per present requirement. Continuous process. Tree felling permission received and tree felling done
2	Utility	Shifting of affected utilities like electric and telephone poles, water lines	<ul style="list-style-type: none"> • List of affected utilities if any and operators • Bid document to include requirement for a contingency plan for service interruptions 	Along drainage alignment	DSC/PIU	Observation and document checking	DSC's Environment Safeguard Specialist	Do	Not required now
3	Traffic Management	Planning for Traffic Management	Ensure traffic management plan is part of contract documents and being implemented	Different road junction along drain	DSC/PIU	Observation and document checking	DSC's Environment Safeguard Specialist	Do	Not required as per the present situation. Project activity outside locality
4	Disposal sites of dredge and solid wastes	Identify agreed sites with local officials to dispose of dredge	<ul style="list-style-type: none"> • Disposal area and aesthetic status of disposed area 	Proposed disposal site	PMU, PIU, and DSC to ensure sites are agreed with local officials and in locations which are away from	Site observation and checking	DSC's Environment Safeguard Specialist	Do	Under compliance – planning continued. Drainage silt deposited at proposed dumping site/ landfill site having NOC

	Field	Mitigation Activities and Method	Parameters monitored	Location	Responsible for Mitigation	Monitoring Method	Responsible for Monitoring	Date of Monitoring	Compliance Status/ Explanation
					sensitive receptors.				NOC from DMB attached as Appendix 4. NOC from Pvt. Landowner also attached in Appendix 4
5	Construction work camps (if needed), hot mix plants, stockpile areas, storage areas, and disposal areas.	Planning for setting up worker camps, hot mix plant, stockpile area, storage and disposal areas <ul style="list-style-type: none"> • Prioritize areas within or nearest possible vacant space in the subproject location • Non use of residential area • Arrangement of toilet and drinking water facility • No disposal of waste in water 	List of selected location for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	Camp site – nearby working area	DSC/PIU	Observation and document checking	DSC's Environment Safeguard Specialist	Do	Complied Construction worker camp at pre cast plant established with all facility Photographs attached as Appendix 2
Construction									
6	Source of Materials	<ul style="list-style-type: none"> • Use of Govt. approved quarry sites for procurement of materials • Verify suitability of all material sources and obtain approval of Investment PMU/PIU 	<ul style="list-style-type: none"> • List of approved quarry sites and sources of materials • Bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary. 	Quarries and material source areas	Contractor	<ul style="list-style-type: none"> • Checking of records • visual inspection of sites 	DSC's Environment Safeguard Specialist and PIU	Do	Approval obtained from DSC/ PMC. Procurement has been started

	Field	Mitigation Activities and Method	Parameters monitored	Location	Responsible for Mitigation	Monitoring Method	Responsible for Monitoring	Date of Monitoring	Compliance Status/ Explanation
			<ul style="list-style-type: none"> Construction Contractor documentation 						
7	Camp sites	<ul style="list-style-type: none"> Establishment of temporary camps with drinking water, sanitary and solid waste management arrangement Train employees in the storage and handling of materials Remove all wreckage, rubbish, or temporary structures 	<ul style="list-style-type: none"> Complaints from sensitive Receptors Water and sanitation facilities for employees Housekeeping – regular disposal of solid waste 	Camp site	Contractor	Visual inspection	DSC's Environment Safeguard Specialist and PIU	Do	Construction worker camp at pre cast plant has been established with all facility. Camp fully operational. Photographs attached as Appendix 2
8	Landscape and Aesthetics	<ul style="list-style-type: none"> Prepare and implement Waste Management List; Avoid stockpiling of excess excavated sludge; and Coordinate with DMB for beneficial uses of dredged silt or immediately dispose to designated areas (specifically use for development of landfill); Recover used oil and lubricants and reuse or remove from the sites; 	<ul style="list-style-type: none"> Waste Management List Complaints from sensitive receptors PMU/PIU/ DSC to report in writing that the necessary environmental restoration work has been done 	Drainage construction site	Contractor	<ul style="list-style-type: none"> Checking of records Visual inspection of sites 	DSC's Environment Safeguard Specialist and PIU	Do	<p>Utilization of drainage silt for filling up low laying area of proposed landfill site/ disposal site having NOC. Transportation already started</p> <p>Waste/ Spoil management plan is applied as per EMP (Attached as Appendix 7)</p> <p>Drainage silt testing has been done. Result attached as Appendix 8.</p>

	Field	Mitigation Activities and Method	Parameters monitored	Location	Responsible for Mitigation	Monitoring Method	Responsible for Monitoring	Date of Monitoring	Compliance Status/ Explanation
		<ul style="list-style-type: none"> • Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; • Remove all wreckage, rubbish; and • Request PMU/PIU/DSC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work. 							
9	Air quality	<ul style="list-style-type: none"> • Selection of materials storage area • Water sprinkling at construction site for arresting dust (if any during dry period) • Use tarpaulins to cover sand and other loose material- Reducing dust hazard • All vehicles and equipments mobilized to construction site 	<ul style="list-style-type: none"> ▪ Location of stockpiles ▪ Complaints from sensitive receptors ▪ Monitoring data ▪ Heavy equipment and machinery with air pollution control ▪ Water sprinkling arrangement ▪ Cover materials 	Along drain and stockpile areas	Contractor	<ul style="list-style-type: none"> • Checking of records • Visual inspection of sites 	DSC's Environment Safeguard Specialist and PIU	Do	<p>Location of stockpiles selected</p> <p>Water sprinkling not done</p> <p>Air quality monitoring during base line/ pre construction phase and construction phase done. Results certificate attached as Appendix 9</p>

	Field	Mitigation Activities and Method	Parameters monitored	Location	Responsible for Mitigation	Monitoring Method	Responsible for Monitoring	Date of Monitoring	Compliance Status/ Explanation
		and producing emission, have Pollution Control Board certification <ul style="list-style-type: none"> Carry out air quality monitoring 							Regular monitoring is required under Pollution Control Certificate of vehicles and equipment obtained
10	Noise level	<ul style="list-style-type: none"> Noise producing work needs to be conducted at day time Regular maintenance of noise producing equipment Require horns not be used unless it is necessary to warn other road users Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s At sensitive locations enclosures provided around generator set or other noise producing machinery. 	<ul style="list-style-type: none"> Complaints from sensitive receptors Use of silencers in noise-producing equipment and sound barriers Monitoring data 	Along drainage construction sites	Contractor	<ul style="list-style-type: none"> Checking of records Visual inspection of sites 	DSC's Environment Safeguard Specialist and PIU	Do	<p>Noise producing machinery mobilized at site</p> <p>Base line/ pre construction and construction noise monitoring has been done. Results are attached as Appendix 9.</p>
11	Traffic	Implement a traffic management schedule	Ensure traffic management plan is part of contract	Along drainage construction	Contractor	<ul style="list-style-type: none"> Checking of records 	DSC's Environment Safeguard	Do	Not required as per present scope of work

	Field	Mitigation Activities and Method	Parameters monitored	Location	Responsible for Mitigation	Monitoring Method	Responsible for Monitoring	Date of Monitoring	Compliance Status/ Explanation
			documents and being implemented	site as per requirement		<ul style="list-style-type: none"> Visual inspection of sites 	Specialist and PIU		Traffic Management plan is attached as Appendix 10
12	Ecological Resources – Terrestrial	<ul style="list-style-type: none"> Minimize removal of vegetation (if any) and disallow cutting of trees Felling of trees done with mitigation measures i.e. planting of three trees for each tree fell. 	Tree requirement and afforestation after final design	Along drainage construction site	PIU, Contractor	<ul style="list-style-type: none"> Site observation Checking of records 	DSC's Environment Safeguard Specialist and PIU	Do	Tree felling permission received and tree cutting done
13	Accessibility	<ul style="list-style-type: none"> Plan transportation routes so that heavy vehicles do not use narrow local roads Schedule transport and hauling activities during on- peak hours Keep the site free from all unnecessary obstructions; Drive vehicles in a considerate manner; Coordinate with Dibrugarh Traffic Office for temporary road diversions and with for provision of traffic aids Notify affected 	<ul style="list-style-type: none"> Traffic Management Strategy Complaints from sensitive receptors Number of signages placed at subproject location. 	Along drainage construction site	Contractor	Visual inspection	DSC's Environment Safeguard Specialist and PIU	Do	<p>Transportation of materials started No diversion of traffic is required.</p> <p>Signagae will be placed as per requirement and other mitigation measures will be applied as per EMP</p>

	Field	Mitigation Activities and Method	Parameters monitored	Location	Responsible for Mitigation	Monitoring Method	Responsible for Monitoring	Date of Monitoring	Compliance Status/ Explanation
		sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/ complaints							
14	Disposal sites of dredged sludge and solid wastes	<ul style="list-style-type: none"> Dispose dredge and solid waste at pre-identified agreed upon sites (e.g., existing dump sites or use for development of landfill) away from sensitive receptors. 	<ul style="list-style-type: none"> Disposal of dredge and solid wastes at pre-identified agreed site 	Along drainage construction site and disposal site	Contractor	Visual inspection	DSC's Environment Safeguard Specialist and PIU	Do	Disposal already started at landfill site and approved sites. Drainage silt testing has been done. Result attached as Appendix 8.
15	Water Quality	<ul style="list-style-type: none"> Avoid stockpiling of dredged silt/ sludge especially during the monsoon season unless covered by tarpaulins or plastic sheets; Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with PMU/PIU/DSC on designated disposal areas; Install temporary 	<ul style="list-style-type: none"> Areas for stockpiles, storage of fuels and lubricants and waste materials Number of silt traps installed along drainages (in slope) leading to water bodies 	Along drainage construction site	Contractor	Site observation	DSC's Environment Safeguard Specialist and PIU	Do	Not required now. No water body nearby the project location

	Field	Mitigation Activities and Method	Parameters monitored	Location	Responsible for Mitigation	Monitoring Method	Responsible for Monitoring	Date of Monitoring	Compliance Status/ Explanation
		silt traps or sedimentation basins along the drainage leading to the water bodies; <ul style="list-style-type: none"> Place storage areas for fuels and lubricants away from any drainage leading to water bodies; Dispose any wastes generated by construction activities in designated sites 							
16	Occupational Health & safety	<ul style="list-style-type: none"> Develop and implement site-specific Health and Safety(H&S) Plan Use Personal Protective Equipment like helmet, gumboot, gloves, nose mask and earplugs H&S Training for all site personnel Documentation of work-related accidents; Designate a safeguard focal person and undertake safeguards orientation by PMU/PIU 	<ul style="list-style-type: none"> Site-specific Health and Safety (H&S) Plan Equipped first-aid stations; Medical insurance coverage for workers Number of accidents Supplies of potable drinking water; Record of H&S orientation trainings Personal protective equipments Sign boards for 	Along drainage construction site	Contractor	<ul style="list-style-type: none"> Checking of records Visual inspection of sites 	DSC's Environment Safeguard Specialist and PIU	Do	Site-specific Health and Safety (H&S) Plan under implementation Attached as Appendix 11 . Use of PPE – partial H & S training arranged for the laborer, Sample training detail is attached as Appendix 12 . Health check up camp for the laborers is also conducted by the contractor. Details shown in Appendix 12

	Field	Mitigation Activities and Method	Parameters monitored	Location	Responsible for Mitigation	Monitoring Method	Responsible for Monitoring	Date of Monitoring	Compliance Status/ Explanation
		<ul style="list-style-type: none"> • Provide specific guidance for suitable PPE for every on-site work assignment • Ensure availability of First aid box at all working sites and labour camp • Provide medical insurance coverage for workers; • Provide supplies of potable drinking water at working sites; • Provide H&S orientation training to all new workers • Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, appropriate • Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. 	hazardous areas such as energized electrical devices and lines, service rooms						<p>Drinking water available at site, first aid box available at site.</p> <p>Insurance arranged for the laborer. Attached as Appendix 13</p> <p>Till date no major accident is reported. Appendix 14 shows first aid statistics during report period</p> <p><i>Overall compliance is satisfactory</i></p>
17	Community Health & safety	<ul style="list-style-type: none"> • Plan routes to avoid times of peak-pedestrian 	<ul style="list-style-type: none"> ▪ Traffic Management Strategy ▪ Complaints from 	Along drainage construction site	Contractor	Visual inspection	DSC's Environment Safeguard Specialist and	Do	Caution tape placed at site. Placement of caution tape and

	Field	Mitigation Activities and Method	Parameters monitored	Location	Responsible for Mitigation	Monitoring Method	Responsible for Monitoring	Date of Monitoring	Compliance Status/ Explanation
		activities. <ul style="list-style-type: none"> Liaise with PMU/PIU/DSC in identifying high-risk areas on route cards/maps. Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. Provide road signs and flag persons to warn. Provide protective fencing around drain, and cover any open trench with metal planks during non-construction hours. Potentially cause soil contamination; Recover used oil and lubricants and reuse or remove from the site 	sensitive receptors				PIU		board should be done for all working locations. Appendix 2 shows site photo
18	Socio cultural resources	<ul style="list-style-type: none"> Strictly follow the protocol for chance finds in any excavation work Stop work 	Chance find protocol	Along drainage construction site	Contractor	Checking records of	DSC's Environment Safeguard Specialist and PIU	Do	Not required till date

	Field	Mitigation Activities and Method	Parameters monitored	Location	Responsible for Mitigation	Monitoring Method	Responsible for Monitoring	Date of Monitoring	Compliance Status/ Explanation
		immediately to allow further investigation if any finds are suspected							
19	Employment generation	<ul style="list-style-type: none"> The use of labour intensive construction measures will be used where appropriate Employ local (unskilled) labour if possible Training of labour to benefit individuals beyond completion of the subproject 	Employment record	Along drainage construction site	Contractor	Checking of records	DSC's Environment Safeguard Specialist and PIU	Do	At present local labors are engaged. List of laborers are attached as Appendix 15.

**Table 11: Compliance to EMP Water Storage Reservoir and Water Transmission Pipelines and Allied Works at Guwahati Subproject
Package No. AUIIP/PR-1/GUW/WS-02A and 02B**

Pre Construction - Design phase

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Utilities	Telephone lines, electric poles and wires, water lines within proposed project area	(i) Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase ;and (ii) Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services.	DSC	(i) List of affected utilities and operators; (ii) Bid document to include requirement for a contingency plan for service interruptions
Structure stability in seismic zone V	Affect during earthquake	Design and analysis as per the Peak Ground Acceleration(PGA) and the seismic acceleration response curve and other factors like Response Reduction Factor (RRF) and Importance Factor (IF) as per the Indian Standard code	DSC/ PIU	(i) Checking of design report – consideration of design measures to minimize earth quake risk
Water Supply	Health risk due to closure of water supply during connection	(i) Plan the construction program to keep the cessation of water supplies to the minimum possible(in both area and duration); and (ii) In coordination with GMC,	DSC	(i) Schedule of closure if any;(ii) delivery of potable water to affected people by GMC

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		provide alternative potable water to affected households and businesses for the duration of the shut-down if any		
Traffic Management	Impede traffic flow during construction	(i) Prepare a traffic management plan during preconstruction phase.	DSC	Ensure Traffic Management Plan is finalized before implementation. Traffic Management Plan is prepared and attached as Appendix ix
Social and Cultural Resources	Ground disturbance can uncover and damage archaeological and historical remains	(i) Consult Archaeological Survey of India(ASI) or concerned department in Guwahati to obtain an expert assessment of the archaeological potential of the site; (ii) Consider alternatives if the site is found to be of medium or high risk; (iii) Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved.	DSC	Chance Finds Protocol

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Construction work camps, hot mix plants, stock pile areas, storage areas, and disposal areas.	Disruption to traffic flow and sensitive receptors along transmission pipeline laying area	<p>(i) Prioritize areas within or nearest possible vacant space in the sub project location;</p> <p>(ii) If it is deemed necessary to locate elsewhere, consider sites that will not promote instability and result in destruction of property, vegetation and drinking water supply systems;</p> <p>(iii) Do not consider residential areas; and</p> <p>(iv) Take extreme care in selecting sites to avoid direct disposal to water body which will inconvenience the community.</p>	PMU/PIU and DSC to determine locations prior to construction	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.
Sources of Materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.	<p>(i) Prioritize sites already permitted by the Mining Department;</p> <p>(ii) If other sites are necessary, inform construction contractor that it is their responsibility to verify the suitability of all material sources and to obtain the approval of PMU/PIU and</p> <p>(iii) If additional quarries will be required after construction is</p>	PMU/PIU and DSC to prepare list of approved quarry sites and sources of materials	<p>(i) List of approved quarry sites and sources of materials;</p> <p>(ii) Bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary.</p>

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		started, in form construction contractor to obtain a written approval from PMU/PIU.		
Construction Stage				
Sources of Materials	Extraction of rocks and material may cause ground instability	<p>(i) Use quarry sites and sources permitted by government;</p> <p>(ii) Verify suitability of all material sources and obtain approval of Investment PMU/PIU;</p> <p>(iii) If additional quarries will be required after construction has started, obtain written approval from PMU/PIU; and</p> <p>(iv) Submit to DSC on a monthly basis documentation of sources of materials.</p>	Construction Contractor	<p>Construction Contractor documentation</p> <p>Appendix-IV</p>
Air Quality	Emissions from construction vehicles ,equipment, and machinery used for excavation and construction resulting to dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous	<p>(i) Consult with PMU/PIU/DSC on the designated areas for stockpiling of clay, soils, gravel, and other construction materials;</p> <p>(iii) Damp down exposed soil and any stockpiled onsite by spraying with water when necessary during</p>	Construction Contractor	<p>(i) Location of stockpiles;</p> <p>(ii) Complaints from sensitive receptors;</p> <p>(iii) Heavy equipment and machinery with air pollution control devices;</p> <p>(iv) Ambient air for respirable</p>

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
	oxides ,and hydrocarbons	dry weather; (iv) Use tarpaulins to cover sand and other loose material when transported by trucks; and (v) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly.		particulate matter (RPM- PM10 &PM2.5) and suspended particulate matter (SPM); (v) Vehicular emissions such as sulphur dioxide (SO ₂), nitrous oxides (NOx), carbon monoxide (CO), and hydrocarbons Appendix-iv,vi,viii
Traffic Management	Impede traffic flow during construction	(i) Implement a traffic management plan during pre construction phase.	Construction Contractor	DSC to ensure traffic management measures are implemented and traffic is not significantly impeded during construction period. Appendix-ix
Surface water quality	Mobilization of settled silt materials, run-off from stockpiled materials, and chemical contamination from fuels and lubricants during construction work can contaminate nearby surface water quality.	(i) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets; (ii) Prioritize re-use of excess spoils and materials in the construction works .If spoils will be disposed, consult with PMU/PIU/DSC on designated disposal areas; (iii) Install temporary silt traps or	Construction Contractor	(i) Areas for stockpiles, storage of fuels and lubricants and waste materials; (ii) Number of silt traps installed along drainages leading to water bodies; (iii) Records of surface water quality inspection; (iv) Effectiveness of water

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		<p>sedimentation basins along the drainage leading to the water bodies;</p> <p>(iv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;</p> <p>(v) Dispose any wastes generated by construction activities in designated sites; and</p> <p>(vi) Conduct surface quality inspection according to the Environmental Management Plan (EMP).</p>		<p>management measures;</p> <p>(v) For inland water: suspended solids, oil and grease, biological oxygen demand (BOD), and coli forms.</p> <p>Appendix-vii,viii</p>
Noise Levels	Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, materials ,and people	<p>(i) Plan activities in consultation with PMU/PIU/DSC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;</p> <p>(ii) Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach;</p> <p>(iii) Minimize noise from construction equipment by using vehicle silencers, fitting jack</p>	Construction Contractor	<p>(i) Complaints from sensitive receptors;</p> <p>(ii) Use of silencers in noise - producing equipment and sound barriers;</p> <p>(iii) Equivalent day and night time noise levels</p> <p>Appendix-viii</p>

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		hammers with noise- reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor, and (iv) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s.		
Ecological resources –Terrestrial	Felling of the trees – affect terrestrial ecological balance	(i) Minimize removal of vegetation and disallow cutting of trees; (ii) If tree-removal will be required, obtain tree-cutting permit from Forest Deptt. (iii) Require to plant three (3) native trees for every one (1) that is removed; and (iv) Prohibit employees from poaching wildlife, bird hunting, and cutting of trees for firewood.	Construction Contractor	(i)Complaints from sensitive receptors; (ii) checking of conservation management plan for tree species and aquatic fauna/ animal Appendix-iv
Existing Infrastructure and Facilities	Disruption of service and damage to existing infrastructure at specified project location	(i) Obtain from PMU/PIU/DSC the list of affected utilities and operators if any; (ii) Prepare a contingency plan to include actions to be done in case	Construction Contractor	Existing Utilities Contingency Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		of unintentional interruption of service		
Landscape and Aesthetics	The presence of heavy duty vehicles and equipment, temporary structures at construction camps, stockpiles, may result in impacts on aesthetics and landscape character.	(i) Storage areas will be properly fenced off. (ii) Prepare and implement Waste Management List; (iii) Avoid stock piling of excess excavated soils; (iv) Coordinate with GMC for beneficial uses of excess excavated soils of about 91889 cum or immediately dispose/ use to designated areas; (v) Recover used oil and lubricants and reuse or remove from the sites; (vi) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; (vii) Remove all wreckage, rubbish; (viii) Retain mature trees on and around the site where possible; (ix) Cluster construction activities on	Construction Contractor	(i) Waste Management List; (ii) Complaints from sensitive receptors; (iii) PMU/PIU/DSC to reporting writing that the necessary environmental restoration work has been adequately performed before acceptance of work.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		<p>site on a specific area to avoid "sprawl";</p> <p>(x) Unwanted material and litter will be removed on frequent basis;</p> <p>and</p> <p>(xi) Request PMU/PIU/DSC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.</p>		
Accessibility	Traffic problems and conflicts near project locations and haul road	<p>(i) Plan transport action routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;</p> <p>(ii) Schedule transport and hauling activities during non- peak hours;</p> <p>(iii) Locate entry and exit points in areas where there is low potential for traffic congestion;</p> <p>(iv) Keep the site free from all unnecessary obstructions;</p> <p>(v) Drive vehicles in a considerate manner;</p>	Construction Contractor	<p>(i) Traffic Management Strategy;</p> <p>(ii) Complaints from sensitive receptors;</p> <p>(iii) Number of signage's placed at subproject location</p>

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		<p>(vi) Coordinate with Guwahati Traffic Office for temporary road diversion and with for provision of traffic aids if transportation activities cannot be avoided during peak hours;</p> <p>(vii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.</p> <p>(viii) Provide planks across trenches in front of businesses ,and ensure works are completed quickly to avoid disruption, and</p> <p>(ix) Avoid full street closure</p>		
Socio-Economic–Income.	Impede the access of residents and customers to nearby shops	<p>(i) Leave spaces for access between mounds of soil;</p> <p>(ii) Provide walk ways and metal sheets where required for people;</p> <p>(iii) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools;</p>	Construction Contractor	<p>(i) Complaints from sensitive receptors;</p> <p>(ii) Number of walkways, signages, and metal sheets placed at subproject location.</p>

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		<p>(iv) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and</p> <p>(v) Provide signboards for pedestrians to inform nature and duration of construction work and contact numbers for concerns/complaints.</p>		
Employment Generation	<ul style="list-style-type: none"> The subproject will provide employment opportunities for local people during construction. Expectations regarding new employment will be high especially among the unemployed individuals in the area. Labourers gathering at the site for work can be a safety and security issue, and must be avoided. The training of unskilled or previously unemployed persons will add to the skills base of the area. 	<p>(i) The use of labor intensive construction measures will be used where appropriate;</p> <p>(ii) Employ local (unskilled) labor if possible;</p> <p>(iii) Training of labor to benefit individuals beyond completion of the subproject; and</p> <p>(iv) Recruitment of labor will take place offsite.</p>	Construction Contractor	<p>(i) Employment records;</p> <p>(ii) records of sources of materials</p> <p>Appendix-x,</p>
Occupational Health and Safety	Occupational hazards which can arise during work	(i) Develop and implement site-specific Health and Safety(H&S) Plan which will include measures such as:(a) excluding public from the site; (b) ensuring all workers are	Construction Contractor	(i) Site-specific Health and Safety(H&S) Plan;

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		<p>provided with and use Personal Protective Equipment like helmet, gumboot, safety belt, gloves, nose musk and earplugs;(c) H&S Training for all site personnel;(d)documented procedures to be followed for all site activities ;and(e) documentation of work-related accidents;</p> <p>(ii) Ensure that qualified first- aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the project site;</p> <p>(iii) Provide medical insurance coverage for workers;</p> <p>(iv) Secure all installations from unauthorized intrusion and accident risks;</p> <p>(v) Provide supplies of potable drinking water at working sites;</p> <p>(vi)Provide clean eating areas where workers are not exposed to hazardous or noxious substances; and</p> <p>(vii) Provide H&S orientation</p>		<p>(ii) Equipped first-aid stations;</p> <p>(iii) Medical insurance coverage for workers;</p> <p>(iv) Number of accidents; (v) Supplies of potable drinking water;</p> <p>(vi) Clean eating areas where workers are not exposed to hazardous or noxious substances;</p> <p>(vii) record of H&S orientation trainings</p> <p>(viii) personal protective equipments;</p> <p>(ix) % of moving equipment out fitted with audible back-up alarms;</p> <p>(xi) Signboards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal.</p> <p>Appendix-x,xi,xii,xiii,xiv</p>

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		<p>training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing</p> <p>injuring to fellow workers;</p> <p>(viii) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;</p> <p>(ix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;</p> <p>(x) Ensure moving equipment is outfitted with audible back- up alarms;</p> <p>(xi) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in</p>		

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		<p>accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and</p> <p>(xii) Disallow worker exposure to noise level greater than 85 dBA for adoration of more than 8hours per day without hearing protection. The use of hearing protection shall be enforced actively.</p>		
Core Labor Standard (CLS)- safety and compliance	Impact on health of contractor's labor	<p>Monitoring compliance with national labor laws and regulations, provided that these national laws are consistent with CLS. PMU will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all: (i) applicable labor laws and core labor standards on: (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste; and (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted</p>	Construction Contractor	<p>All records, documents related to health & safety of labors</p> <p>Appendix-xv</p>

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		diseases including HIV/AIDS to employees and local communities surrounding the project sites.		
Community Health and Safety.	Traffic accidents and vehicle collision with pedestrians during material and waste transportation	<p>(i) Plan routes to avoid times of peak-pedestrian activities. (ii) Liaise with PMU/PIU/DSC in identifying high-risk areas on route cards/maps.</p> <p>(iii) Maintain regularly the vehicles and use of manufacturer- approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.</p> <p>(iv) Provide road signs and flag persons to warn.</p> <p>(v) Provide protective fencing around open trenches, and cover any open trench with metal planks during non- construction hours. Potentially cause soil contamination;</p> <p>(vi) Recover used oil and lubricants and reuse or remove from the site;</p> <p>(vii) Manage solid waste according to the following preference hierarchy :reuse, recycling and</p>	Construction Contractor	<p>(i) Traffic Management Strategy;</p> <p>(ii) Complaints from sensitive receptors</p>

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		<p>disposal to designated areas;</p> <p>(viii) Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required ;and</p> <p>(ix) Request PMU/PIU/DSC to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.</p>		
Office, Work Camps & storage	Temporary air, land and noise pollution from operation of camp & machine, water pollution from storage and use of fuels, oils, solvents, and lubricants	<p>(i) Consult with PIU/ DSC before locating project offices, sheds, and construction plants;</p> <p>(ii) Minimize removal of vegetation and disallow cutting of trees;</p> <p>(iii) Provide water and sanitation facilities for employees/labors;</p> <p>(iv) Prohibit employees from poaching wildlife and cutting of trees for firewood;</p> <p>(v) Train employees in the storage and handling of materials which can potentially cause soil contamination;</p> <p>(vi) Recover used oil and lubricants</p>	Construction Contractor	<p>(i) Complaints from sensitive receptors;</p> <p>(ii) Water and sanitation facilities for employees; and</p> <p>(iii) PIU/ DSC report in writing that the camp has been vacated and restored to pre-project conditions</p> <p>Appendix-xvi,xvii, and xviii</p>

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		<p>and reuse or remove from the site;</p> <p>(vii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;</p> <p>(viii) Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and</p> <p>(ix) Request DSC/ PIU to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.</p>		
Social and Cultural Resources	Risk of archaeological chance finds	<p>(i) Strictly follow the protocol for chance finds in any excavation work;</p> <p>(ii) Request PMU/PIU/DSC or any authorized person with archaeological field training to observe excavation;</p> <p>(iii) Stop work immediately to allow further investigation if any finds are suspected; and</p> <p>(iv) Inform PMU/PIU/DSC if a find is</p>	Construction Contractor	Records of chance finds

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		suspected and take any action they require ensuring its removal or protection in situ.		

DSC =Design Supervision Management Consultant, H&S =health and safety, RPM=respirable particulate matter, PMU=Project Management Unit; PIU = Project Implementation Unit; SPM= suspended particulate matter, GMC =Guwahati Municipal Council

V. ENVIRONMENTAL MONITORING AND EVALUATION

19. In addition to desk reviews and site inspections, monitoring of selected environmental parameters have been conducted during the reporting period. The frequencies of the environmental monitoring activities are commensurate to the type and significance of the impacts. For **Project 1** subprojects, the parameters to be monitored are ambient air quality, noise levels and drainage silt.

20. At present only two packages, (AUIIP/PR-01/DIB/DR/01 and AUIIP/PR-01/GUW/WS/02A and 02 B is under implementation. During report period both base line and during construction air quality monitoring has been conducted for DTP Drain package. Results show (**Table 12 and 13**) that concentration of SO₂, NO₂ increased during working period. Similarly, concentrations of PM_{2.5} and PM₁₀ during construction are much above the base line level. There is a requirement of stringent application of mitigation measures for control of dust and gaseous emission. In all the cases, concentrations of all parameters are with the prescribed standard. Concentration of lead is always below the detection limit.

Table 12: Ambient Air Quality Monitoring at Different Working Locations, Dibrugarh

Package	Sampling Locations	Implementation Stage	Date of Monitoring	Monitoring parameters				
				SO ₂ µg/m ³	NO ₂ µg/m ³	PM _{2.5} µg/m ³	PM ₁₀ µg/m ³	Lead (Pb) µg/m ³
AUIIP/PR-01/DIB/DR/01	Drain construction site, chainage 0.0 km	Base line	03.11.2015	ND	ND	8.94	21.57	ND
	Drain construction site, chainage 4.5 km	Base line	03.11.2015	ND	ND	4.86	15.29	ND
	Drain construction site, chainage 5.5 km	Base line	03.11.2015	ND	ND	10.72	27.64	ND
	Drain construction site, chainage 7.5 km	Base line	03.11.2015	ND	ND	4.31	14.57	ND
	Drain construction site, chainage 9.5 km	Base line	03.11.2015	ND	ND	11.57	28.19	ND
	Pre-Cast Casting Site Lepetkata Dibrugarh	Base line	03.11.2015	ND	ND	12.64	27.41	ND
		Average		ND	ND	8.84	22.44	ND
	Drainage construction site, Paltan Bazar 0 chainage	Construction stage*	21.11.2016	ND	ND	12.62	28.49	ND
	Drainage construction site, Paltan Bazar 0 chainage	Construction stage*	21.11.2016	ND	ND	31.7	69.3	ND
	Drainage construction site, Platen Bazar 0 chainage	Construction stage*	21.11.2016	ND	ND	12.62	28.49	ND
		Average		ND	ND	29.78	69.08	ND

Package	Sampling Locations	Implementation Stage	Date of Monitoring	Monitoring parameters				
				SO ₂ µg/m ³	NO ₂ µg/m ³	PM _{2.5} µg/m ³	PM ₁₀ µg/m ³	Lead (Pb) µg/m ³
	Standard as per CPCB			80.0	80.0	60.0	100.0	1.0

Note: CPCB - Central Pollution Control Board, ND- Not detected

21. Base line and during construction monitoring as conducted at different sites for the package **AUIIP/PR-01/DIB/DR/01** indicates that base line noise level is within the CPCB standard but construction phase noise are mostly above the standard for residential and commercial areas. Mitigation measures need to be applied for control of noise level within the standard.

22. The next environmental monitoring activities are scheduled on May/June 2017 to measure air quality, noise level and drainage silt. The cost of the environmental monitoring is charged to the funds of contractor (Ref. Monitoring budget disclosed in **Appendix 3**).

23. Parameters of drainage silt are within the normal range.

24. **Appendix 9** shows scanned copy of air quality, noise level and **Appendix 8** shows drainage silt and waste water testing results.

Table 13: Noise Level Monitoring at Different Working Locations

Packages	Sampling Locations	Implementation Stage	Date of Monitoring	Day time Max.	Day time Min.	Day Time Leq dB(A)	Night time Max.	Night time Min.	Night Time Leq dB(A)
AUIIP/PR-01/DIB/DR/01	Drain construction site, chainage 0.0 km	Base line	04.11.2015	70	58	50	50	40	45
	Drain construction site, chainage 4.5 km	Base line	04.11.2015	50	40	38	40	36	30
	Drain construction site, chainage 5.5 km	Base line	04.11.2015	55	38	45	43	30	28
	Drain construction site, chainage 7.5 km	Base line	04.11.2015	40	30	32	34	28	25
	Drain construction site, chainage 9.5 km	Base line	04.11.2015	50	32	40	40	28	30
	Pre-Cast Casting Site Lepetkata Dibrugarh	Base line	04.11.2015	60	42	51	35	30	24

Packages	Sampling Locations	Implementation Stage	Date of Monitoring	Day time Max.	Day time Min.	Day Time Leq dB(A)	Night time Max.	Night time Min.	Night Time Leq dB(A)
		Average		70	30	43	50	28	30
	KKSP Casting yard and Diesel Generator site, Lepetikata,	Construction stage*	26.11.2016	42	33	39	43	31	35
	KKSP Casting yard and Diesel Generator site, Lepetikata (near by residence)	Construction stage*	26.11.2016	44	35	41	51	33	39
	Drain construction site 0, chainage (paltan bazaar)	Construction stage*	26.11.2016	50	38	30	70	54	64
		Average		45	35	35	50	40	50
	CPCB Standards-Silence					50			40
	CPCB Standards-Residential					55			45
	CPCB Standards-Commercial					65			55
	CPCB Standards-Industrial					75			70

CPCB - Central Pollution Control Board)

25. A performance monitoring fact sheet has been prepared to facilitate tracking and quick reference on environmental monitoring of Project 1 subproject packages (**Tables 16 and 17**).

Table 14: Ambient Air Quality Monitoring at Different Working Locations, Guwahati

Base line and during construction monitoring as conducted at different sites for the package AUIIP/PR-01/GUW/WS-02A/02B indicates that base line noise level is within the CPCB standard but construction phase noise are mostly above the standard for residential and commercial areas. Mitigation measures need to be applied for control of noise level within the standard. The next environmental monitoring activities are scheduled on May/June 2017 to measure air quality, noise level and drainage silt. The cost of the environmental monitoring is charged to the funds of contractor (Ref. Monitoring budget disclosed in Appendix 3). Parameters of drainage silt are within the normal range.

26. Appendix 9 shows scanned copy of air quality, noise level and Appendix 8 shows drainage silt and waste water testing results.

Package	Sampling Locations	Implementation Stage	Date of Monitoring	Monitoring parameters				
				SO ₂ µg/m ³	NO ₂ µg/m ³	PM _{2.5} µg/m ³	PM ₁₀ µg/m ³	Lead (Pb) µg/m ³
AUIIP/PR-1/GUW/WS-02A and 02B	Gopal Nagar	Base line	04.11.2016 & 05.11.2016	6	14	41	70	<0.01
	North Joyti Nagar	Base line	28.12.2016 & 29.12.2016	7	14	36	70	<0.01
	Kenduguri,	Base line	29.12.2016 & 30.12.2016	9	17	39	79	<0.01
	Nabajyoti Nagar	Base line	29.12.2016 & 30.12.2016	9	17	34	69	<0.01
	Hengrabari	Base line	28.12.2016 & 29.12.2016	8	15	38	74	<0.01
	Standard as per CPCB			80.0	80.0	60.0	100.0	1.0

Table 15: Ambient Noise Quality Monitoring at Different Working Locations, Guwahati

Packages	Sampling Locations	Implementation Stage	Date of Monitoring	Day time Max.	Day time Min.	Day Time Leq dB(A)	Night time Max.	Night time Min.	Night Time Leq dB(A)
AUIIP/PR-1/GUW/WS-2A and 02B	Gopal Nagar	Base line	04.11..2016	66.2	55.6	65	44.6	40.3	55
	North Joyti Nagar	Base line	28.12.2016	48.3	35.35	65	36.8	30.34	55
	Kenduguri,	Base line	29.12.2016	46.5	35.6	65	33.5	30.12	55
	Nabajyoti Nagar	Base line	29.12.2016	48.3	30.5	65	36.8	32.5	55
	Hengrabari	Base line	28.12.2016	47.4	40.5	65	34.8	30..5	55

Table 16: Performance Fact Sheet for Required Environmental Consents/Clearances of AUIP Project 1 (Package-wise)

	Package Number	Name of Contractor	EMP Part of contract Document(Yes / No)	Environmental Consents / Clearances Required					
				Tree Cutting	Crusher	Batching Plant	Hot Mix Plant	Diesel Generator Set	Pollution Under Control (PUC) Certificates for Contractor's Vehicles
1	AUIP/PR-1/GUW/WS/01	Procured and awarded to M/s. IVRCL Ltd. on 29/05/2014 and subsequently terminated on 07.12.2015 for non-performance. After rebidding of the package, M/s Tirupati Cements have been selected as L1 bidder. Contract agreement signed. LOA issued on 30.08.2016.Preliminary work in progress	Yes	-	-	-	-	-	-
2-3	AUIP/PR-1/GUW/WS/02A & 02B	M/S Shivam Transcon Pvt Ltd	Yes	-Tree felling for Gopalnagar compoeted.	-	-	-	-	-

4	AUIIP/PR-1/DIB/DR-01	M/s CORSAN CORVIAM CONSTRUCCION S.A.	Yes	Tree felling permission received and tree felling done mostly	Instruction given for collection from suppliers Crusher plant - Not yet required	Constructed CTE received from Pollution control board. Also CTO received from pollution control board	NR as per present work	CTO received from pollution control board	Collected mostly
5	AUIIP/PR-1/DIB/SWM-01A	Work not awarded							
6	AUIIP/PR-1/DIB/SWM-01B	Work not awarded							
7	AUIIP/PR-1/DIB/SWM-02	Work not awarded							

Table 17: Performance Fact Sheet for EMP Implementation of AUIP Project 1 (Package-wise)

	Package Number	Name of Contractor	EMP Part of contract Document(Yes / No)	Contract or Social/ Environment Person ⁷	Overall Status of EMP Implementation	Field to be Monitored as per EMP												
						Source of Materials	Camp Sites	Landscape and Aesthetics	Air Quality	Noise Level	Traffic	Ecological Resources – Terrestrial	Accessibility	Water Quality	Occupational Health & safety	Community Health & safety	Socio cultural resources	Employment generation
						In compliance (2) / Partial Compliance (1) / Not in compliance (0) / Not applicable (n/a)												
1	AUIIP/PR-1/GUW/WS/01	Procured and awarded to M/s. IVRCL Ltd. on 29/05/2014 and subsequently terminated on 07.12.2015 for non-performance. After rebidding of the package, M/s Tirupati Cements have been selected as L1 bidder. Contract agreement signed. LOA issued on 30.08.2016.Preliminary work in progress	Yes															
2-3	AUIIP/PR-1/GUW/WS/02A & 02B	M/S Shivam Transcon Pvt Ltd	Yes															
4	AUIIP/PR-1/DIB/DR-01	M/s Corsan Corviam Construction S.A.	Yes	Yes	Complied	2	2	2	2	2	n/a	2	2	n/a	1	1	n/a	2
5	AUIIP/PR-1/DIB/SWM-01A	Work not awarded																
6	AUIIP/PR-1/DIB/SWM-01B	Work not awarded																
7	AUIIP/PR-1/DIB/SWM-02	Work not awarded																

{Note calculation of numerical value for determining performance status- Calculation is based on addition of numerical value like below-

Package - AUIP/PR-1/DIB/DR/01= Total score- 2+2+2+2+2+2+2+1+1+2= 18. Number of working field=18, **Then- 18/10=1.8- More than 1.5, fully complied**

Package AUIP/PR-1/GUW/WS/02A AND 02B= Total score- 2+2+2+2+2+2+2+1+1+2= 18. Number of working field=18, **Then- 18/10=1.8- More than 1.5, fully complied**

⁷Nomination of Environmental & Social Safeguard Officer by Contractor(Nominated / Yet to be Nominated)

VI. CONSULTATIONS AND DISCLOSURES CONDUCTED

27. As per approved IEE, consultations and disclosure will be a continuous process throughout Project 1 implementation involving public consultations and focus group discussions. Regular tool box training for labourer has been conducted for the Dibrugarh drainage package and Guwahati Water supply. **Appendix 12** shows some sample tool box training record for labourer. Also health camp and HIV/ AIDS awareness camp have been organized by the contractor for the labourers. Documents are also attached in **Appendix 12**.

28. The indicative schedule for consultations and disclosure is presented in **Table 18**. **Appendix 16** provides the sample public consultation detail. Before starting of the work at a specific locations information is provided by the construction staff to the locals about the duration and type of work. The sample documentation is attached as **Appendix 17**.

Table 18: Indicative Schedule for Consultations and Disclosure

Type of Consultation/Disclosure	Target Date	Location	Target Participants	Responsible Person and Source of Funds
Community Consultation, FGD, Perception survey.	2 consultations bi-monthly	Dibrugarh	Community, Ward Members, Councillors Related departments. CBOs	Safeguard Specialist Environment & Social (PMC&DSC) Safeguard Compliance Officer (PMU), Construction Manager ,DSC
Community Consultation, FGD, Perception survey.	2 consultations bi-monthly	Guwahati	Community, Ward Members, Councillors Related departments. CBOs	Safeguard Specialist Environment & Social (PMC&DSC) Safeguard Compliance Officer (PMU), Construction Manager ,DSC

VII. GRIEVANCE REDRESS MECHANISM

29. As per approved IEE, a project-specific grievance redress mechanism (GRM) to 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 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.

30. 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 Form (**Appendix 18 and Xviii**) 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.

31. GRM and GRC for Guwahati and Dibrugarh have been established.

VIII. FINDINGS AND RECOMMENDATIONS

32. Based on environmental monitoring conducted during July to December 2016. AUIIP Project 1(Dibrugarh) is in compliance of environmental safeguards. The main partial-compliances include:

- Proper signages/information board at drainage worksite.
- Need to improve use of PPE by contractor's workers at all times.
- Need of properly barricade at worksite along the drain and excavated area
- Regular air and noise quality monitoring

33. Based on environmental monitoring conducted during July to December 2016. AUIIP Project 1(Guwahati) is in compliance of environmental safeguards. The main partial-compliances include:

- Proper signages/information board at drainage worksite.
- Need to improve use of PPE by contractor's workers at all times.
- Need of properly barricade at worksite along the drain and excavated area
- Regular air and noise quality monitoring
- Need to put GRC mechanism at the site
- Improve sanitation facility for labourer

Table 19: Corrective Action Plan (Dibrugarh)

	Non-compliance	Action Required	Responsible	Target Date	Indicator of Compliance
1.	Insufficient signages/information board at drainage worksite.	Sign board needs to be arrange at all working locations	Contractor	15 th January 2017	Site observation
2	Need to improve use of PPE by contractor's workers at all times.	Use of PPE should be at all times as per site condition and work type.	Contractor	15 th January 2017 and continued	Availability and use of PPE
3.	Need of properly barricade and use of caution tape at all worksite along the drain and excavated area	Complete barricading and complete use of caution tape at all working sites	Contractor	15 th January 2017	Site observation
4	Regular air and noise quality monitoring	Monitoring should be done as per EMP	Contractor	To be continued as per EMP	Observation and document checking

Table 20: Corrective Action Plan (Guwahati)

	Non-compliance	Action Required	Responsible	Target Date	Indicator of Compliance
1.	Insufficient signages/information board at drainage worksite.	Sign board needs to be arrange at all working locations	Contractor	15 th January 2017	Site observation
2	Need to improve use of PPE by contractor's workers at all times.	Use of PPE should be at all times as per site condition and work type.	Contractor	15 th January 2017 and continued	Availability and use of PPE
3.	Need of properly barricade and use of caution tape at all worksite along the drain and excavated area	Complete barricading and complete use of caution tape at all working sites	Contractor	15 th January 2017	Site observation
4	Regular air and noise quality monitoring	Monitoring should be done as per EMP	Contractor	To be continued as per EMP	Observation and document checking
5	Need to put GRC mechanism at	Display of Grievance board at the site	Contractor	15 th January 2017	Site observation

	Non-compliance	Action Required	Responsible	Target Date	Indicator of Compliance
	the site				
6	<ul style="list-style-type: none"> Improve sanitation facility for labourer 	Stay arrangement and drinking water facility need to improve	Contractor	15 th January 2017	Site observation

The programme will help the state to achieve the Millennium development Goals on environment Goals on Environmental sustainability and increase access to safe drinking water and basic sanitation. Through improved sewerage systems, the risk of severe flooding and drainage pollution in the project area will considerably reduce. This coupled with the state's strategic position will encourage greater business opportunities and enhance greater regional cooperation.