Ref. No.: JV-ALDLP-BR-21-360

Date : 26 December 2021

Mr. Md. Mamunul Islam
Project Director (Addl. Charge)
Bangladesh Railway, Rail Bhaban (7th Floor)
16 Abdul Ghani Road, Dhaka 1000, Bangladesh

Project: **Contract No.: PD/ALDLP/ADB-EIB/2015: Construction of Dual Gauge Double Line and Conversion of Existing Railway into Dual Gauge between Akhaura-Laksam**

Subject: **Semi-Annual (July - December 2021) Environment Monitoring Report**

Dear Sir,

In conformity with Schedule 5 of the Project Loan Agreement on regular progress report submission to the ADB, we are forwarding herewith the Semi-Annual (July – December 2021) Environmental Monitoring Report.

During the reporting months of July – December 2021, Project Environmental Safeguard Activities include the implementation of the Environmental Management Plan (EMP) by the Contractor CTM JV, Compensation Tree Plantation activities by the Sub-Contractor Gumti Nursery, EMP compliance monitoring and Environmental Quality Monitoring by Sub-Contractor EQMS, HIV/AIDS STD Awareness; and Prevention Seminars by NGO UDOY, and supervision work of ALDLP Environmental Sub-Contractors by CSC Environmental team. It can be noted that the replacement CSC Sr. Environmental Specialist had mobilized on an intermittent basis starting November 2021.

Should you find the report acceptable, may we request that it be forwarded to ADB for their information and approval for posting at their website.

Sincerely yours,

26.12.2021

Md. Khairul Alam
Acting Team Leader
Construction Supervision of Akhaura-Laksam Double Track Project
E-mail: khairulalammd59@gmail.com

Attachment: Semi-Annual (July - December 2021) Environment Monitoring Report.

BANGLADESH RAILWAY

CONSULTING SERVICES CONTRACT
FOR CONSTRUCTION SUPERVISION OF
AKHAURA-LAKSAM DOUBLE TRACT PROJECT

ADB Loan No.:3170-BAN(SF)

Contract No.: PD/ALDLP/CSC/02/2016

Document Title:

SEMI-ANNUAL
ENVIRONMENT MONITORING REPORT
JULY - DECEMBER 2021

Document Number		
Rev. No.	Date	Revision Description
01	30/12/2021	First Draft

Prepared by	**DOHWA Engineering Co. Ltd., Korea** ***In Joint Venture with*** **Korea Rail Network Authority, Korea;** **Oriental Consultants Global Co. Ltd., Japan;** **Balaji Railroad Systems Limited, India; and** **Development Design Consultants Ltd., Bangladesh**

Semi-Annual Environmental Monitoring Report (July- December 2021)

December 2021

BAN 3170: SASEC Railway Connectivity: Akhaura-Laksam Double Track Project

Prepared by the ALDLP Construction Supervision Consultant for the Bangladesh Railway

Government of the People's Republic of Bangladesh

MINISTRY OF RAILWAYS

BANGLADESH RAILWAY

SOUTH ASIA REGIONAL ECONOMIC COOPERATION RAILWAY CONNECTIVITY: AKHAURA-LAKSAM DOUBLE TRACK PROJECT

Semi Annual Environmental Monitoring Report
July - December 2021

CONSULTING SERVICES CONTRACT FOR CONSTRUCTION SUPERVISION OF AKHAURA-LAKSAM DOUBLE TRACK PROJECT

ADB Loan No.: 3170-BAN (SF)

Submitted To : ADB BRM, Dhaka

Submitted By : Project Director, ALDLP, Bangladesh Railway

Prepared By : Construction Supervision Consultant, ALDLP, Bangladesh Railway

EXECUTIVE SUMMARY

The Akhaura-Laksam Double Line Project, is part of Dhaka-Chittagong Railway corridor, that is a component of the Trans-Asian Railway Network, SASEC, SAARC & BIMSTEC corridors in Bangladesh. The project entails the double tracking of a 72 km rail line, upgrading of 2 major and 11 minor stations; and a few hundred meters of access roads in eastern Bangladesh.

The land use in the project area is mainly agricultural with no significant environmental features or protected areas. The Project is basically an expansion of an existing single track to double railway line, thereby increasing its current capacity to convey passengers and cargo not only along the Akhaura to Laksam track segment, but the whole Dhaka to Chittagong network. In view of this site condition and nature of the Project, it has been categorized as ADB Environment Category B, where the environmental impacts are known, limited in scope to within the Project area and its adjacent environ, short-term, reversible, and can be mitigated with proper implementation of the prescribed Environmental Management Plan (EMP) contained in the Initial Environmental Examination (IEE) that was prepared for the Project During the Detailed Design Phase.

Other reportorial requirements complied by the Project was the Environmental Impact Assessment (EIA) report that was prepared in compliance to the European Investment Bank (EIB) Environmental and Social Handbook (2013), as well as the EIA report in fulfillment of the requirements of the Department of Environment (DoE), Ministry of Environment and Forests, Government of Bangladesh for red category projects.

Protection of the Environment is one of the most important policy that ADB, EIB and the Bangladesh government subscribed to. ADB and EIB is seriously concerned about this issue and strictly ensure that any development project financed by them will not significantly affect the natural and social environment of the Project site and its adjacent environs. The Project Loan Agreement prescribes that ADB's Safeguard Policy Statement (SPS-2009) through the EMP be complied with by the Executing Agency throughout the Project implementation.

The Project has also instituted measures consistent with the guidelines prescribed by the World Health Organization (WHO) and Bangladesh Government Directorate, in order to help control the spread of Covid-19 virus. These prevention measures that include discouraging personnel from unnecessary movement within and outside of the Project site, inclusion of Covid-19 prevention lectures in the regular tool-kit meetings and at the HIV/AIDS STD prevention seminars that are attended by construction workers; distribution of face masks to construction workers, and installation of wash areas in the workplace, as well as disinfecting booths in Project offices. The body temperature of persons are taken as well as observing any Covid-19 symptoms, for persons entering offices to avoid possible virus contamination. An ambulance is on stand-by at the Project site 24/7 to ferry sick or injured persons to nearby medical facilities when necessary. In the few cases where Project staff experience Covid-19 like symptoms, they are promptly isolated, tested in government accredited laboratories and if found positive for the virus, are quarantined until they get a negative test result. Offices of these infected staff are also quickly sanitized.

Project Status

As of 30 November 2021, the Project has achieved 78.25% cumulative progress (against total work sections), had an overall financial cumulative progress of 76.23% (against total work sections) as well as a 69.37% overall cumulative financial progress (against total contract sum). Embankment works is 122.9 km (85.7%) complete with 68.1 km (95.75%) and 54.5 km (75.7%) upline and downline respectively built. Bridge work is 99.66% (12 units) and 70.67% (6 units) complete for upline and downline respectively. Culverts are 93.15% (41 units) and 55.97% (26 units) completed for upline and downline respectively. Station buildings (13 units) are 71.88% completed with physical progress ranging from 32.95% in Saldanadi Station to 100% in Alishahar, Lalmai, Mainamati and Cumilla Stations. The overall track linking is 51.7% complete with 95.21 km of new tracks laid, where 63.06 km and 30.357 km for upline and downline respectively. Signaling works is about 61.88% complete.

The 8th version of the Contractor's Work Program (WP-H) is still under refinement. The current 7th version of the Contractor's Work program (WP-G), had been approved by BR and concurred by the Bank, which resulted in the time extension of the Contractor's handing over of Section 1 from 1 September 2020 to 16 June 2021 which is equivalent to 264 days. However, the actual handover of Section 1 was done in 30 November 2021. Correspondingly, the handing over of the other Sections had been adjusted accordingly. Section 2 had been given a 412 day extension ending in 12 November 2022, while Section 3 had a 400 days extension ending in December 2022.

Environmental Monitoring

All anticipated negative environmental impacts, appropriate mitigation measures and monitoring requirements have been defined in Environment Management Plan (EMP). There are two types of Environmental Monitoring works being conducted in the Project, the first of which is the Compliance monitoring of EMP implementation and the second is the Environmental Quality Monitoring. A third party had been hired through the Contractor, to perform both monitoring works. The Sub-Contractor EQMS conducts periodic site inspection, focusing on the contractor's work areas, construction waste disposal sites, vegetative rehabilitation of embankments and opened areas, restoration of local access used as haul roads, clean-up of completed works such as station buildings, site offices, bridges, culverts and others. During the reporting period, the new MS Excel-based reporting system that had been developed during the first quarter of the year 2021, is in continued use in the monitoring of the Contractor's compliance to the EMP. The system provided a mechanism by which non-compliant activities are tracked up to the time these are resolved.

Similarly, the Environmental Quality Monitoring is done by conducting sampling in preselected sites within the Project area. Every month, EQMS conducts air quality and noise level monitoring and ground water sampling in 2 of 13 major and minor stations; as well as surface water sampling in 2 preselected nearby waterways that intersect the construction site. Monitoring will be shifted to 2 other stations and 2 nearby surface water bodies in the following month and so on. While Section 1 had already been handed over by CTM JV to BR, there are partially completed works that

During the reporting period that covers both rainy season (July to October) and dry months (November), on-site measurement of air quality and noise level were done using portable analyzers; while surface and ground water quality from preselected water bodies/sources is performed by securing grab water samples, and transporting them in suitable containers, and analyzed in government registered laboratories using standard methods for specific analytical parameters set by the Government environment agency. The results of the analysis were compared to the government set standards to determine compliance. A brief description is provided to explain the test results and provide recommendation when necessary. The EQM is conducted every month.

Water Quality Monitoring

Surface water quality monitoring had been performed at natural waterways along the Project alignment on a monthly basis during reporting period that is between the months of July to November 2021. This sampling period is found in both dry and rainy seasons. All samples taken with the exception of those from the Goniajuri River had exhibited parameter concentrations that are within the DOE standards. Construction of 2 bridges (Bridge 232 and 234) and 1 culvert (culvert 235) that traverse the meandering Goniajur river are already completed and so pollutants from agricultural, residential, commercial and industrial areas are the main cause of the poor surface water quality for Dissolved Oxygen (DO) and Biological Oxygen Demand (BOD_5) **Table A.1** contains the summary of surface water quality test results.

Table A.1. Summary of Surface Water Quality Test Results

Month	Location	pH	Temperature (^0C)	Electric Conductivity, EC (mS)	Total Dissolved Solids, TDS (mg/L)	Dissolve Oxygen, DO (mg/L)	Biochemical Oxygen Demand, BOD_5 (mg/L)	Chemical Oxygen Demand, COD (mg/L)	Total Suspended Solid, TSS (mg/L)
July	Haora River Water (Upstream)	7.20	27.5	0.16	80	6.1	1.2	41	38
	Haora River Water (Downstream)	7.15	28.2	0.16	80	6.0	1.0	44	34

Month	Location	pH	Temperature (^{0}C)	Electric Conductivity, EC (mS)	Total Dissolved Solids, TDS (mg/L)	Dissolve Oxygen, DO (mg/L)	Biochemical Oxygen Demand, BOD_5 (mg/L)	Chemical Oxygen Demand, COD (mg/L)	Total Suspended Solid, TSS (mg/L)
August	Gomti River Water (Upstream)	7.01	29.0	0.11	60	6.7	1.1	24	31
	Gomti River Water (Downstream)	6.84	29.4	0.11	60	7.0	0.9	23	34
September	Sindai River Water (Upstream)	6.83	27.2	0.09	50	6.1	1.8	31	23
	Sindai River Water (Downstream)	6.56	27.4	0.09	40	6.0	1.5	31	27
October	Goniajuri River Water (Upstream)	7.06	30.5	0.38	190	2.8	12.5	24	56
	Goniajuri River Water (Downstream)	7.01	31.1	0.28	140	2.7	13.1	18	48
November	Salda River Water (Upstream)	6.95	24.4	0.10	50	5.6	1.6	14	40
	Salda River Water (Downstream)	6.88	24.3	0.09	50	5.8	1.7	11	36
Bangladesh Standard									
Water usable by fisheries		6.5-8.5	-			5 of more	6 of less		
Water usable by various process and cooling industries		6.5-8.5	-			5 of more	10 or less		

Groundwater samples taken from various sites indicate that the test results for all samples were compliant to government set standards. Heavy metals manganese and iron concentration that had been reported during the same period last year, (July-December 2020) have yielded reduced to acceptable levels following DOE standards since last reporting period (January-June 2021). **Table A.2** contains the summary of ground water quality test results of samples taken from selected railway stations during the reporting period.

Table A2. Summary of Ground Water Quality of Selected Railway Stations

Month	Location	pH	Temperature (^{0}C)	Phosphate (mg/L)	Manganese, Mn (mg/L)	Arsenic, As (mg/L)	Iron, Fe (mg/L)	Fecal Coliform, FC (N/100mL)
July	Rajapur Station	6.71	26.8	0.04	0.02	<0.01	0.01	0
	Akhaura Station	6.44	27.2	0.02	0.01	<0.01	0.04	0
August	Sadar Rasulpur Railway Station	6.67	27.6	0.01	0.02	<0.01	0.06	0
	Gangasagar Station	6.58	27.6	0.03	0.01	<0.01	0.01	0
September	Cumilla Station	7.20	26.4	1.7	0.02	<0.01	0.15	0
	Kasba Station	6.80	27.1	0.8	0.01	<0.01	0.88	0
October	Mainamati Station	7.37	27.8	0.04	0.02	<0.01	0.01	0
	Mandabag Station	6.71	27.6	1.4	0.01	<0.01	0.89	0
November	Lalmai Station	6.68	26.7	0.01	0.03	0.01	0.46	0
	Saldanodi Station	6.76	27.1	0.03	0.09	0.025	0.93	0
Bangladesh Standard Error! Bookmark not defined.		**6.5-8.5**	**–**	**6.0**	**0.1**	**0.05**	**0.3-1**	**0**

Air Quality Monitoring

A total of 10 ambient air samples were collected from the Railway Station areas of the project Rail corridor between Akhaura and Laksam. The ambient status of major air pollutants viz. Particulate Matter (SPM, PM**10** and PM**2.5**), Sulfur Dioxide (SO_2), Oxides of Nitrogen (NO_x), and Carbon Monoxide (CO) have been assessed by monitoring air quality. All parameters of air quality are found within the acceptable limits specified by the DoE. $PM_{2.5}$ values are between 8.94 – 32.41 ug/m^3; PM_{10} have results between 16.35 to 55.13 ug/m^3; SPM was measured between 34.42 to 96.62 ug/m3; SO_2 is between 2.37 – 17.29 ug/m^3; NO_x figures is between 8.18 to 21.13 ug/m^3; **Table A.3** contains the summary of the air quality levels monitored during the last 6 months (June to July 2021) and CO levels are between 0.01 – 0.3 ppm; which are all found compliant with the DOE standard for the said contaminants. Previously air sample was collected for 2 hours but at present they are taking the sample for about 8 hours.

Table A3. Summary of Air Quality Monitoring Results during the period July - December 2021

Sampling Period	Sampling Location	$PM_{2.5}$ µg/m^3	PM_{10} µg/m^3	SPM µg/m^3	SO_2 µg/m^3	NO_x µg/m^3	CO_1 ppm
July	Rajapur Railway Station	16.39	29.12	71.04	2.72	12.68	0.03
	Akhaura Railway Station	32.41	55.13	96.62	7.68	21.13	0.05
August	Gangasagar Railway Station	18.43	37.07	74.88	16.42	10.53	0.01
	Sadar Rasulpur Railway Station	8.94	16.35	34.42	17.29	8.18	0.31
September	Cumilla Railway Station	11.19	24.84	48.89	10.23	16.25	0.04
	Kasba Railway Station	25.75	50.37	93.08	6.13	15.02	0.02
October	Mainamati Railway Station	13.74	19.22	45.17	2.86	17.48	0.04
	Mandabag Railway Station	10.28	17.83	37.41	2.37	9.12	0.02
November	Saldanodi Railway Station	14.27	27.22	56.69	3.87	12.10	0.08
	Lalmai Railway Station	19.63	39.81	78.65	2.61	15.93	0.06
Bangladesh Standard**Error! Bookmark not defined.**		**65**	**150**	**200**	**365**	**100**Error! Bookmark not defined.	**9**

Noise Level Monitoring

Ambient noise levels have been monitored from Railway Stations of the ALDLP project and adjacent “quiet areas” such as Mosques and schools. Potential noise intensity vary and dependent on the distance from the source, site land use, topography, presence of obstructions and meteorological factors. From the noise level measured from twenty sampling locations, done over the period of 5 months, five had slightly exceed the government prescribed threshold for institutional area of 50 db(A) for rail station mosques and railway station of 60 dB(A). These mosques are located at the parking lot or along the access road of the stations that are affected by the noise emanating from the movement of vehicles, commuters and pedestrians rather than the construction work. In the Mainamati station that is almost completed save for final finishing works, the noise recorded emanates mostly from the adjacent busy bus terminal rather than the manual construction works. Noise attenuation measure is suggested for mitigation.

Tree Plantation

To mitigate the estimated 55,000 trees logged as a result of ALDLP implementation, the Project entails to replace these trees through a “Compensation Tree Plantation and Rehabilitation Program”. Under the program, three times the number of trees felled will be planted along the completed track embankments, around train stations and environmental sensitive areas. Tree planting has commenced last year and continued this year. For the 2021 tree planting season, a total of 96,547 saplings had been planted, which surpass its annual target of 87,000 saplings

planted. However, about 73,197 saplings have so far survived (75.8% survival rate) that is composed of 19,450 saplings in Section 3 and 53,747 saplings in Sections 1 & 2. This year's plantation establishment failed to meet the 90% survival prescribed by ADB. The unfavorable performance in the tree plantation establishment can be attributed to delays in the start of the plantation activities resulting from the lockdown imposed by government due to the Covid-19 pandemic; poor quality of saplings procured and their handling/maintenance prior to planting, and internal financial problem within the Contractor resulting in delays of workers salaries. To help remedy the problem, CSC and CTM JV closely monitor/supervise the SubContractor responsible for implementing this tree plantation program. Plantation protection and maintenance had been enhanced with the deployment of watch guards that will double as maintenance person at a ratio of 1 guard per 2 km of established plantation.

Results of Environmental Monitoring and Compliance Measures

The EMP compliance monitoring results reveal, that most of the mitigation measures identified in the EMP are complied with by the Contractor. Corrective actions have been prescribed by the third party monitor EQMS for the appropriate action of the Contractor, while good practices are also encouraged to be continued. There are however, a few prescribe measures that have not been adequately complied with by the contractor and as such, their immediate attention were called to address these short comings at the soonest possible time. Among the non-compliance is the habitual non-wearing of issued Personal Protective Equipment (PPE) by construction subcontracted laborers; inadequate orientation for workers most especially subcontracted unskilled laborers doing hazardous tasks, inadequate dust control, and proper temporary storage and disposal of petroleum and other construction waste.

Health & Safety

Despite the above short comings of the Health & Safety Program as mentioned above, during the reporting period, there were no reports of serious accidents within the workplace that result in stoppage of the construction activities. Overall, for the average 2,142 personnel mobilized by CTM only no case of fatal nor major injury had been recorded during the reporting period with the exception of 14 minor cases that only require first-aide. A total of 2,601,226 uninterrupted working hours have been recorded as a result of the almost accident-free working condition. The Contractor continues to implement their Health & Safety Program, that includes activities such as tool-box meetings, distribution of appropriate PPE to workers, holding of HIV/AIDS and Covid-19 Prevention Seminars, provision of drinking water and sanitation facilities at site; assignment of an ambulance 24/7 at the site to transport sick or injured personnel to the appropriate health facility. While attention will be made on implementing disciplinary action against worker's non-wearing of provided PPEs, the project will also pursue an increase in awareness training for workers, and installation of more appropriate Health & Safety posters at the workplace. When appropriate, sharing of accident/incident report with workers will be encouraged. A total of 23 trainings were conducted by the Contractor that was participated in by about 246 directly hired personnel, and resource persons were CTM JV senior Environment, Health & Safety Officers.

Conclusions

Akhaura-Laksam Double Track project had generated a number of environmental impacts, such as those associated with the embankment construction, bridge/culvert installation or worker's campsite and housekeeping by the contractor. The EMP provides the specific guidelines which BR has put in place to prevent or mitigate these undesirable effects. The assessment of the Contractor's performance indicate compliance to the EMP with a few individual site slippages that need rectification as prescribed in the Corrective Action Plan.

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
ADF	Asian Development Fund
ALDLP	Akhaura- Laksam Double Line Project
BDT	Bangladesh Taka
BOQ	Bill of Quantities
BR	Bangladesh Railway
BG	Broad Gauge
CROW	Construction Right of Way
CSC	Construction Supervision Consultancy
DB	Dispute Board
DG	Dual Gauge
DOHWA JV	DOHWA Engineering Co.Ltd. Korea In Joint Venture
DPP	Development Project Pro-forma/Proposal
EIA	Environment Impact Assessment
EIB	European Investment Bank
GIBR	Government Inspector of Bangladesh Railway
GOB	Government of Bangladesh
IEE	Initial Environmental Examination
INGO	Implementation Non-Government Organization
IPC	Interim Payment Certificate
ITC	Instruction to Commence
LA	Land Acquisition
LC	Level Crossing
MG	Meter Gauge
MoF	Ministry of Finance
MoR	Ministry of Railways
MPR	Monthly Progress Report
OCR	Ordinary Capital Resource
PAM	Project Administrative Manual
PVD	Prefabricated Vertical Drain
RoB	Rail Over bridge
RoW	Right-of-Way
RP	Resettlement Plan
SAARC	South Asian Association for Regional Co-operation
SASEC	South Asia Sub-regional Economic Cooperation
SRP	Supplemental Resettlement Plan
TL	Team Leader of DOHWA Joint Venture
TOR	Terms of Reference

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I. INTRODUCTION

I.1 Project Background

1. The Akhaura-Laksam Double Line Project seeks to convert the existing 72 km track from Laksam Station to Akhaura Station to double track, as well as upgrade the existing 2 major and 11 minor stations along this route; install state of the art signaling and communications facilities within these stations; and upgrade existing level crossings and provide new ones in other critical road crossings. Residential buildings are likewise to be provided to most of these stations for use as accommodations of BR personnel that are assigned to these areas.

2. The upgraded rail facilities will complete the double tracking of the route from Dhaka to Chittagong, thereby providing an environment friendly alternative to other modes such as road based transport. The Initial Environmental Examination (IEE) prepared for the Project had identified 3 main benefits which includes traffic diversion and fuel savings. Once the 44 train sets are in operations, it estimated that about 64.4 million liters of fuel would be saved, a reduction of the country's carbon footprint by 145,000 tons/year, and installation of upgraded rail buildings following international design.

3. The implementation of the Project is expected to yield adverse environmental impacts during construction and operation phase. The IEE identified these adverse impact as: a) deterioration of existing local roads by construction hauling trucks; b) blockage of waterways by construction materials spillage or erosion of embankments; c) air and noise pollution affecting sensitive receptors; and d) poor housekeeping of construction camps and work places leading to water pollution of nearby water bodies.

4. An environmental management plan (EMP) had been developed and approved for execution in order to mitigate the negative effects of Project implementation. To ensure that the Project implementation is compliant to the approved EMP, monthly environmental monitoring is being conducted by a third party Contractor, under the supervision of the Consultant and the Employer BR PIU. This Semi-Annual report covers the progress of the EMP implementation during the period of January-June 2021. This report also provides information on corrective actions done for non-compliant works, as well as the progress of the tree planting program that seeks to replace the trees that had been removed as a result of Project implementation, as well as replace the dead trees from last year's plantation program.

1.2 Rationale

5. The Preparation and Submission of the Semi-Annual Report on EMP Implementation Status is among the Project Loan Agreement conditions [Schedule 5, Number 12, item (a)] that was entered into by and between the Government of Bangladesh and the Asian Development Bank (ADB). The report is also a means ADB, EIB and GoB can help ensure that another Loan Agreement condition [Schedule 5, paragraph 6] is met where "*the Borrower and BR shall ensure that the preparation, design, construction, implementation, operation and decommissioning of the Project and all Project facilities comply with (a) all applicable laws and regulations of the Borrower relating to environment, health and safety; (b) the Environment Safeguards; and (c) all measures and requirements set forth in the IEE, the EMP, and any corrective or preventive actions set forth in a Safeguards Monitoring Report.*"[2]

1.3 Environmental Monitoring

6. The Project is engaged in two types of monitoring, the first is the Environmental Management Plan (EMP) compliance monitoring to record and assess the performance of the Contractor CTM JV in the implementation of the EMP which is part of its Scope of Work; and secondly the Environmental Quality Monitoring of key environments such as air, land and water using government prescribed analytical parameters in order to determine if the approved EMP is effective in mitigating the identified negative impacts that the Project implementation will

[2] ADB Loan Number 3170 – BAN, Schedule 5 (Execution of Project: Financial Matters), paragraph 6 (Environment).

create. The conduct of the environmental monitoring is through a third party that had been selected through the Contractor CTM JV. The environmental monitor called EQMS performs both EMP compliance monitoring as well as the Environmental Quality Monitoring works. The Contract Supervision Consultant (CSC) Environmental team supervises the work of EQMS; while the overall supervision work is performed by the Executing Agency BR that has a Project Implementing Unit (PIU) who has designated one of its Deputy Directors as the environment Focal Person. The contents of this Semi-Annual (January-June 2021) EMP Implementation Status Report contains the progress attained by the Project in complying with the EMP and verification of its effectivity in mitigating the negative impacts to the environment during the 6 months monitoring period. Lessons learned and recommendations are likewise provided for consideration of BR decision makers and planners for future projects.

1.4 Brief Project Description

7. The ALDLP has 3 outputs under the Design and Monitoring Framework, namely a) upgraded railway infrastructure; b) improved capacity of BR in Project Management and Implementation; and c) Improved Project Implementation unit in BR.

8. Under Output 1 (upgraded railway infrastructure), the following are the major Project components:

i. Construction of a second track in dual gauge;
ii. Reconstruction of the present track to dual gauge;
iii. Lengthening passing loops;
iv. Construction of new bridges;
v. Reconstruction of existing bridges and culverts;
vi. Modernization of signaling and telecommunication system; and
vii. Construction of 11 new stations and upgrading of 2 major stations.

9. Likewise, a modern computer-based interlocking signaling system will be installed; where this will be integrated with the Centralized Traffic Control system. **Table 1.1** below provides details of the Project components.

Table 1.1. Project Major Components

Project Component	Quantity
Major Bridges	12 bridges
Minor Bridges	46 bridges
New Station	11 minor stations
Upgraded Station	2 major station
Route km	72 km
Track	180.29 km
Level crossing	33

10. The project will support the Government of Bangladesh to upgrade about 72 km Akhaura-Laksam section of Dhaka Chittagong railway corridor to a double track railway line with modern signaling and telecommunication equipment. The section is part of a major sub-regional corridor and the Trans-Asia Railway network.

11. Output 3 on the other hand, entails the establishment and strengthening of a Project Implementation Unit (PIU) within the Executing Agency BR, that will oversee the ALDLP implementation. Currently, a BR PIU had been established for the implementation of the Project, which is manned by senior permanent officers of BR headed by a career Project Director, and supported by a Chief Engineer, an Additional Chief Engineer, and 4 Deputy Directors for Headquarters, Resettlement, Works and Ways, and Signal & Telecommunications. Two Additional Directors have likewise been assigned to the PIU to provide on-site support to the PIU's activities. The Deputy Director for Headquarters has been

designated as the Environment Focal Person on a concurrent capacity. However, no Focal Person had yet been designated for Gender concerns.

12. Output 2 involves the holding of capacity-building activities for BR officials and staff to enable them to more effectively carryout their respective tasks in the Project and in other BR operating units. Several BR officials and staff had attended various trainings abroad covering various topics which includes among others project management and procurement. During this reporting period, DD HQ (Environment Focal Person) and the DD Signal & Telecommunications participated in the "face to face" training/workshop on Environmental Monitoring using the new reporting system, that was conducted by the CSC Environment Team. Other concerned personnel of CSC, CTM JV and third party monitor EQMS also attended the activity.

1.5 Project Location

13. The Project is located within the Division of Chottogram found east of the capital city of Dhaka. Two Districts exercise jurisdiction over the Project site namely Cumilla and Brahmanbaria. Similarly, under the Cumilla District, there are 3 upuzillas that are traversed by the Project which includes Bhramanpara, Burichang, Cumulla Saar, Daksmin and Laksam; while the Upazilla that cover the Project site in the Brahmanbaria Districts include Akhaura and Quasba. **Figure 1.1** contains the location map of the Project, while **Table 1.2** contains details of the administrative subdivision that exercise jurisdiction over the Project site.

Table 1.2. Location of the Akhaura-Laksam Double Line Project

Division	District	Upazilla
Chottogram	Brahmanbaria	Akhaura, Quasba
	Cumilla	Bhramanpara, Burichang, Cumilla Sadar, Cumilla Sadar Daksmin, Laksam.

1.6 Progress in Project Implementation

14. As of 30 November 2021, the Project has achieved 78.25% cumulative progress and utilized 69.37% of its contracts budget amounting to BDT 18.9 Billion. Embankment works is at 122.9 km (85.7%) complete with 68.10 km and 54.5 km upline and downline respectively built. About 91.37% Sub-Grade and 67.33% Sub-Ballast layers already laid, and 271.52% of unsuitable materials removed and properly disposed. Bridge work is 99.66% (12 units) and 70.67% (6 units) complete for upline and downline respectively. Whereas culverts construction are 93.15% (41 units) and 55.97% (26 units) completed for upline and downline respectively. Station buildings are 71.9% completed with physical progress ranging from 32.95% in Saldanadi Station to 100% in Alishahar Station. The 4 stations in Section 1 (i.e. Alishahar, Lalmai, Mainamoti and Comilla) are substantially completed and had been handed over to BR. The overall track linking is 51.7% complete with 95.21 km of new tracks laid, where 63.06 Km and 30.36 km are for upline and downline respectively. Signaling works is about 61.88% complete.

15. The 7th version of the Contractor's Work program (WP-G), had been endorsed by CSC, and subsequently approved by BR which resulted in the awarding of a time extension to the Contractor's handing over of Section 1 from 1 September 2020 to 16 June 2021 which is equivalent to 264 days. Correspondingly, the handing over of the other Sections is adjusted accordingly. Section 2 had been given a 412 days extension ending in 12 November 2022, while Section 3 have a 400 days extension that will end in December 2022.

Figure 1.1. Akhaura-Laksam Double Line Project Location Plan

1.7 Environmental Classification of the project

16. This project was classified as Environment Category B according to the ADB Safeguard Policy Statement (SPS) 2009 as there are no environmentally sensitive sites within the project area. The project only entails the construction of tracks alongside an already existing railway line. Hence an Initial Environmental Examination (IEE) was required to comply with ADB safeguard reportorial requirements.

17. The European Investment Bank (EIB), a co-financier for this project on the other hand, requires the preparation of an Environmental Impact Assessment (EIA) in accordance with the requirements of EIB Environmental and Social Handbook, 2013-Version 9.0.

18. Moreover, in accordance with the requirements of the Department of Environment (DoE), Ministry of Environment and Forests, Government of Bangladesh; the project is classified as red category and requires a full EIA. This is due to the Project's estimated total cost of more than 1 million taka and its component bridges having spans longer than 100 m, which puts the ALDLP under the red category following the Environmental Conservation Rules 1997.

1.8 Environmental Clearances

19. According to the Environmental Conservation Rules, 1997, the project falls under Red category and thus under the provisions of the Bangladesh Environment Conservation Act (1995), Bangladesh Railway (BR) need to obtain an Environmental Clearance Certificate (ECC) from the Department of Environment, Government of Bangladesh; before commencement of the construction works.

20. So on the 2nd of May 2016, an Environmental Clearance Certificate (ECC) was secured by BR from the Department of Environment (DOE) for the project that is valid for one year, by virtue of their memo no. DOE/Clearance/ 5209/2013/188, dated 02 May 2016. Subsequently yearly renewals of the ECC has been obtained by BR by lodging renewal applications of the environmental clearance to the environment agency. For the reporting period, the ECC renewal application filed at the DOE branch in Cumilla District during the middle of June 2021 is still under process.

1.9 Institutional Arrangements

Bangladesh Railway

21. The Executing Agency is the Bangladesh Railway that is the overall responsible to the Bangladesh Government and to ADB and EIB for the smooth implementation of the Project. A Project Implementing Unit (BR-PIU) has been established and assigned senior permanent BR officers and staff to manage the Project. The PIU is headed by a career Project Director, who is assisted by a Chief Engineer (CE), Additional Chief Engineer (ACE), 4 Deputy Directors for Headquarters, Resettlement, Works and Ways, and Signal & Telecommunications. Two Additional Directors have likewise been assigned to the PIU to provide on-site support to the PIU's activities. The Deputy Director for Headquarters has been designated as the Environment Focal Person.

Environment and Social Safeguards Unit (ESSU)

22. Within the BR-PIU, an Environment and Social Safeguards Unit (ESSU) will be created that is tasked of overseeing the implementation of various Safeguard program such as the Environmental management Plan (EMP), the Resettlement Plan (RP) and the Gender Action Plan (GAP). The establishment of the ESSU within the BR-PIU is the first step towards its full institutionalization after the completion of the Project.

23. The objective of an ESSU is to build enough technical capacity within BR to permit it to oversee environmental and social safeguard matters arising from donor projects and to respond with technical knowledge to specific safeguard issues triggered by Project activities, or community complaints. Secondly, the ESSU should be able to manage Consultant and

oversee the Consultant's deliverables. Thirdly it will need to be able to fully address EIA requirements of the Project when the Engineer is no longer on the job. The ESSU will have to be able to assess environmental data, analyses it and define actions required to address non-compliant findings in a credible and timely manner. Finally, the ESSU should be able to provide training as needed to both contractors and BR staff in all aspects of environmental and social safeguards management.

24. The Environment and Social Safeguards Unit (ESSU) however has not yet been established at the moment due to shortages of qualified permanent staff in the agency. A number of senior staff have retired, and their replacements are still forthcoming. At the moment BR PIU senior officers are designated safeguards supervision position on a concurrent capacity such as the Deputy Director (HQ) Tania Mostafa who is the focal person for Environment. The creation of the ESSU can still be pursued in the near future when the qualified staff are available.

Construction Supervision Consultant (CSC)

25. There are other operating entities under the Project which includes the Construction Supervision Consultant (CSC) or "Consultant" task to supervising the day to day activities of the Construction Contractor CTM JV, which includes the implementation of the approved EMP, Health and Safety Program among others. The CSC has mobilized an international Resident Engineer for Environment, a Senior and 2 Junior Environment Specialist to oversee the Contractor's EMP implementation. The CSC prepares the Semi-Annual Environmental Monitoring Report covering the progress of the contractor in complying with the EMP as well as the Environmental Quality Report that is intended to confirm the effectiveness of the EMP in mitigating adverse environmental impacts.

26. However, in July 2019 the Resident Environmental Specialist had exhausted his assigned person months (24 pm) demobilized. During the reporting period (July-December 2020), the Sr. Environmental Specialist had been relieved of his duty by the Employer. BR-PIU was not satisfied over the performance of the Sr. Environmental Specialists and so they (BR) required his replacement. Only 2 Jr. Environmental Specialist are left to carry out the task of overseeing the EMP implementation. The CSC Resident Social, Resettlement and Gender Specialist had been temporarily assigned by CSC to support the 2 Jr. Environmental Specialist while awaiting the mobilization of Dr. Kabile Hossain's (Sr. Environmental Specialist) replacement. The CSC Resident Social, Resettlement and Gender Specialist is also a practicing international Environmental Specialist providing services to ADB, World Bank and JICA projects. During the reporting period, BR had approved the mobilization of the CSC nominated consultant for the Sr. Environmental Specialist position, as well as other CSC nominees. In view of the long time it took for BR to decide on the mobilization of the CSC Sr. Environmental Specialist, he had joined another Project. However, it was agreed with the specialist that he can provide intermittent inputs to the ALDLP in November and December 2021, and will be engaged full-time starting January 2022.

CTM JV

27. The Contractor CTM JV is the main implementor of the EMP. At the start of their contract period, CTM JV was required to submit their own EMP, that was duly approved by the Engineer, and was the basis for their environmental implementation activities and served as the performance indicator for the monitoring work. The EMP is part of the Contractor's scope of works, and payment is obtained by CTM JV for the fulfillment of their environmental protection work.

EQMS

28. The environmental monitoring is done by the third party EQMS. Their services is availed of the Project as a subcontract of CTM JV. EQMS performs both EMP Compliance Monitoring as well as Environmental Quality Monitoring. Every month, a team from EQMS visits the Project site to perform their EMP compliance monitoring using a checklist intended to guide the evaluation of the Contractor's environmental performance. A report is submitted by EQMS to CSC, covering the result of their monthly activity. Similarly, EQMS also conducts on-site air quality and noise level monitoring in preselected stations using portable air quality

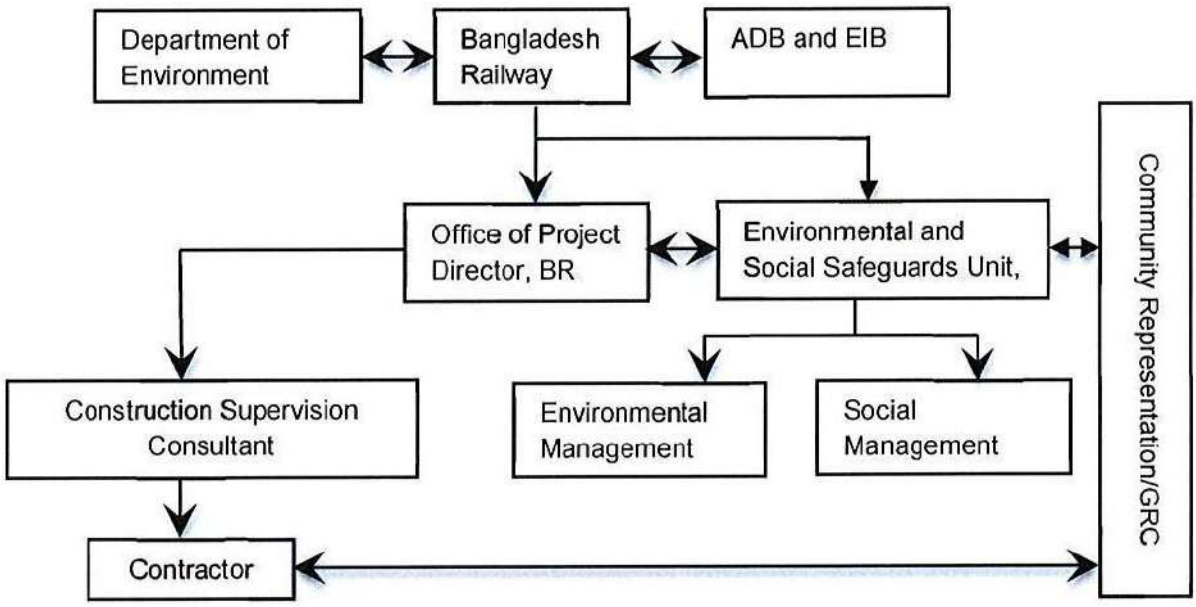
and noise level measuring instruments; as well as collect surface and ground grab water samples for analysis in their laboratory for parameters prescribed by the government environment agency. The results of the environmental quality sampling is compared to prescribe government environmental quality thresholds to determine compliance to set standards. Exceedance to government standards is provided with explanation and recommendations for action when necessary.

Compensation Tree Plantation Sub-Contractor

29. A last but not the least implementor is the Compensation Tree Plantation subcontractor named the Gomti Nursery. This organization is responsible for replacing the removed trees within the Project site, as a result of the construction works. Their scope of works include the production or procurement of quality planting materials such as tree saplings (i.e timber, fruit-bearing, medicinal and fuel wood), site preparation, transport and out planting of saplings, replacement of dead saplings, plantation protection and maintenance. Out planting is only done during the rainy months to help ensure adequate availability of moisture to the saplings and less intense heat that can dry up the young plants. Dead out-planted saplings are promptly replaced by good quality ones also during the rainy months. The CSC is responsible for monitoring the performance of the compensation tree planning due to the inability of EQMS to carry out this task.

30. The Asian Development Bank and the European Investment Bank, being the development partner of GoB, conducts periodic monitoring of the performance by the Executing Agency in implementing the Project as well as compliance to the approved Safeguard measures which includes the EMP. Bank technical staff review reports submitted by the Executing Agency and conducts field verification Missions to validate the information contained in the progress reports, which includes the EMP compliance reports and the Environmental Quality monitoring reports. Bank technical consultants review the progress of the Project's environmental work, site issues that require rectification, and recommends corrective measures to resolve identified issues for rectification. **Figure 1.2** contains the Safeguards Implementation and Report Work Flow diagram.

Figure 1.2. Safeguards Implementation and Reporting Work Flow



1.10 Environmental Management Plan

31. For this project the EIA report included (Table 38, Table 39, Table 40 and Table 41 of the EIA report**)** the Environmental Management Plan (EMP)**.** The EMP defines a set of mitigation and monitoring actions to be taken, in response to potential impacts predicted to take place during the pre-construction, construction and operating period of the Project. The sources of the impacts and the impacts were identified during the EIA study. The EMP is presented as two tables, defining not only impacts and mitigative and monitoring actions to be implemented, but also, where, when and who will be responsible for implementing them. The EMP describes well known and best practice mitigative action to be taken to prevent negative impacts from taking place and if that is not possible to mitigate them to an acceptable level. In addition, this EMP will:

- define measures to off-set or compensate irreversible negative impacts;
- specify the institutional arrangement for the implementation of the EMP; and
- identify means to enhance and maximize positive impacts.

32. The EMP (Table 38 and Table 39 of the EIA report) will be the main tool with which BR will manage environment impacts by applying both mitigative and monitoring measures in a technically credible and timely manner. The mitigative measured are considered successful when the impacts have either been eliminated or the residual effect complies with the environmental quality standards, policies, and legal requirement set by DoE. Mitigative measures are tracked via the monitoring program, which is described in the second of two EMP tables, and focuses on construction and operating period impacts.

33. As agreed with DoE, the construction of any large bridge (>100 m spans) which under DoE regulations would normally require their own EIA, and which DoE has exempted BR from doing, will be presented in more detail and with its own mitigative and monitoring requirements. These details for the Gomti River Bridge are provided in Chapter VI and Chapter IX in the EIA report.

34. The Contractor shall be responsible for preparing detailed documentation related to implementing this EMP. This should include information regarding scheduling, personnel, reporting and auditing requirements, training and detailed procedures for implementing the EMP. The Contractor's EMP and associated documentation shall be approved by BR prior to construction commences.

1.10.1 The Environmental Management Plan Implementation in different Phases of the Project

Preconstruction Phase

35. During the pre-construction period, several environment-related activities had been performed for the Project. These includes: a) the preparation of the Initial Environmental Examination (IEE) for approval of ADB; b) preparation of an Environmental Impact Assessment (EIA) report for the review and approval of the Department of Environment; and c) securing of environmental clearance for the Project from the DoE in compliance to government environmental laws. The IEE and EIAR had been prepared, reviewed and approved by ADB and DOE respectively; and the corresponding environmental clearance had been issued by the DOE for the Project. Moreover, this environmental clearance is renewed on an annual basis by the Project from the DOE designated district office of Cumilla. So, ever since the start of the ALDLP, the environmental clearance had been renewed 4 times by the CSC Environmental team in behalf of BR PIU for the Project.

36. Once the Project had been approved and made effective; the BR-PIU was established, and procurement process for several contract packages commenced. For the construction contract package, the EMP had been integrated into the scope of works and corresponding budget also provided in the package, to help ensure that the environmental mitigation measures are implemented by the winning bidder. Upon the selection of the most responsive

bid, the winning contractor CTM JV was required to submit their detailed EMP that was subject to the approval of the Engineer, who was also selected by the Employer following ADB procurement guidelines.

Construction Phase

37. The implementation of the EMP rests with the Contractor CTM-JV. To supervise the EMP works internally within CTM JV, the Contractor had deployed qualified senior staff, one for the MAX side of the Project; while the other for the TCCL part. They report directly to the respective Construction Manager of CTM MAX and TCCL. These personnel likewise coordinate their activities with the concerned temporary CSC Resident Environmental Specialist (Resident Social, Resettlement and Gender Specialist) who does the supervision work in behalf of the Employer. These Environmental Officers of CTM JV, also cover the Health and Safety concerns, which is under the supervision of the CSC Resident Health & Safety Engineer. However, since the Resident H & E Engineer had already demobilize, the supervision of the H & E is being done by the CSC mid-level Health and Safety Specialist.

38. Likewise, the Contractor CTM JV also shared some of its EMP scope to their Subcontractor. These works include the 3rd party environment monitoring to the company EQMS whose scope covers the EMP compliance monitoring, environmental quality monitoring and monthly report preparation. The other shared EMP task is the Compensation Tree Planting which is being implemented by the Gomti Nursery. Details of the EQMS scope of work is found in the subsequent paragraphs.

39. Since the issuance of the “Notice to Proceed” issued by the Employer to CTM JV that marked the start of the construction phase, followed by the approval of the Contractor’s detailed EMP by the Engineer (CSC), the mitigation measures prescribed in the EMP had been implemented by the Contractor, monitored by EQMS, and supervised by the CSC Environmental team. Regular monthly reports have been submitted by EQMS that were subject to the review and validation of CSC. These reports as well as the field inspection reports; form the basis for the Semi-Annual Reports prepared by the CSC Resident Social, Resettlement and Gender Specialist (who also serve as the temporary Environmental Engineer), for submission to the Employer and subsequently forwarded to ADB for information and uploading to the ADB website in line with its transparency policy.

40. Since the start of the Project, a total of 81 reports have been prepared, which includes: 56 monthly environmental reports; 15 Quarterly Environmental Reports; 8 Semi-Annual Environmental Monitoring Reports; and 3 Annual Environmental Reports. The monthly and quarterly environmental monitoring reports are prepared by the CTM Subcontractor EQMS, while the Semi-Annual and Annual Environmental Reports are done by CSC Environment team.

II. Environmental Quality Monitoring

2.1 Water Quality Monitoring

2.1.1 Surface and Ground Water Quality

41. Surface water sampling was based on the identification of major surface water bodies which has crossed the Construction site. Groundwater sampling locations were selected to obtain a representative water sample from various zones within the study area. The samples were collected from existing tube wells of the railway stations, stored in a suitable plastic container, and transported to a government accredited laboratory for analysis following standard methods.

42. The results of the surface water sample analysis were compared to the standards prescribed by government for Inland Surface Water, Environment Conservation Rules (ECR) and 1997-Schedule 3. Similarly, the groundwater test results were on the other hand, compared to the Drinking Water Standard ECR Schedule-3, 1997. The standards have been presented along with the monitoring test results of surface and groundwater samples for comparison. Considering that the beneficial use for humans of the waterways sampled, is mostly for fisheries, then the water quality standards set for this beneficial use was made the basis for the analysis of water quality compliance to standards.

Results of Sampling and Laboratory Analysis

43. The surface water sampling was done for 4 sites (Haora River, Gomti River, Sindai River, and Goniajuri River) during the rainy season from July to October 2021; while the last surface water site (Salda River) was sampled during the dry month of November 2021. Environmental monitoring during the month of December was done at the last week of the month and so its results had not been incorporated into this report.

44. It can be noted that all water samples collected from most stations yielded laboratory test results compliant to Bangladesh surface water standard (Beneficial use for fisheries) for pH, dissolved oxygen (DO) and 5-day Biological Oxygen Demand (BOD_5). However, water samples taken from the Goniajuri River failed in the parameters of DO and BOD_5. Dissolved oxygen (DO) is essential for the survival of aquatic life for respiration. Surface water with DO level below 5 mg/l is not suitable for many fish and aquatic life. Similarly, samples from the same river has a BOD_5 level that is higher than the DOE allowable threshold value of 6 mg/l (Beneficial use for fisheries). BOD_5 is a measure of pollution in terms of the amount of DO needed in 5 days to stabilize organic pollutants in the water. A low DO and high BOD_5 is a clear indication of a polluted river.

45. The Goniajuri River meanders through a mixed used area having the land-use of paddy rice fields/fish ponds; residential, commercial and industrial areas. The river also intersects the Project at 3 points namely: Bridge 234 (km144+769), Bridge 232 (km 141+627) and culvert 235 (km 145+557). It can be noted that the poor water quality of samples taken from the Boniajuri river can be attributed mainly to non-Project related activities. Already, Section 1 including the above 2 bridges and 1 culvert had already been completed and handed over by the Contractor to BR. Agricultural, domestic and industrial waste can be seen mixing with the river water. The quality of 5 surface water tested and analyzed in the project area is provided in the following **Table 2.1.**

Table 2.1. Surface Water Quality in the Study Area during July to November 2021

S/N	Sampling Code	Location	pH	Temperature (^{0}C)	Electric Conductivity, EC (mS)	Total Dissolved Solids, TDS (mg/L)	Dissolve Oxygen, DO (mg/L)	Biochemical Oxygen Demand, BOD_5 (mg/L)	Chemical Oxygen Demand, COD (mg/L)	Total Suspended Solid, TSS (mg/L)
July 2021										
1	SWQ-1	Haora River Water (Upstream)	7.20	27.5	0.16	80	6.1	1.2	41	38
2	SWQ-2	Haora River Water (Downstream)	7.15	28.2	0.16	80	6.0	1.0	44	34
August 2021										
1	SWQ-1	Gomti River Water (Upstream)	7.01	29.0	0.11	60	6.7	1.1	24	31
2	SWQ-2	Gomti River Water (Downstream)	6.84	29.4	0.11	60	7.0	0.9	23	34
September 2021										
1	SWQ-1	Sindai River Water (Upstream)	6.83	27.2	0.09	50	6.1	1.8	31	23
2	SWQ-2	Sindai River Water (Downstream)	6.56	27.4	0.09	40	6.0	1.5	31	27
October 2021										
1	SWQ-1	Goniajuri River Water (Upstream)	7.06	30.5	0.38	190	2.8	12.5	24	56
2	SWQ-2	Goniajuri River Water (Downstream)	7.01	31.1	0.28	140	2.7	13.1	18	48
November 2021										
1	SWQ-1	Salda River Water (Upstream)	6.95	24.4	0.10	50	5.6	1.6	14	40
2	SWQ-2	Salda River Water (Downstream)	6.88	24.3	0.09	50	5.8	1.7	11	36

	Bangladesh Standard					
	Source of drinking water supply only after disinfecting	6.5-8.5	-		6 or above	2 or less
	Water usable for recreational activity	6.5-8.5	-		5 of more	3 or less
	Source of drinking water supply after conventional treatment	6.5-8.5	-		6 or above	6 of less
	Water usable by fisheries	6.5-8.5	-		5 of more	6 of less
	Water usable by various process and cooling industries	6.5-8.5	-		5 of more	10 or less
	Water usable for irrigation	6.5-8.5	-		5 of more	10 or less

*Note: BDL = Below Detection Limit; NR= Not Reported; Source: EQMS Field Survey and DPHE Central Laboratory LA= Lab analysis **
Bangladesh Environment Conservation Rules, 1997- Schedule 3 (Standards for inland surface water).

2.1.2 Ground Water Quality

46. The analysis of groundwater samples taken from the selected 10 stations had indicate that all comply with Bangladesh Drinking water Standards. These stations where ground water sampling were conducted include: Rajapur (July 2021), Akhaura (July 2021), Sadar Rasulpur (August 2021), Gangasagar (August 2021), Cumilla (September 2021), Quasba (September 2021), Mainamati (October 2021), Mandabag (October 2021), Lalmai (November 2021) and Saldanadi (November 2021). It can be noted that the test results values for the parameter manganese and iron which in the previous year's Semi-Annual report (July-December 2020) was none compliant, this reporting time the test results yield compliant figures. This test result values is similar to January-June 2021 Sem-Annual Report. The quality of groundwater tested and analyzed in the project area is provided in the following **Table 2.2.**

Table 2.2. Ground Water Quality in the Study Area during July - November 2021

S/N	Sampling Code	Location	pH	Temperature (^{0}C)	Phosphate (mg/L)	Manganese, Mn (mg/L)	Arsenic, As (mg/L)	Iron, Fe (mg/L)	Fecal Coliform, FC (N/100mL)
July 21									
1	GWQ-1	Rajapur Railway Station	6.71	26.8	0.04	0.02	<0.01	0.01	0
2	GWQ-2	Akhaura Railway Station	6.44	27.2	0.02	0.01	<0.01	0.04	0
August 21									
1	GWQ-1	Sadar Rasulpur Railway Station	6.67	27.6	0.01	0.02	<0.01	0.06	0
2	GWQ-2	Gangasagar Railway Station	6.58	27.6	0.03	0.01	<0.01	0.01	0
September 2021									
1	GWQ-1	Cumilla Railway Station	7.20	26.4	1.7	0.02	<0.01	0.15	0
2	GWQ-2	Kasba Railway Station	6.80	27.1	0.8	0.01	<0.01	0.88	0
October 2021									
1	GWQ-1	Mainamati Railway Station	7.37	27.8	0.04	0.02	<0.01	0.01	0
2	GWQ-2	Mandabag Railway Station	6.71	27.6	1.4	0.01	<0.01	0.89	0
November 2021									
1	GWQ-1	Lalmai Railway Station	6.68	26.7	0.01	0.03	0.01	0.46	0
2	GWQ-2	Saldanodi Railway Station	6.76	27.1	0.03	0.09	0.025	0.93	0
		Bangladesh Standard Error! Bookmark not defined.	**6.5-8.5**	**–**	**6.0**	**0.1**	**0.05**	**0.3-1**	**0**

Note:

BDL = Below Detection Limit; LA: Lab Analysis Still Going On; Source: EQMS Field Survey and DPHE Central Laboratory.

2.2 Air Quality Monitoring

47. A total of 10 sets of ambient air samples were collected from selected railway station areas of the Project rail corridor between Akhaura and Laksam. Eight (8) sets of samples were taken during the rainy months of July to October; while 1 set of samples were taken during the start of the dry month of November. The ambient status of major air pollutants such as Particulate Matter (SPM, PM10 and PM2.5), Sulfur Dioxide (SO2), Oxides of Nitrogen (NOx), and Carbon Monoxide (CO) have been covered in the monitoring work. Sampling time varies depending on the parameter, where PM2.5, PM10, SO_2, NOx were monitored for a period of 24 hours, while the parameters SPM and CO were measured for 8 hours. The air quality measurements were done using portable analyzers that were installed at the selected stations. The test results when compared to the Bangladesh air quality standards indicate that all of them are compliant at a level far below the set threshold. The test results would indicate that the EMP measures being implemented by the Contractor at the time of the air quality monitoring work, to minimize air pollution and dust control is working. Nevertheless, the contractor still needs to carry out the anti-pollution and dust control measures most especially during the rest of the dry months (January – April 2022) on which much dust are normally generated at the Project site especially at the Block Cotton Zone area. **Table 2.3** below contains the ambient air quality monitoring test results from selected stations for the period July - November 2021. The results of the ambient air quality monitoring for the month of December 2021 did not make it to the time of this report writing.

Table 2.3. Air Quality monitoring during July - November 2021

Sampling Code	Sampling Location	$PM_{2.5}$ µg/m³	PM_{10} µg/³	SPM µg/m³	SO_2 µg/m³	NO_x µg/m³	CO_3 ppm
July 2021							
AAQ-1	Rajapur Railway Station	16.39	29.12	71.04	2.72	12.68	0.03
Baseline Status	Rajapur Railway Station	12.47	26.81	63.21	2.91	10.43	<2
AAQ-2	Akhaura Railway Station	32.41	55.13	96.62	7.68	21.13	0.05
Baseline Status	Akhaura Railway Station	26.85	61.53	105.72	5.27	17.45	<2
August 2021							
AAQ-2	Gangasagar Railway Station	18.43	37.07	74.88	16.42	10.53	0.01
Baseline Status	Gangasagar Railway Station	22.73	49.97	98.46	2.95	12.39	<2
AAQ-1	Sadar Rasulpur Railway Station	8.94	16.35	34.42	17.29	8.18	0.31
Baseline Status	Sadar Rasulpur Railway Station	11.32	27.76	48.57	2.41	12.57	<2
September 2021							
AAQ-1	Cumilla Railway Station	11.19	24.84	48.89	10.23	16.25	0.04
Baseline Status	Cumilla Railway Station	24.87	56.98	96.79	4.95	14.86	<2
AAQ-2	Kasba Railway Station	25.75	50.37	93.08	6.13	15.02	0.02
Baseline Status	Kasba Railway Station	10.95	25.56	49.52	3.73	11.46	<2
October 2021							

Sampling Code	Sampling Location	$PM_{2.5}$ µg/m³	PM_{10} µg/³	SPM µg/m³	SO_2 µg/m³	NO_x µg/m³	CO_3 ppm
AAQ-1	Mainamati Railway Station	13.74	19.22	45.17	2.86	17.48	0.04
Baseline Status	Mainamati Railway Station	18.75	42.45	78.48	3.63	14.78	<2
AAQ-2	Mandabag Railway Station	10.28	17.83	37.41	2.37	9.12	0.02
Baseline Status	Mandabag Railway Station	14.43	33.93	59.18	3.11	12.83	<2
November 2021							
AAQ-1	Lalmai Railway Station	19.63	39.81	78.65	2.61	15.93	0.06
Baseline Status	Lalmai Railway Station	13.45	29.87	53.98	3.79	11.23	<2
AAQ-2	Saldanodi Railway Station	14.27	27.22	56.69	3.87	12.10	0.08
Baseline Status	Saldanodi Railway Station	7.91	19.79	34.69	2.76	9.58	<2
Bangladesh Standard**Error! Bookmark not defined.**		**65**	**150**	**200**	**365**	**100**Error! Bookmark not defined.	**9**
Duration (Hours)		**24**	**24**	**8**	**24**	**24**	**8**

[1] Carbon Monoxide (CO) concentrations and standards are 8-hourly only.

[2] The Bangladesh National Ambient Air Quality Standards have been taken from the Environment Conservation Rules, 1997 which was amended on 19 July 2005 vide S.R.O. No. 220-Law/2005.

[3] The Bangladesh Standard for Oxides of Nitrogen (NO_X) is considered for annual measurement.

Note:

** CO concentrations and standards are 8-hourly only.*

*** The Bangladesh National Ambient Air Quality Standards have been taken from the Environmental Conservation Rules, 1997 which was amended on 19th July 2005 vide S.R.O. No. 220-Law/2005.*

All parameters shown in ***Table 4*** are within the acceptable limits specified by the DoE.

2.3 Noise Level Monitoring

48. Ambient noise levels have been monitored from 11 railway stations of the ALDLP project during this reporting period. Noise meter with data logger (Digital Noise Meter: Model no. GM 1357) was used to record the ambient noise levels. Twenty (20) noise level sampling locations had been selected which are located near sensitive receptors of the stations. The Detail list of sampling location is shown in **Table 2.4.** Noise level measurement was done continuously for 8 hours per monitoring site instead of the DOE prescribed 24 hours period. The average Leq was recorded and compared to the prescribed ambient noise threshold for the specific zone on which the monitoring site is located; to determine compliance to government noise level standards.

49. Potential noise intensity reaching a receptor vary and dependent on the distance from the source, site land-use, topography, presence of obstacles and meteorological factors. In this project key noise source are operating trains, back-up electric generators, moving vehicles, operating construction equipment and people (i.e. construction workers, commuters, pedestrians, vendors). The average noise levels measured at the monitoring sites are mostly compliant to the government noise threshold for the relevant zone category with the exception of 5 (20%) out of 20 sites. All (5) of these sites are BR station mosques (Akhaura, Gangasagar, Mainamati, Lalmai and Cumella) that are located in the parking lot or beside the access road of the respective stations, where local transport vehicles pass through. Here the noise is mainly generated by the movement of vehicles entering, idling and leaving the station, as well as the commuters and vendors/shop owners selling their merchandise. It can be noted that at the time of the noise level monitoring, the Lalmai and Mainamati train stations had already been completed, no construction work is being done at the respective stations, and yet the noise level still exceeded the DOE standard for

institutional areas (50 dB(A)). One possible attenuation measure is to plant trees between the construction yard and the mosque.

50. The methodology employed by EQMS does not comply with existing DOE prescribed methods specifically the duration of the continuous noise measurement. The correct duration should be 24 hours continuous and not the 8 hours as performed by the third-party monitor. Subsequent noise monitoring should comply with the prescribed regulation else they would not be compensated for their noise monitoring efforts. The results of noise level monitoring is given in **Table 2.4**.

Table 2.4. Results of noise level monitoring during July – November 2021

Month		Sampling Code	Location	Leq dB(A)[4]	Baseline Status	Zone[5]	Bangladesh Standard at day Time dB (A)	Remarks
Jul 21	1	ANL-1	Rajapur Railway Station	57.29	66.84	Mixed	60	Low
	2	ANL-2	Rajapur Railway Station Jame Mosque	49.14	60.98	Silent	50	Low
	3	ANL-3	Akhaura Railway Station	57.18	66.23	Mixed	60	Low
	4	ANL-4	Akhaura Railway Station Jame Mosque	54.11	55.80	Silent	50	High
Aug 21		ANL-1	Sadar Rasulpur Railway Station	58.81	63.51	Mixed	60	Low
		ANL-2	Sadar Rasulpur Railway Station Jame Mosque	49.57	52.25	Silent	50	Low
		ANL-3	Gangasagar Railway Station	54.98	55.06	Mixed	60	Low
		ANL-4	Gangasagar Railway Station Jame Mosque	54.66	55.51	Silent	50	High
Sep 21		ANL-1	Cumilla Railway Station	58.21	72.68	Mixed	60	Low
		ANL-2	Cumilla Railway Station Jame Mosque	56.37	66.10	Silent	50	High
		ANL-3	Kasba Railway Station	54.11	54.65	Mixed	60	Low
		ANL-4	Kasba Railway Station Jame Mosque	49.65	NR	Silent	50	Low
Oct 21		ANL-1	Mainamati Railway Station	58.17	74.99	Mixed	60	Low
		ANL-2	Mainamati Railway Station Jame Mosque	55.82	65.20	Silent	50	High

Month		Sampling Code	Location	Leq dB(A)[4]	Baseline Status	Zone[5]	Bangladesh Standard at day Time dB (A)	Remarks
		ANL-3	Mandabag Railway Station	54.37	54.64	Mixed	60	Low
		ANL-4	Mandabag Railway Station Jame Mosque	48.27	54.74	Silent	50	Low
Nov 21		ANL-1	Lalmai Railway Station	57.31	64.13	Mixed	60	Low
		ANL-2	Lalmai Railway Station Jame Mosque	55.93	59.12	Silent	50	High
		ANL-3	Saldanodi Railway Station	54.08	62.49	Mixed	60	Low
		ANL-4	Ganganagar Jame Mosque	49.17	55.82	Silent	50	Low

[1] A-weighted decibel, abbreviated dB(A), is an expression of the relative loudness of sounds in air as perceived by the human ear. In the A-weighted system, the decibel values of sounds at low frequencies are reduced, as the ear is less sensitive to low audio frequencies, especially below 1000 Hz, than to high audio frequencies.
[2] Noise Pollution (Control) Rules, 2006.

*Source: EQMS Survey Team; EMP: Environmental Management Plan; NR: Not Reported; *Environmental Conservation Rules, 1997 (Schedule 4) (subsequent amendment in 2006)*

III. Environmental Management Plan Compliance

3.1 Progress of EMP Compliance during Construction Period

51. The implementation of the approved EMP is one of the conditions for the effectivity of the Project Loan Agreement. To ensure the contractor's compliance to the EMP, the Loan Agreement prescribe that this measures be incorporated into the bid documents as among the scope of work by the contractor.

52. During the actual EMP implementation by the Contractor, the monitoring of its compliance had been awarded to a third party that serves as an independent monitor. The third party monitor called EQMS is also tasked to conduct the Environmental Quality Monitoring to check if the EMP is effective in mitigating the projected negative environmental impacts. The CSC Environment team on the other hand, supervises the work of the third party monitor EQMS, and confirms their findings and recommendations for corrective action to be performed by the Contractor to remedy non-compliances to the EMP.

53. In response to the comments of ADB on last year's January – June 2020 Semi-Annual report on the quality of the EMP compliance monitoring, the CSC Social Safeguards team developed a new monitoring system that provides for a quantitative methodology to evaluate compliance by the Contractor to approved EMP, and contains a routine that allows for the identification and monitoring of non-compliant activities. Using MS Excel apps, the implementation of all major project components is evaluated for compliance to the EMP by an evaluator by giving a numerical score between 1 to 5 to each relevant mitigation measures as applied to each project component, where 1 is non-compliant and 5 is fully compliant. The MS Excel apps will consolidate all scores and generate a single number that can define if the Contractor is fully, partially or non-complaint to the EMP. The system was introduced to representative of CTM JV, CSC, and third party monitor EQMS in a 2 day workshop held in 23-24 March 2021. Due to fine tuning of the system, it was only applied during the May 2021 monitoring period.

54. Under the new system, the Project was divided into 83 components made up of 13 stations, 12 bridges, 43 culverts, 14 5 km segment of railway track & embankment, and 1 plant nursery. Each of these Sections are individually evaluated for compliance to EMP. Section 1 has 26 components (4 stations, 3 bridges, 14 culverts, 5 5 km long track/embankment); Section 2 has 25 components (4 stations; 5 bridges, 11 culverts, 4 5 km track/embankment, and 1 plant nursery) while Section 3 has 32 components (5 stations, 4 bridges, 18 culverts, 5 5 km long track/embankment). More details on the new Environmental monitoring system will be discussed in later chapters of this report.

3.2 EMP Progress Status During the Period July - December 2021

3.2.1 Overall EMP Compliance Status

55. Overall, the Project is evaluated as compliant to the approved EMP with an overall average rating of 4.4 points. Under the new reporting system, a score greater than or equal to 4 points (> 4 points) is considered compliant to EMP. A score that is less than 4 points but greater than 3 (>3 and <4) is considered as partially compliant. However, a score less than 3 points (< 3) is non-complaint. It is in the aspect of dust control, control of petroleum products and occupational health and safety, that an overall average points of 3.3-3.8 was garnered, meaning partially compliant was recorded. The partially compliant rating on these 3 general mitigation is almost similar though out the 3 Project sections. **Table 3.1** contains the overall summary of EMP compliance.

56. The evaluation of the Contractor's performance in complying with the EMP covered the whole Project site and its 83 components. **Table 3.1** contains the summary of the Contractor's compliance to the EMP per section, **Table 3.2** has details, while **Annex 1** contains the full evaluation table covering all of the 83 Project components, per EMP mitigation measure.

Table 3.1 SUMMMARY EVALUATION OF COMPLIANCE TO ENVIRONMENTALMANAGEMENT PLAN AS OF 30 NOVEMBER 2021

S.I.	GENERAL MITIGATION	SECTION 1		SECTION 2		SECTION 3		OVERALL	
		RATING	REMARKS	RATING	REMARKS	RATING	REMARKS	RATING	REMARKS
1	Noise and Attenuation Measures	4.3	Compliant	4.1	Compliant	4.7	Compliant	4.4	Compliant
2	Dust Control	3.3	Partially compliant	3.5	Partially compliant	3.4	Partially compliant	3.4	Partially compliant
3	Watercourse Impacts in Wetlands/Ponds/Rivers	4.7	Compliant	4.7	Compliant	4.7	Compliant	4.7	Compliant
4	Borrow and Dredging Site Impacts	5.0	Compliant	5.0	Compliant	4.9	Compliant	5.0	Compliant
5	Disposal of Construction Debris and other Waste Materials	4.6	Compliant	4.4	Compliant	4.6	Compliant	4.6	Compliant
6	Servicing and Operating Equipment	4.7	Compliant	4.8	Compliant	4.6	Compliant	4.7	Compliant
7	Control of Petroleum Products	3.8	Partially Compliant	3.8	Partially Compliant	3.8	Partially Compliant	3.8	Partially Compliant
8	Protection of Topsoil and Soil Erosion	4.9	Compliant	5.1	Compliant	4.9	Compliant	5.0	Compliant
9	Occupational Health and Safety	3.6	Partially Compliant	4.3	Compliant	3.5	Partially Compliant	3.8	Partially Compliant
	AVERAGE RATING	4.3	Compliant	4.4	Compliant	4.3	Compliant	4.4	Compliant

Table 3.2. SUMMARY OF COMPLIANCE TO EMP PER SECTION

MITIGATTION MEASURES			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
1	**Noise and Attenuation Measures**							
	1	Use of modern plant and equipment.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
	2	All powered mechanical equipment and machinery to be fitted with noise abating gear such as mufflers for effective noise control, in compliance with DoE regulations.	5.0	**Compliant**	3.1	**Partially compliant**	5.0	**Compliant**
	3	Locate rock crushing, concrete mixing and material shipment yards away from residential areas, schools, colleges and hospitals.	5.0	**Compliant**	4.9	**Compliant**	5.0	**Compliant**
	4	Install temporary noise barriers near sensitive locations such as schools, religious places and hospitals	5.0	**Compliant**	4.9	**Compliant**	5.0	**Compliant**
	5	Providing the construction workers with suitable hearing protection like ear cap, or earmuffs etc.	1.0	**Non compliant**	1.8	**Non compliant**	3.0	**Partially compliant**
	6	Noise quality monitoring to be carried out as per the schedule in the environmental monitoring plan.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
		Average Rating	4.3	**Compliant**	4.1	**Compliant**	4.7	**Compliant**
2	**Dust Control**							
	1	Vehicles transporting construction material to be covered	1.0	**Non compliant**	1.0	**Non compliant**	1.0	**Non compliant**
	2	Construction equipment to be maintained to a good standard and idling of engines discouraged.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
	3	Machinery emitting visible smoke to be banned from construction sites.	3.6	**Partially compliant**	3.2	**Partially compliant**	4.6	**Compliant**

MITIGATTION MEASURES			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
	4	Contractor to prepare a dust sup pression program detailing action to be ta ken to minimize dust generation (e.g. s praying of roads with water), and the equip ment to be used.	3.0	**Partially compliant**	3.0	**Partially compliant**	3.0	**Partially compliant**
	5	Dust masks to be provided to wo rkers where dust hazards exist.	1.0	**Non compliant**	1.0	**Non compliant**	1.0	**Non compliant**
	6	Air quality monitoring to be carrie d out as per the schedule in the environment al monitoring plan.	5.0	**Compliant**	5.0	**Compliant**	4.8	**Compliant**
	7	All roads, permanent or tempora ry, pukka or katcha, that become dusty and a ll areas where construction related activities are carried out, shall be subject to necessary du st suppression measures by watering, sweeping or other measures approved or directed by the Engineer	3.0	**Partially compliant**	3.0	**Partially compliant**	3.0	**Partially compliant**
	8	Contractor shall not allow waste oil, lubricant or other petroleum derivatives to be used as dust suppressants and shall take all r easonable precautions to prevent accidenta l spillage of petroleum products, contact of s uch materials with soil or water course through discharge run-off, and or seepage	4.8	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
	9	Contractor shall take all reasona ble measures to minimize dust-blowing from areas under his control by spraying water on stoc kpile, bare soil, haul road, un-surfaced traffic route and any other source of dust when c onditions require dust suppression. If the Engineer considers that the dust suppressi on measures adopted by Contractor ineffectiv e. Contractor shall in that case take further me asure to	3.0	**Partially compliant**	5.0	**Compliant**	3.0	**Partially compliant**

MITIGATTION MEASURES			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
		minimize dust blowing at construction site as per his direction						
		Average Rating	3.3	**Partially compliant**	3.5	**Partially compliant**	3.4	**Partially compliant**
3	**Watercourse Impacts in Wetlands/Ponds/Rivers**							
	1	Adequate mitigation measure shall be undertaken to limit the impact on all water bodies within the Project area	5.0	**Compliant**	4.9	**Compliant**	5.0	**Compliant**
	2	Earth moving in the vicinity of watercourses shall be kept to a minimum to avoid sedimentation and contamination from fuel and lubricants.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
	3	Proper disposal of bricks, cement, and steel reinforcement which will be removed as part of the reconstruction of bridges/ culverts shall be ensured not to block stream flow.	3.6	**Partially compliant**	3.6	**Partially compliant**	3.3	**Partially compliant**
	4	Temporary erosion and sedimentation control measures during rehabilitation of cross-drainage structures shall be undertaken to ensure that sediment laden run off does not enter the adjoining watercourses.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
	5	Construction materials and waste shall not be discharged in watercourse during construction of bridges/culverts by implementing appropriate mitigation measure.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
		Average Rating	4.7	**Compliant**	4.7	**Compliant**	4.7	**Compliant**

MITIGATTION MEASURES			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
4	**Borrow and Dredging Site Impacts**							
	1	Proper management of borrow pi ts and dredging sites so that water pollu tion and water logging may not be happe ned.	5.0	**Compliant**	5.0	**Compliant**	4.9	**Compliant**
		Average Rating	5.0	**Compliant**	5.0	**Compliant**	4.9	**Compliant**
5	**Disposal of Construction Debris and other Waste Materials**							
	1	No burning shall be allowed.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
	2	No cleared debris shall be left lyi ng on the surface of the ground or buried in any agricultural land.	4.8	**Compliant**	4.5	**Compliant**	5.0	**Compliant**
	3	Man-made construction debris shall be disposed of in disposal areas the location and nature of such disposal shall be subject to the approval of the Engineer.	3.7	**Partially compliant**	3.2	**Partially compliant**	3.4	**Partially compliant**
	4	All disposal areas shall be finally graded to a uniform and level condition and l eft such that they create a minimum impact o n the surrounding area.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
		Average Rating	4.6	**Compliant**	4.4	**Compliant**	4.6	**Compliant**
6	**Servicing and Operating Equipment**							
	1	Servicing of machines or equipm ent near rivers, streams or other bodies of water shall be carried out in such a manner as to avoid pollution with gasoline, diesel fue l, oil, grease, or surplus or disposable material s	5.0	**Compliant**	5.2	**Compliant**	5.0	**Compliant**
	2	Without limiting the generality of the foregoing, the Contractor shall e nsure that all hydraulic systems, fuel systems and lubricating systems are in good c ondition to avoid leakage of petroleum prod ucts.	5.0	**Compliant**	5.2	**Compliant**	5.0	**Compliant**
	3	Fuel spills will not be condoned and care shall be taken to avoid overfilling mac hines.	3.8	**Partially compliant**	5.0	**Compliant**	3.9	**Partially compliant**

MITIGATTION MEASURES			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
	4	The Contractor shall have the pr oper equipment to transport fuel so th at spillage will not occur. Automatic shut-off nozzles shall be installed on all fuel dispensing u nits.	4.9	**Compliant**	5.2	**Compliant**	5.0	**Compliant**
	5	The Contractor shall have oil spil l abatement equipment on the Site at all time s.	4.5	**Compliant**	4.5	**Compliant**	4.3	**Compliant**
	6	The type of equipment shall be s ubject to the approval of the Engineer, and th e equipment shall be maintained in good work ing condition.	5.0	**Compliant**	5.2	**Compliant**	5.0	**Compliant**
	7	Disposal of used oil, lubricants, ti res, etc. shall be in accordance with the EMP o r as directed by the Engineer.	4.5	**Compliant**	4.8	**Compliant**	4.4	**Compliant**
		Average Rating	4.7	**Compliant**	4.8	**Compliant**	4.6	**Compliant**
7	**Control of Petroleum Products**							
	1	All petroleum products shall be s tored in a designated storage location whe re any spillage can be safely maintaine d without contamina-tion of the surrounding area. Storage of petroleum products s hall not be permitted in the vicinity of stream s rivers or to avoid groundwater contaminat ion. be placed on subsurface of the s torage room other bodies of water. Impermea ble liner shall	3.8	**Partially compliant**	3.8	**Partially compliant**	3.8	**Partially compliant**
		Average Rating	3.8	**Partially compliant**	3.8	**Partially compliant**	3.8	**Partially compliant**
8	**Protection of Topsoil and Soil Erosion**							
	1	Topsoil storage areas must be pr otected during the dry season from wind erosion by covering.	4.7	**Compliant**	5.0	**Compliant**	4.6	**Compliant**
	2	Rapid re-vegetation and use of hydro-seeding and jute erosion protecti on mats will be applied in areas where erosio n is noted during the regular monthly inspe ctions.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**

MITIGATTION MEASURES			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
	3	Embankment site to be planted with trees to promote natural vegetation; as well as fast growing grasses.	5.0	Compliant	5.0	Compliant	5.0	Compliant
	4	The stockpiling and/or disposal of material as aforesaid shall be such that the material is not placed in any area where natural drainage or storm water could pond and become stagnant, or where could erode the material and cause silting of the adjacent area or of any natural or man-made water course.	5.0	Compliant	5.0	Compliant	5.0	Compliant
		Average Rating	4.9	Compliant	5.0	Compliant	4.9	Compliant
9	**Occupational Health and Safety**							
	1	Supply of appropriate personal protection equipment, such as safety boots, helmets, gloves, protective clothing, goggles and ear protection among the workers and enforce its use.	1.3	Non compliant	1.2	Non compliant	1.3	Non compliant
	2	Follow the specification on construction safety as defined in civil works	5.0	Compliant	5.1	Compliant	5.0	Compliant
	3	Construction workers will be required to train in general health and safety matters and on specific hazards of their work.	3.0	Partially compliant	2.7	Non compliant	2.6	Non compliant
	4	Must not hire child labor, age below 14	5.0	Compliant	5.1	Compliant	5.0	Compliant
	5	Hire, use of benefit from child Labor-Child labor (as defined by ILO Conventions 138 and 182) means that no workers under the age of 14 may be hired as general labors, and no workers under the age of 17 are to be hired for hazardous jobs.	5.0	Compliant	5.1	Compliant	5.0	Compliant

MITIGATTION MEASURES			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
	6	Provide adequate number of toilet and other sanitation facilities in the offices, workplace, and worker's accommodations.,	1.3	Non compliant	4.6	Compliant	1.0	Non compliant
		Average Rating	3.6	Partially compliant	4.3	Compliant	3.5	Partially compliant

3.2.2 Noise Attenuation Measures

57. To help insure compliance to Clause 3.5 of the EMP that prescribes the implementation of noise attenuation measures, site monitoring work was performed by the third party monitor EQMS. The monitor had indicated that most of the 6 prescribed measures had generally been complied with under the prescribed EMP measures. These complied measures include a) use of modern plant and equipment that are properly maintained; installation of noise abatement gear on all powered equipment; location of rock crushers and other noisy equipment and activities away from noise sensitive areas. However, it can be noted that ear protection had not been provided to workers exposed to extreme noisy environment during the period.

58. It can be noted that during the reporting period (July-December 2021), construction activities have been substantially completed in Section 1, while work in Section 2 and 3 had slowed down significantly. The demand by the Indian Border Guards to seek diplomatic clearance before work on Section 2 bridges and stations can continue had cause work in those areas to stop; while Section 3 specifically within the Akhaura yard is hampered by Project affected structures (i.e. food godown, privately owned residential and commercial structures, and BR operating units) still located along the path of the tracks that requires relocation. In view of these events, extreme construction noise is very minimal to nil, and therefore ear protection against noise is not needed by the workers at the construction site.

59. The observation of non-use of ear protection by Construction workers were found in the train stations and bridge/culvert works. None in the earth/embankment works. However, as mentioned earlier, Station 1 is substantially completed and so no significant noise in the stations nor bridge/culverts is expected. Similarly, since work in the 3 of 4 stations (i.e. Sashiadal, Saldanadi and Mandabag; as well as the major bridge 261, had been stopped by the Indian border Patrol pending clearance from diplomatic channels, then noise levels from major construction work are not expected to be significant, if any.

3.2.3 Dust Control

60. EQMS had noted that most of 9 measures prescribed had been fully complied (3 or 33.3%) and partially complied (4 or 44.4%) with by the Contractor. The non-compliant measures include: a) the provision of dust mask to construction workers and b) covering of trucks transporting construction materials that had not been complied with. The fully compliant measures include: a) proper maintenance of construction equipment; b) conduct of monthly air quality monitoring; and c) avoiding the use of spent petroleum products as dust suppressant. Likewise the partially compliant measures include: a) watering of all roads, temporary or permanent; as well as b) watering of construction materials/waste stockpiles to prevent dust suspension by wind.

61. It can be seen in Annex 1 that the Contractor has failed to cover their trucks hauling construction materials, waste and others; as well as provision of dust mask to construction workers in the 83 project components, be it stations, bridges, culverts, or track/embankment works. The rest of the mitigation measures under the dust control sector, are fully and partially compliant. The green color of the cells indicates full compliant, while yellow cells symbolize partially compliant measures.

62. The reporting period covered at least 4 months within the rainy season, and only 2 during the dry season. In view of this condition, the contractor consider that the materials being transported are mostly wet from the rain and thus not susceptible to dust suspension by the wind. Similarly, stockpiles of materials at the construction yard were also not watered, due to the same reason (materials wet by rain). But there are instances when no rain was felt most especially during the dry months of the reporting period (November and December), when dust had started to be generated. The attention of the Contractor had been done to remind them to cover the transport trucks and moisten the stockpiles as prescribed in the EMP. **Table 3.2** contains details of the dust mitigation measures, site observations made by the third party monitor and recommended action to ensure full compliance of the EMP prescribed measure.

Table 3.1 contains the summary compliance to EMP per major mitigation measure, per Section.

3.2.4 Watercourse Impacts in Wetlands/Ponds/Rivers/Canals

63. During the reporting period, it was observed that most of the (4 out of 5) watercourse impact preventive measures had been fully complied with. These fully achieved measures during the reporting period include: a) All waterways where Construction activities are conducted, are maintained open at all times, else temporary diversion works adequate to convey surface water flow are installed; b) Earth moving in the vicinity of watercourses are kept to a minimum ; c) temporary erosion and sedimentation control measures are installed during rehabilitation of drainage structures; and d) construction materials and waste are not dumped into water courses and are deposited into designated disposal areas. Only the proper and prompt disposal of construction wastes is partially compliant. The Contractor should continue to ensure that these pollution preventive measures be followed in all sites, and the monitor will need to follow-up on this matter.

64. The Contractor had some difficulty in promptly disposing properly of construction waste in view of the difficult hauling road condition during the rainy months. The unpaved hauling roads built adjacent to the track are normally muddy or even submerged during the period, which make the movement of vehicles and hauling trucks very difficult. There are instances when continuous torrential rain will prevent any movement in the construction site. Only when the rains have stopped and the ground had dried can the hauling trucks can transport the construction waste. As a result of this condition, the construction waste are temporarily stockpiled within the construction area, awaiting for the right time to haul them out towards the authorized disposal areas. Whereas the waste to be transported are found mostly in the stations and the bridges/culvert construction sites, the hauling roads that are used to transport the waste materials are found alongside the track embankments that are susceptible to mud and flooded conditions.

65. However, in view of the substantive completion of Section 1 and minimal construction activities in Sections 2 and 3, minimal transport of construction waste to the authorized disposal areas have been observed. One of the authorized disposal site is the Comilla City solid waste facility which the Project had used to deposit its inert wastes. Local people are allowed to collect some of the unsuitable materials for their own use; while solid waste materials with value are auctioned-off by the Contractor for their profit.

3.2.5 Borrow and Dredging Site Impacts

66. During the reporting period, there were no borrowing nor dredging activity performed by the Contractor. It is for this reason that this activity had not been covered in the monitoring work performed by EQMS.

3.2.6 Disposal of Construction Debris and other Waste Materials

67. Most (3 out of 4) of the mitigation measures related to proper storage and disposal of construction waste has been complied during the reporting period. These measures include: a) no burning was allowed; b) No construction debris left lying on the surface of the ground, pond or buried in agricultural areas; c) discarded waste were properly covered with earth before abandoned in a manner that blends with the surrounding environment. Similar to the mitigation measure on clearing waterways of construction debris, it can be noted one mitigation specifically: proper disposal of man-made construction related debris in disposal areas is only partially complied with. As mentioned in paragraph 63 above, the poor condition of the hauling roads have hindered the regular transport of construction waste to proper disposal site. Wastes such as non-suitable materials are normally stockpiled at the construction site, and awaits transport to disposal sites when the hauling road condition is favorable. Similarly, some unsuitable materials are left for local people to collect, while those having value are sold to interested private parties.

68. The partially complied with measures are found at Section 2 and 3 stations, bridge and culvert construction sites. Section 1 had already been completed and handed over to BR by the Contractor, and so no significant volume of solid waste are left for disposal.

3.2.7 Servicing and Operating Equipment

69. All of the mitigation measures prescribed under Servicing of Construction Equipment had been complied with. These measures include: a) avoidance of servicing equipment near water course; b) ensuring equipment hydraulic, fuel and lubricating systems are properly operating to avoid oil spillage; c) non-condoning of spillages; d) provision of proper equipment for transporting and/or filling fuel and other petroleum products; e) and securing first the approval of the Engineer prior to the deployment of equipment at the site; and f) disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP. Construction equipment are important element that facilitates the construction work effectively and on a timely manner. Moreover, their proper use and maintenance will ensure the machines longer service life, minimizes costly down time due to equipment brake down, and government imposed penalties due to pollution of adjacent environs.

70. However, the 5th and 7th (last) mitigation measure under the servicing and operating equipment (provision of proper oil spill abatement equipment and proper disposal of used oil, lubricants, tires, etc), were not complied in most stations except Alishahar station. It can be noted that construction equipment assigned to these are being maintained in these sites, rather than at the Construction yard to minimize fuel and maintenance cost, and unnecessary generation of greenhouse gases. However, with the exception of Lalmai, Quasba and Comilla Stations, and others; the other sites have no Construction yards and so appropriate garage facilities are not available to service the construction equipment (i.e. change engine oil, change radiator coolant, replacement of broken parts, etc.). Refilling of petroleum are also done at site using fuel tankers manned by Contractor's personnel.

71. Waste oil and other petroleum products are collected by the Contractor, and temporarily stored in the used oil storage facilities at the above mentioned stations, to await their collection for proper treatment/disposal by a licensed contractor. The spent oil/lubricants are kept in steel drums, and stored in concrete floor with roofing. There were instances observed that spillages occur in the storage area maybe due to mishandling of the drums, and clean-up takes time to be completed. The Contractor spread sand over the concrete floored storage area, which they intend to absorb spilled waste oil. The contaminated sand will be collected and properly disposed of at the authorized local government disposal site. There are however some station where no proper storage area is available. The waste oil-filled drums are exposed to the elements, no concrete flooring and only protected with polyethylene cover from rain. To these sites, the attention of the Contractor had been called to transfer the drums to a compliant storage area, until these are collected by licensed contractors.

72. For other hazardous waste such as broken equipment parts, rusting small pieces of reinforcement bars and other metallic construction waste materials, these are normally collected by the Contractor, temporarily stored at selected areas within the Construction area, and then sold to buyers who use them as scrap materials. Those scraps not sold, as well other wastes such as broken glass, broken bulbs, are brought to the authorize local government garbage disposal area for deposit.

3.2.8 Control of Petroleum Products

73. The storage of petroleum products in suitable places with proper impermeable bottom, located at a distance away from water bodies is an essential measure to help insure the prevention of any accidental spillage that may contaminate the soil and eventually ground water of which majority of rural people in the country are dependent on for their domestic water needs. During the reporting period, it has been observed that most (78 or 94%) of the construction sites and yards where petroleum products are stored, comply with the measure. There are however, still some areas that need to have adequate storage facility for their petroleum products these include the Contractor's construction yard at Lalmai and Quasba stations and Gangasagar basecamp. The Contractor needs to ensure that this measure is strictly followed at site, else arrangements will have to be made for sites with no adequate

petroleum storage facility to store their fuel/lubricants/other petroleum products in other nearby sites with compliant storage facilities and carefully retrieve them when needed. Since waste petroleum are hazardous substances, appropriate modification of the existing storage facilities will need to be made such as installing of walls to ensure that possible spillages due to improper handling or storage will not flow to the adjacent areas most especially drainage or water bodies thereby polluting these areas.

3.2.9 Occupational Health and Safety

74. The other major activity where deficiencies were observed are in the Occupational Health and Safety Program. While this program got a partially compliant average score, there are activities that are non-compliant that require attention. These non-compliant activities include: a) the supply and proper utilization of Personal Protective Equipment (PPE); b) inadequate health and safety orientation for construction workers most especially the subcontracted non-skilled labor; and c) provision of adequate sanitary toilet and clean water supply at the construction sites.

75. While CTM JV provides the PPEs, however, its proper utilization by the contract unskilled labor, has much to be desired. Workers are observed not wearing the PPE since they find it inconvenient to use. Only when CSC engineers visit the site will the workers wear them. All Project Sections has garnered a non-compliant rating for PPE use. Since Section 1 had during the reporting period been handed over by the contractor to BR, then only Section 2 and 3 can be considered as delinquent in this mitigation measure. The Contractor had been issued formal notices about these deficiencies. What is lacking is the implementation of the prescribed measures such as construction supervisors to prevent the local contracted workers with no properly worn PPE from working. Habitual violators of the PPE wearing rule to be suspended from work.

76. It was also observed, that there is a the lack of orientation in general health and safety matters especially on specific occupational hazards to the local subcontracted laborers. CTM JV's directly hired personnel in contrast can be seen regularly holding their tool box meetings, but the local subcontracted laborers are lacking in this respect. Workers engaged in hazardous work such as welding, working in high places such as building roofing fabrication, installation of elevated concrete water tanks, painting multi-story buildings, etc. need to be properly oriented on their assigned tasks, the risk their job entails, as well as the safety measures in place to managed these risks. It has been observed that welders and their assistants perform their work without eye protection nor safety gloves and shoes. Steel fabricators and painters can be seen working on elevated areas with barely no harness to prevent them from falling.

77. Annex 1 would show that the Contractor has not complied with workers properly wearing PPE requirement in all Sections with exception of the 3 handed over train stations in Section 1 (Alishahar, Lalmai and Mainamati), 3 culvert construction sites (culvert 241, 260 and 266), track section at chainage km150+675 – km155+200 and the Gumti plant Nursery.

78. With respect to the inadequate orientation of workers on the hazards of their work, this deficiency have been observed in Section 2 specifically 2 stations (Shashidal and Salda Nadi) and 5 bridge sites (bridge 243, 246, 249, 259 and 261) and in Section 3 specifically in 5 stations (mandabag, Quasba, Imambari, Gangasagar, and Akhaura), and 3 bridge sites (Bridge 262, 263, and 272). All the rest of the 83 component sites have full or partial compliance rating.

79. The contractor needs to pay more attention to the provision of PPEs to its workers or subcontractors; and strict enforcement of their use in the workplace. Disincentives may need to be imposed by the CSC on the Contractor for the habitual disregard of health and safety measures. Likewise, increase in awareness trainings/orientations for workers will be pursued along with the installation of more Health & Safety posters. Sharing of accident/incident report outcomes with the workers are encouraged. Details on the occupational health and safety measures are found in Table 3.7.

80. For the provision of inadequate sanitary toilets and clean water supply at the construction site, both Section 1 and 3 are delinquent in this respect. Since, Section 1 had

already been handed over to BR by the Contractor; only Section 3 will need to given attention in as far as sanitation and clean water supply at the construction site. It can be noted that the 3rd party monitor has observed that the whole Section 3 has inadequate sanitation facilities and clean water supply. The attention of the Contractor will need to be called to remedy the situation, most especially during this time of the Covid-19 pandemic where proper handwashing is essential to help preventing the spread of the virus.

3.2.10 Protection of Topsoil and Soil Erosion

81. All 5 measures were fully complied with by the Contractor under the protection of topsoil and soil erosion mitigation measures. These compliant activities include: a) protection of topsoil storage areas from wind and rain; b) prompt protection of open embankments using appropriate methods that includes hydroseeding among others; c) planting of selected embankments with appropriate tree saplings and maintenance and protection of the established plantations; d) proper selection of stockpiling and disposal areas; and e) proper siting of disposable materials in areas located away from water bodies, flood prone and erodible slopes. The Contract should ensure that soil erosion be prevented most especially on unprotected embankment slopes which can be the source of weakness in the upgraded double track and may be the cause of future train accidents.

82. There are however 6 stations (Comilla, Shashidal, Saldanadi, Quasba, Gangasagar and Akhaura) and area adjacent to the Lalmai Station (km136+675 to km140+675) where stockpiles of construction materials and unsuitable materials have been placed but not covered so as to prevent dust suspension by wind. The Contractor had not done so as mention in previous paragraph, since most of the time, these stockpiles are wet due to the rains that fell on the Project site. During the dry season, the Contractor will need to cover or water these heaps to prevent dust suspension by wind.

3.3 Compensatory Tree Plantation and Replacement Program

3.3.1 Objective of tree plantation

83. The objective of the tree plantation and replacement program is to compensate for the loss of trees due to the implementation of the Akhaura-Laksam double line railway Project. Other major objectives of the program are:

- To protect the affected cultural/sensitive areas located within 50 m from the RoW boundary;
- To enhance the health of the existing ecosystem;
- To reduce the impacts of air pollution and dust as trees are known to be natural sink for air pollutants; and
- To arrest soil erosion at the embankment slopes.

3.3.2 Scope of tree plantation

84. About 31,749 timber trees, 13,546 fruit trees, 188 medicinal trees, 4,166 banana clumps, and 5,693 bamboo poles of different sizes had been cut due to the implementation of Project at pre-construction and construction periods. Approximately, 55,000 trees had been removed from the study area, but are under the process of being replaced under the Project. The Compensation Tree Plantation Establishment and Rehabilitation Program intends to plant at least three times the number of fallen trees and other forest products. These trees and other important forest products are being planted on both sides of the widened embankments, station building areas, and new station access road alignments and along affected cultural/sensitive areas within 50m from the ROW boundaries. Therefore, a total of 165,000 trees and other forest products are in the process of being planted and maintained by the completion of this project.

3.3.3 Status of tree plantation

85. For this year 2021, compensation tree plantation establishment and rehabilitation had commenced in the last week of June 2021. Contractor has targeted to plant 87,000 saplings during the rainy months of June to September 2021. It was reported that about 96,547 saplings have been planted, of which 72,547 saplings are from Section 1 and 2, while 24,000 saplings

are from Section 3. Based on the total number of saplings planted, the Project has exceeded the set target of 87,000 saplings. However, only about 73,197 saplings of those planted, have survived so far, corresponding to a 75.8% survival rate, which is below the 90% survival rate prescribed by ADB. Section 1 & 2 has a higher number of live tree saplings at 53,747 but has a lower survival rate of 74.1%. Section 3 on the other had has a lower number of live saplings at 19,450 but has a higher survival rate of 81.0%. Moreover, contract specification requires about 80% planted tree sapling survival and so the existing plantation status in as far as survival is concerned, did not meet its target. **Table 3.3** contains the current and last year's established tree plantation status.

Table 3.3. Status of 2020 and 2021 Tree Plantation Establishment Program

	2020			2021			Total	
	Section 1 & 2	Section 3	Subtotal	Section 1 & 2	Section 3	Subtotal	Overall Target	2020+2021
Annual Tree Plantation Establishment target	-	-	-	57,000	30,000	87,000	165,000	87,000
Total Tree Saplings Planted	37,500	8,382	45,882	72,547	24,000	96,547	165,000	142,429
Dead tree saplings	24,500	7,482	31,982	18,200	4,550	22,750	-	54,732
Total Surviving Trees	13,000	900	13,900	53,747	19,450	73,197	165,000	87,097
% Survival	34.7%	10.7%	30.3%	74.1%	81.0%	75.8%	100.0%	61.2%

86. The annual target was limited due to the unavailability of several plantation sites at the time of the planting season. These unavailable plantation sites include track embankment, that still have active construction works (Section 2 and 3) such as those at the Black Cotton Zone, train stations, and environment sensitive areas (schools, mosques, etc.) adjacent to the Project site.

87. Overall, of the 165,000 tree saplings targeted to be planted, a total of 142,429 saplings have already been installed by the Project corresponding to 86.3%. From this total, 110,047 saplings were in Sections 1 & 2; while 32,382 are in Section 3. However, overall sapling mortality was also high, totaling to 54,732 saplings or 38.4% of total planted. Sections 1&2 has the higher mortality at 42,700 dead saplings or 38.8% of planted plants; while Section 3 has a mortality of 12,032 dead saplings or 37.2% of those planted. At the moment, there are a total of 87,097 live saplings at site, where 66,747 and 20,350 saplings are in Sections 1&2, and Section 3 respectively. **Table 3.4** contains the details of the tree sapling procurement and production.

88. Sapling production and procurement had exceeded the set targets at 107,125 saplings (123.1%) as against the target of 87,000 saplings. Sapling procurement is at 60,500 saplings (134.4%) as against the target of 29,000 saplings. Sapling production at the Gumti main nursery yielded a total of 46,625 as against the 28,000 target. Most saplings producted/procured were timber tree species at 64,200 (144.3%) as against 14,500 target. This was followed by fruit trees (21,170 saplings), medicinal trees (5,050 saplings) and fuel wood trees (10,040 saplings). **Table 3.4** contains the details of the Project sapling procurement and production.

Table 3.4. Sapling Production and Procurement Status

I. SAPLING PROCUREMENT								
	Type	TARGET			ACTUAL			%
		Section 1 & 2	Section 3	Total	Section 1 & 2	Section 3	Total	
1	Timber trees	15,000	8,000	23,000	25,750	12,800	38,550	167.6%
2	Fruit trees	8,500	4,800	13,300	8,150	1,450	9,600	72.2%
3	Medicinal trees	2,700	1,600	4,300	2,250	4,650	6,900	160.5%
4	Fuel Wood trees	2,800	1,600	4,400	1,850	3,600	5,450	123.9%
	Total	29,000	16,000	45,000	38,000	22,500	60,500	134.4%
II. SAPLING PRODUCTION								
	Type	TARGET			ACTUAL			%
		Section 1 & 2	Section 3	Total	Section 1 & 2	Section 3	Total	
1	Timber trees	14,500	7,000	21,500	23,450	2,200	25,650	119.3%
2	Fruit trees	8,500	4,200	12,700	11,270	300	11,570	91.1%
3	Medicinal trees	2,600	1,400	4,000	4,415	400	4,815	120.4%
4	Fuel Wood trees	2,400	1,400	3,800	4,290	300	4,590	120.8%
	Total	28,000	14,000	42,000	43,425	3,200	46,625	111.0%
III. TOTAL SAPLINGS PRODUCED/PROCURED								
	Type	TARGET			ACTUAL			%
		Section 1 & 2	Section 3	Total	Section 1 & 2	Section 3	Total	
1	Timber trees	29,500	15,000	44,500	49,200	15,000	64,200	144.3%
2	Fruit trees	17,000	9,000	26,000	19,420	1,750	21,170	81.4%
3	Medicinal trees	5,300	3,000	8,300	6,665	5,050	11,715	141.1%
4	Fuel Wood trees	5,200	3,000	8,200	6,140	3,900	10,040	122.4%
	Total	57,000	30,000	87,000	81,425	25,700	107,125	123.1%

89. As earlier mentioned, much of the mortality belongs to the tree saplings procured in far plant nurseries such as in Bogra. Sapling procurement was initially the preferred method by the SubContractor in view of the relatively lower unit cost per sapling as compared to those grown at the Gumti Nursery. These procured saplings may have been left over stock from previous years and so they are being sold at a discounted price. However, the poor quality of these planting materials, combined with stress related to long transport from the source to the Project site and inadequate maintenance at the temporary plantation staging areas, may have led to the relatively high mortality rate of the planted saplings. Shifting of sapling source from the far nurseries to the Gumti main Nursery was a good move, else the mortality rate would have been bigger.

90. Gomuti Nursery had been subcontacted by CTM JV to implement the program. Plantation site preparation (i.e. site clearing, hole digging, etc.) was supposed to commence before June 2021 starting from zero point at Laksam (Chainage 130+700). But due to COVID-19 pandemic lockdown that prevented the movement of migrant workers to the Project alignment, site preparation activities could only start at the last week of June 2021 at Sections 1 and 2; while work at Section 3 commenced on the first week of July 2021.

91. In order that the Contractor can meet their annual target, certain activities specifically fencing was delayed, in order that the work can focus on site preparation and sapling planting. Minor fencing work was done parallel to the tree plantation program, then proceeded “full swing” after the tree planting activity had been completed by the end of October 2021. There were more saplings procured from existing nurseries at 60,500 saplings as compared to produced Saplings at 46,625. There were more saplings produced/procured in order to make available planting materials to replace the dead saplings planted. It has been observed that the saplings procured had a higher mortality as compared to those produced in the Gumti

main nursery. Species like the timber tree mahogany had a poor viability and made up much of the mortality. Realizing the poor performance of the procured saplings, further purchases of these planting materials were stopped, and subsequent plantings already utilized the saplings produced in the Gumti Nursery.

92. Maintenance activities were also slightly initiated during the plantation establishment period, but accelerated once the tree planting works had been completed. These maintenance activities include: a) fencing; b) deployment of watch guards tasked to protect the plantation from physical damage cause by grazing domestic animals or fire; and b) weeding and supplemental fertilization of the planted saplings. As has been reported during the first Semi Annual Report (January-June 2021), internal financial problems had affected the performance of the SubContractor specifically in the plantation maintenance work. Watchguards are less motivated to maintain the tree plantation due to delays in their wages. This results in delays in the weeding of the established plantation, where newly planted saplings get covered by weeds before being cleared. Surviving trees of last year's (2020) plantation on the other hand are big and stable enough that weeds no longer pose as a problem.

93. For fencing works, the pigeon pea fencing intended to provide a vegetative barrier for the plantation against domestic animals was stopped due to the poor germination rate of the seeds procured. Domestic animals find the pigeon pea leaves distasteful and avoid eating them, thus are repelled by a wall of these plants. Meanwhile, the long plastic mesh fencing was replaced by the bamboo fences installed around each planted sapling. Based on site inspection, it seems the bamboo fencing is more effective that the plastic that is prone to being toppled over by cattle.

94. In conformity with the Contract specifications, a draft Site-Specific Tree Plantation Establishment and Rehabilitation Plan 2022 will be prepared by the Contractor. The CSC Environment team can support CTM JV in the preparation of this plan when so requested. The plan will target the planting of 90,000 tree saplings, following the recommendations of the during the last concluded ADB Project Review Mission (21 October – 4 November 2021). The Contractor is expected to meet a 100% tree survival since this is the last planting season under the Project.

IV. Compliance to Environment Related Project Covenants

4.1 Compliance with National Environmental Laws

95. The environmental legislation of GoB emphasizes reducing the negative impacts of infrastructure development projects and enhancement of the positive effects. This conforms to the National Environmental Policy 1992 that was enacted by the government, based on the Agenda 21 of Rio de Jenero Conference, and subsequent enactments of the Bangladesh Environmental Conservation Act (ECA) 1995 and Bangladesh Environmental Conservation Rules (ECR) 1997. The DOE guidelines however do not specifically provide measures for railway tracks, station buildings and bridges.

4.2 Compliance with ADB SPS 2009 Guidelines

96. According to the ADB Social Policy Safeguards (SPS 2009), the project falls under Environment Category B and hence an IEE was sufficient to meet the Bank's environmental requirements. An IEE report was prepared by the Consultant engaged by ADB during appraisal in 2014. In addition, an updated Environmental Management Plan (EMP) was prepared during the detailed design stage in 2016. In view of these, the project had conformed with the ADB Safeguard Policy Statement (SPS 2009).

4.3 Contractor Compliance

Compliance with EMP

97. Overall, the contractor is able to comply with the mitigation measures as prescribed in the Project Environmental Management Plan (EMP) which is also part and parcel of their Contract TOR. As mentioned in earlier chapters of this report, there are however site specific non-compliance that require to be resolved by the contractor. A corrective action plan was provided to help remedy the situation. CTM JV has mobilized 2 focal persons for Section 1 & 2, and the other for Section 3 to coordinate the implementation of the EMP and respond to instructions by CSC for any environment related concerns.

Environmental Monitoring Reports

98. The contractor began submitting monthly environmental monitoring reports based on the approved template and Table of Contents from November 2016. Based on the environmental reports of January – June 2021 prepared by the Subcontractor EQMS, this Semi-Annual EMP Implementation Report was prepared by CSC. While the Environmental Monitoring Report format used is still the same, however the "Construction Period Environmental Mitigation Measures Report" format had been appropriately revised to cater to the information requirement of the Bank. The report contains among others, the tables of all monitoring results from the monthly reports for the period July – November 2021.

Landscaping and Site Restoration

99. During site inspection it was found that, aside from the borrow areas which have been turned over to local operators for use as fishponds, landscaping had been partly executed. During the reporting period, Section 1 had been substantially completed, and so partial landscaping works had been implemented specifically at 3 stations such as Alishahar, Lalmai and Mainamati. Tree plantation works which also contributes to the aesthetics of the site, continues up to June 2022. For Sections 2 and 3, earthworks for embankment and bridges still are not yet completed, as well as works in the station, such as the station building, platforms, platform sheds, pedestrian foot over bridges and the signaling system. As such, cleaning up of surplus materials along the embankment and track, and its tidy storage at approved temporary storage sites is required as well as the cleaning up of all the station yard areas and approaches of construction debris. Some clearing of channels and removal of construction debris is also required at some of the bridge sites, but this can only be done after the monsoon season when the river water levels have dropped. Once these sites are cleared of debris, then the compensation tree plantation program can come in and install appropriate tree saplings that will improve the aesthetics of the place

V. Corrective Action Plan

100. Despite the compliant implementation of the EMP by the Contractor, a number of site specific deficiencies had been identified and corresponding corrective action is necessary to address these issues. **Table 5.1** below contains the mitigation measures that had not been fully complied with, the location of these infringements, the nature of the non-compliance, the prescribed corrective action, the responsible persons and the time line for action.

Table 5.1. Corrective Action Plan Status

S.I.	Mitigation Measure		Location of Non-Compliance	Nature of Non-Compliance	Corrective Action Prescribed	Status
	General	**Specific**				
I. SECTION 1, 2 and 3						
1.1	Noise and Attenuation Measures	All powered mechanical equipment and machinery to be fitted w ith noise abating gear such as mufflers for eff ective noise control, in compliance with DoE re gulations.	Lalmai, Mainamati, Cumilla Railway Station, Saldanodi, Shoshidol, Quasba, Gangasagar Station/ construction area	Lack of noise abating gear	Installation of noise abating gear on power equipment required. Planting of trees as noise barrier for "quiet areas" affected by Project generated noise.	No noise abating devise had so far been installed. The attention of the Contractor had been called to implement the recommendations.
1.2	Dust Control	Vehicles transporting c onstruction and waste material to be covered	All locations	No cover of vehicles during transporting construction and waste material	Vehicle should be covered properly during transporting construction and waste material	This measure had not been strictly enforced due to the mostly wet materials transported during the rainy season. Strict enforcement will be done during the upcoming dry months.
1.3	Dust Control	Contractor to prepare and implement upon the approval of the Engineer, a dust suppression program detailing action to be taken to minimize dust generation (e.g. spraying of roads with water), and the equipment to be used.	All locations	Lack of dust suppression program to minimize dust generation	The frequency of water spraying need to be revised according to the need assessment in sensitive working site where people have excessive access	This measure had not been strictly enforced due to the mostly wet or flooded hauling roads during the period. Strict enforcement will be done during the upcoming dry months.
1.4	Dust Control	Dust masks to be provi ded to workers where dust hazards exist.	All locations	Lack of dust masks	Dust mask to be provided to the workers as need basis	This measure was not implemented. Surgical masks issued were appropriate for Covid-19 spread prevention and not for dust protection.
1.5	Disposal of Construction Debris and other Waste Materials	No construction-related debris shall be left lying on the surface of the ground, pond or buried in any agricultural land.	Lalmai, Mainamati, Cumilla Railway Station, Saldanodi, shoshidol, Quasba, Gangasagar Station/ construction area	Improper management of construction debris	Construction debris should be promptly collected, stored in appropriate sites, and deposited in authorized location.	Contractor had mostly complied with the measure. Delays on waste material disposal had been experience during strong rains that cause the deterioration or even flooding of hauling roads.

S.I.	Mitigation Measure		Location of Non-Compliance	Nature of Non-Compliance	Corrective Action Prescribed	Status
	General	**Specific**				
1.6	Servicing and Operating Equipment	Disposal of used oil, lub ricants, tires, etc. shall be in accordance with t he EMP or as directed by the Engineer.	Lalmai, Quasba,	Improper disposal of used oil, lubricants and tires	Proper disposal of used oil, lubricants, tires require to be implemented. Contracted collector to regularly retrieved waste oils from site for proper treatment/disposal.	Collection/disposal of waste oil and other spent petroleum products from storage area had been much delayed due to the government imposed lockdowns. The Contractor to instruct its waste disposal subcontractor to promptly collect their spent oil to prevent their accumulation in storage areas.
1.7	Control of Petroleum Products	All petroleum products shall be stored in a suitable facility where any spillage can be safely controlled to avoid contamination of the surrounding areas. Storage of petroleum products shall not be permitted in the vicinity of streams, rivers or other bodies of water. To avoid groundwater contamination, impermeable liner shall be placed on subsurface of the petroleum products storage area.	Lalmai, Quasba,	Improper storage of all petroleum products and waste	Proper storage of petroleum products and waste need to be implemented following prescribed methods mentioned in the EMP. Contracted collector to regularly retrieve waste oil from site for treatment/disposal.	Same as above.
1.8	Occupational Health and Safety	Provide personal protection equipment appropriate to the construction workers' job; which may include among others, safety vest, safety shoes, helmets, gloves, welding protective eye glasses, harness, safety goggles and ear protection, and others; and enforce its proper use.	All locations	Workers working with lack of proper PPE	Strict enforcement of PPE use in the workplace. Consider imposition of penalties for habitual violators.	Contractor Engineers and directly hired laborers comply with PPE regulations. However, subcontracted laborers are delinquent in wearing the PPEs issued to them. The Contractor had been formally instructed to enforce the wearing of issued PPEs regardless of their regular or directly hired laborers or subcontracted laborers.

VI. Other Issues

6.1 Time Allocation for CSC Environmental Specialists

101. The original consultants time allocated for this work is for 4 years for international specialist and for national counterpart. This level of effort only allowed for the preparation of two semi-annual monitoring reports every year up to 2019, but did not provide enough time for the essential workshops and training at the start of the Contract and the time requirement for the international environmental specialist to be on site when the Contractor mobilized. Likewise, the budget provided should be related to the size of the project, since larger projects take longer time to inspect and longer to report on.

102. The Resident Environmental Specialist demobilized in September 2018, while the Sr. Environmental Specialist resigned on September 2020. The task of the Resident Environmental Engineer and Sr. Environmental Specialist was assigned to the Resident Social, Resettlement and Gender Specialist without additional compensation and no Senior National Specialist (Resettlement and Environment) as support. The task of handling all Safeguards matter for the Project with minimal Jr. national specialist level support had been a challenge, since there are instances where priority activities or deliverables coincide.

103. A recent CSC Variation Order 3 had been proposed by the Engineer to the Employer for consideration which provides for additional time and cost for CSC engineers to continue their services up to the middle of 2022 in view of the time extension granted to the Contractor up to the same period. The time and cost allocated were provided for the Senior and Junior Environmental Specialist that will allow their full time engagement, however, the multi-tasking Resident Social, Resettlement and Gender Specialist will be deployed only on a part-time basis covering half of the extended time period. No time has been proposed for the Resident international Environmental Specialist. This Variation Order 3 had not been approved by the Employer pending that approval of the Revised Department Project Proposal (RDPP) by the Cabinet Committee for Government Procurement. For the period of about 6 months following the expiration of the CSC Contract on 30 June 2021, no payment had been made by the Employer to the CSC, and yet demand for continuous construction and supervision work had been required. This includes supervision of the Contractor in the implementation of the approved Environmental Management Plan, as well as the Compensation Tree Plantation Establishment and Rehabilitation Program. All monthly, Semi-Annual Reports and Special reports were also prepared by the International consultant. It was only after the conclusion of the virtual ADB Project Review Mission (21 October – 4 November 2021) that the Sr. Environment and Sr. Resettlement Specialists have been cleared by BR for mobilization. It is hoped that the newly deployed Sr Environment can take over most of the Resident Environmental Specialist task, so that the Resident Social, Resettlement and Gender Specialist can focus on Social Safeguards which remains to be a challenge even at the last 6 months of the Project.

6.2 Establishment of the Environment and Social Safeguards Unit

104. Bangladesh Railways has recognized the gap in their technical capacity and engaged Environment Consultant (CSC) to address safeguard issues and to supervise the implementation of EMPs. BR is committed to establishing an Environmental and Social Safeguards Unit (ESSU) to manage safeguards across the agency. The persons intended to be assigned to this unit will require capacity-building sessions to enable them to carry-out their assigned tasks. However this ESSU has not yet been consummated at the time of this report due to the shortage of qualified permanent BR personnel. It is expected that once there are available qualified career personnel, then an ESSU can be institutionalized and these available personnel will be assigned to it.

6.3 Monitoring Plan for Tree Plantation & Replacement Program

105. Items listed below are required to be monitored according to the approved Compensation Tree Plantation Establishment and Rehabilitation Program. CSC`s

environment specialists will monitor closely whether these items are in practice and implemented properly.

Monitoring before Plantation

a. Monitoring of Species Selection - Species selection is very crucial. Species selection is according to approved TPRP or not to be monitored.

b. Monitoring of Source of tree planting stocks - Sapling source that is selected nursery should be monitored. Availability of saplings, their size, nursery management status, and nursery workers experience, number of workers both male and female should be monitored.

c. Monitoring of Sapling Types - Sapling types, sapling health, and mentioned ratio need to be monitored.

d. Monitoring of Sapling Size - Preferable sapling size would be 4 to 6 feet height to adapt new environment and survive against threats.

e. Monitoring of Plantation Area **-** Trees must be planted in both sides of the embankment slopes, Back side of station yards and culturally affected and sensitive areas.

Monitoring during Plantation

a. Monitoring of Size of Pits - Size of excavated pit should be 1ft x 1ft x1ft

b. Monitoring of Gap between Pits - Gap between each pit must be 2 meter.

c. Monitoring of Soil Preparation - Soil preparation with compost or decomposed cow dung and mix properly. Debris and weeds need to be removed during soil preparation.

d. Monitoring of Support Stack - Support stack is essential for trees for survive. Support stack must be removed after the firm establishment of trees.

Monitoring during Post Plantation

a. Monitoring of Watering and weeding - Saplings must be watered daily until they are strongly rooted. Regular weeding and clearing the surface surrounding the planted saplings must be maintained.

b. Monitoring of Fencing - Proper fencing must be ensured to protect the saplings from goat and cattle.

c. Monitoring of Watch Guard - Deploy watch guard throughout the plantation area, divide their watching area and time. Provide adequate number of watch guard according to plantation area.

d. Capacity Building training - At least 3 trainings need to be arranged for watch guard and workers. One training has been performed.

e. Status of Planted trees - Condition of planted tress must be inspected. A rating system will be followed while counting. According to the condition of planted trees five scale rating will clearly describe the status of trees. The scale includes –Very Good, Good, Fair, Weak and Dead.

f. Monitoring of Tree Replacement - Dead trees will be detected and ensure new sapling plantation for each dead tree as replacement.

g. Monitoring of Counting of Trees - The physical count enabled estimation of the actual number of surviving trees out of many planted sites. Through this count, each tree (s) reported to have been planted at any site by each respondent was physically checked in order to ascertain that the said trees were really planted and thereby being able to record the reliable survival rate of trees on that site. Physical count also helps identify the real species of the planted trees since some respondents were not aware of tree species that were planted. Per each site, only five transects will randomly be selected for physical count, and per each selected transect, both the number of empty holes and the number of surviving trees were recorded. These records help in

calculating the survival rate of trees per that site given that the total number of planted trees was known. Below figure is a sketch of how physical count will be carried out in the field. The Statistical Package for Social Sciences (SPSS) and Microsoft Excel will be used to process the data.

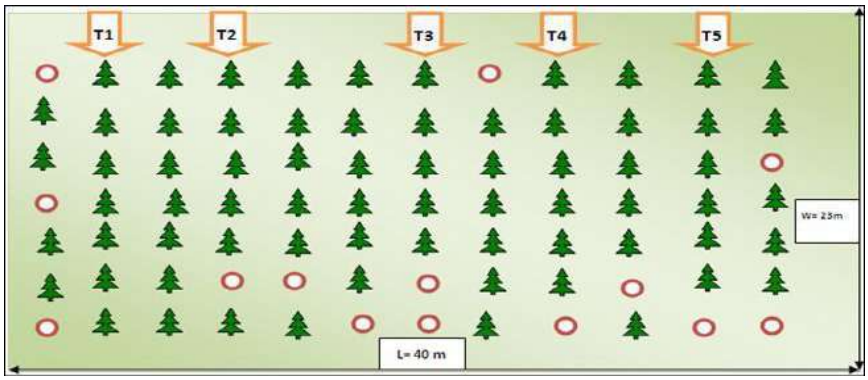


Figure 6.1 Graphical illustration of how physical count is carried out in the field

k. **Monitoring of post planting care conduction on newly planted trees -** Post-planting care to trees is important. One of the most important works are carrying out weeding, as weeding activity for tender trees is known to be the most important post-planting care for successful establishment of newly planted trees. The watchguards should be instructed on proper tending techniques of young tree plantations. This is a great challenge that should really be addressed if higher survival rate and performance are to be achieved. Other important activities are watering, fencing/sheltering, low pruning, mulching, beating up etc.

6.4 Grievance Redress Mechanism

106. The Project loan agreement has prescribed the establishment of a Grievance Redress Mechanism (Schedule 5, paragraph 5) in the project that can address possible complaints emanating from stakeholders. The Project Administrative Manual (Chapter VII, Item C, paragraph 47) further defines the scope of the GRM. The PAM mentions that issues be first referred to the Executing Agency (EA) level (i.e. project site, BR-PIU, BR) and only when it is not resolved, will the case be forwarded to the Grievance Redress Committee for action. The Project Initial Environmental Examination Report (Chapter VII) provided the rationale, composition of the GRC, its function, process followed in resolving cases brought to it, publication of resolutions.

107. At present, no Environment GRC has yet been created for the Project. This condition had been so since complaints related to the environment if any, had been resolved at the Project level. The CSC Environment and Social Safeguards team also function as the informal grievance redress team at the project site. Complaints related to safeguards are first referred to CSC by either the local people or the Contractor for resolution. The GRC established for the Project's resettlement related issues is currently inactive since the INGO SAMAHAR serving as its Secretariat had not been paid by BR PIU for the last 3 years, and so most of its personnel had already demobilized.

108. The CSC Jr. Environment and/or Resettlement specialists (depending on the case), hear the details of the complaint and report the details to the CSC Resident Social, Resettlement and Gender Specialist (RSRGS). Upon learning on the facts of the case, the CSC RSRGS will arrange for a meeting with the aggrieved party with representative of the Contractor and do an actual site inspection to better appreciate the situation. If the case can be resolved at the RSRGS level, then an amicable solution will be reached, documented and appropriate report will be sent to the Employer for their record. However, if the case will require CSC and/or BR PIU opinion/decision, a report will be prepared and sent to CSC headquarters and/or BR for their action. It is only when the case cannot be resolved at the BR level will a GRC will be needed.

109. During the reporting period, there was only 1 environment/health & safety related community complaint that was referred to CSC by a local resident/lawyer. The case was a dangerous informal railway crossing at Mouza Doiyra, Comilla City Corporation (chainage km 149+590). The previously single lane Sonagazi road crossed by the railway track had been upgraded by the local government, which motivated local transport vehicles (i.e. CNG, rickshaw, autorickshaw, cars and buses) to drive faster than before. Due to the obligue alignment of the road, and presence of residential and commercial structures on the side of the road, it was difficult for motorist and pedestrians to see any incoming train. Already an CNG was reported to have been hit by a fast moving train on 18 December 2021 resulting in physical injuries to the driver and total damage of the vehicle. The case has also been reported on AKASH TV24.

110. Upon learning of the case on 21 December 2021, CSC Safeguards and Track Engineers visited the site, interview local people and reported the case to the Employer, CSC Acting Team Leader and the Contractor. The following day (22 December 2021), the Acting ALDLP Project Director visited the Doiyra rail crossing (among other places) along with senior BR, CSC and Contractor; to see for himself the actual site conditions. After a short deliberation on the possible courses of action; it was agreed that for the time being, warning signs are to be installed along the road prior to the intersection to warn motorists. The site was also included in the list of level crossings proposed to be upgraded under the Project; where railway gates that will be manned by gate guards, as well as the gate lodge will be constructed. The list also contained other illegal railway crossings that an ADB Project Review Mission had recommended for inclusion in the program.

Figure 6.2 . Dangerous Doiyra rail crossing

Figure 6.3 Acting PD Islam (left) inspects the Doiyra rail crossing .

6.5 Covid-19 Prevention Program

111. In response to the rapidly degrading Covid-19 pandemic situation within the ALDLP track alignment and stations, the Project has pursued a pro-active approach to the prevention and control of the virus. As would be describe in detail in health and safety Chapter VI (Section 6.22) , the Project has pursued a preventive approach. Construction supervisors and workers are provided a short orientation on the nature of the virus and how to prevent its spread as part of the monthly HIV/AIDS prevention seminars; face masks and hand sanitizers have been distributed to all members of the construction team; wash stations had been installed in many work sites; and disinfection booths were also placed at major construction yards.

112. In the event personnel do get infected by Covid-19 virus and its new variants, instruction was given to office managers/construction supervisors to first isolate the possible infected person, arrange for RT PCR Swab test to confirm if indeed the illness is Covid-19 related, disinfect the work area/accommodations, and report the case to higher authorities for information or further action. An ambulance is on a 24/7 hour standby at the Comilla Station Office, ready to convey any sick person for isolation, testing, treatment, or retrieval from the health facility.

113. As a result of the measures undertaken by the Project, no Covid-19 related cases at the site had been reported during the reporting period (July-December 2021). However, it is saddening that the Project Director and his family had been infected by the pandemic. They are on isolation for 2 weeks and hopefully they can be free of the virus at the end of the quarantine period. In the meantime, the Chief Engineer serves as the Acting Project Director. **Annex 3** contains photographs of the Covid-19 prevention measures in place at the Project site.

Table 6.1. Complaints Registered

Complaint Number	Date	Complaint through (phone/letter/site)	Name of Complainer	Complaint Details	Action Taken by Contractor/PMU/CSC	Date- case resolved (days required)	Remarks-further action, if any
Section 1							
1	21 Dec 2021	Mobilephone	Councillor Shahalom Khan	Doiyra Rail crossing has become dangerous due to the upgrading of the existing Sonagazi road and the absence of a rail gate to control the movement of vehicular and pedestrian traffic especially when a train crosses the intersection.	• CSC Safeguards and Track Engineers investigated the Doiyra rail crossing, recommended the installation of temporary gate to the Employer, CSC Acting team leader and Contractor. • Acting Project Director M. Islam visited the site with CSC Acting Team Leader and Contractor representative, after deliberation they decided to install warning signs on the road before and after the rail crossing; and included the illegal rail crossing in the list of proposed level crossings to be upgraded by the Project, which is awaiting approval by BR.	5	Preparation and Installation of warning sign along the Sonagazi road before and after the Dioyra rail crossing. Approval by BR of the proposed rail level crossing for construction by the Contractor
Section 2							
				NA			
Section 3							
				NA	•		•

6.6 Training/Capacity Building Status

114. The contractor CTM JV held 23 trainings (7 CTM-JV-MAX and 16 CTM-JV-TOMA) during the reporting period. The 7 capacity building activities conducted by the Contractor CTM-JV-MAX include: a) Workplace safety and HSE Awareness Program for Safety personnel of ALDLP (18 August 2021); b) Hazard and risk assessment training for safety supervisors and safety personnel (25 August 2021); c) Safe Driving and Road Safety training for Drivers and Operators, and Health Awareness Program at the Comilla Office (12 September, 26-28 October 2021) and d) Initial Fire Response and Workplace Health and Safety training (29 November 2021). A total of 107 personnel directly hired by CTM JV attended the trainings. The resource person of the CTM JV MAX trainings was the CTM-JV In-charge of Health, Safety & Environment Mr. Abu Hanif.

The 16 capacity-building activities of CTM-JV-TOMA include the following: a) Awareness Training for Covid-19 at Akhaura Station Building (14 July 2021); b) Awareness for Passing Vehicle & Road Safety Training With Signalman at Akhaura Station Building (2 July 2021); c) Individual Training for Tree Plantation at Br#272 (18 August 2021); d) Awareness Training for Lifting Work With Supervisor, Driver & Helper at Br#259 (12 August 2021); e) Awareness Training for Construction Site Rule at Br#272 (24 August 2021); f) Awareness Training for Hazardous Material at Akhaura Station Building (22 September 2021); g) Awareness Training for Construction Site Rules at Br#262 (24 September 2021); h) Training for Tree Maintenance at Quasba HSE Office (28 October 2021); i) Awareness Training for Railway General & subsidiary Train Passing at Shasidal Station (29 October 2021); j) Individual Training for Signalman at Akhaura.(16 October 2021); k) Awareness training with Driver for level crossing gate vehicle passing rules by csc/tccl representative at Akhaura CSC office (24 October 2021); l) Awareness Training for Hazardous Materials at Br#263 (27 November 2021); m) Individual Awareness Training for Lifting Work at Br#01 (07 November 2021); n) Awareness Training for Solid Waste Management at Akhaura Food Go down (15 November 2021), o) Training for Safe Passing Public Vehicle & Construction Vehicle with Signalman at Akhaura (15 November 2021); and p) Individual Awareness Training for Road safety & Signalman at Akhaura (23 December 2021). The resource persons for the capacity-building activities include the Health & Safety Officer of CTM-JV-MAX Mr. Mozibur Rahman, and their Environmental Engineer Habibur Rahman. A total of 139 personnel directly hired by CTM-JV-TOMA attended the trainings. **Table 6.3** below contains details of the conducted trainings.

Table 6.3. Training and Capacity Building Activities

Date	Name of Training	Trainers Details	No. of Participants
1. ***CSC Initated Trainings/Workshops***			
2. ***Contractor Initiated Trainings (CTM-JV-MAX)***			
18. August .2021	Workplace safety, and HSE Awareness Program for Safety personnel of ALDLP, at Comilla Office Conference room, Comilla	Md. Abu Hanif, In-charge of HSE (max part)	08
25. August .2021	Hazard and Risk Assessment training for safety Supervisor and safety personnel, and health awareness program at Comilla Office,	Md. Abu Hanif, In-charge of HSE (max part)	13
12 September .2021	Safe Driving and Road Safety training for Driver and Operators, and health awareness progremme at Comilla Office,	Md. Abu Hanif, In-charge of HSE (max part)	12
26 October .2021	Safe Driving and Road Safety training for Driver and Operators, and health awareness progremme at Comilla Office,	Md. Abu Hanif, In-charge of HSE (max part)	12
27 October .2021	Safe Driving and Road Safety training for Driver and Operators, and health awareness progremme at Comilla Office,	Md. Abu Hanif, In-charge of HSE (max part)	25
28 October .2021	Safe Driving and Road Safety training for Driver and Operators, and health awareness progremme at Comilla Office,	Md. Abu Hanif, In-charge of HSE (max part)	28

Date	Name of Training	Trainers Details	No. of Participants
29 November .2021	Initial Fire Response and Workplace Health and Safety training for Max and CTM-JV employees, at Labiba Tower, Comilla.	Md. Abu Hanif, In-charge of HSE (max part)	21
3. ***Contractor Initiated Trainings (CTM-JV-TOMA)***			
14 July 2021	Awareness Training for Covid-19 at Akhaura Station Building.	Mozibur Rahman A.P.O of HSE (TCCL part)	06
2 July 2021.	Awareness for Passing Vehicle & Road Safety Training With Signalman at Akhaura Station Building.	Md. Habibur Rahman S.S of HSE (TCCL part)	07
18 August 2021.	Individual Training for Tree Plantation at Br#272.	Md. Mirja Hasanul Habib. Environment Eng. of HSE (TCCL part)	02
12 August 2021.	Awareness Training for Lifting Work With Supervisor, Driver & Helper at Br#259.	Mozibur Rahman A.P.O of HSE (TCCL part)	08
24 August 2021.	Awareness Training for Construction Site Rule at Br#272.	Mozibur Rahman A.P.O & Md. Mirja Hasanul Habib. Environment Eng. of HSE (TCCL part)	28
22 September 2021.	Awareness Training for Hazardous Material at Akhaura Station Building.	Mozibur Rahman A.P.O of HSE (TCCL part)	11
24 September 2021.	Awareness Training for Construction Site Rules at Br#262.	Mozibur Rahman A.P.O of HSE (TCCL part)	21
28 October 2021.	Training for Tree Maintenance at Quasba HSE Office.	Md. Mirja Hasanul Habib. Environment Eng. of HSE (TCCL part)	09
29 October 2021.	Awareness Training for Railway General & subsidiary Train Passing at Shasidal Station	Mozibur Rahman A.P.O of HSE (TCCL part)	05
16 October 2021.	Individual Training for Signalman at Akhaura.	Md. Habibur Rahman S.S of HSE (TCCL part)	02
24 October 2021.	Awareness training with Driver for level crossing gate vehicle passing rules by csc/tccl representative at Akhaura CSC office.	Mozibur Rahman A.P.O of HSE (TCCL part)	14
27 November 2021.	Awareness Training for Hazardous Materials at Br#263.	Md. Mirja Hasanul Habib. Environment Eng. of HSE (TCCL part)	04
07 November 2021.	Individual Awareness Training for Lifting Work at Br#01	Md. Habibur Rahman S.S of HSE (TCCL part)	03
15 November 2021	Awareness Training for Solid Waste Management at Akhaura Food Go down.	Mozibur Rahman A.P.O Md. Habibur Rahman S.S of HSE (TCCL part).	11
09th November 2021.	Training for Safe Passing Public Vehicle & Construction Vehicle with Signalman at Akhaura.	Mozibur Rahman A.P.O of HSE (TCCL part)	05.
23 December 2021.	Individual Awareness Training for Road safety & Signalman at Akhaura.	Md. Habibur Rahman S.S of HSE (TCCL part)	03

VII. Occupational Health and Safety

7.1 Main Objective in Health and Safety

115. The main objectives of the health & safety program include:

- Identify hazards involved in the work
- Assess the risk of harm to health and safety arising from the hazards identified
- Eliminate or control any foreseeable risks
- Review risk assessment and control measures
- Provide instruction, training and information about safety procedures
- Provide reasonable supervision for employee
- Provide personal protective equipment (PPE) where required Provide emergency
- procedures for the workplace
- Provide and maintain amenities such as the facilities for toilets, drinking water
- Provide Appropriate First Aid facilities and trained personnel

7.2 H&S Management system principles

116. HSE main principle is “keep safe workplace, keep safe people”. So, if we want to ensure this principle, then we must need our employee are to know-what is safety and why it is necessary. So, contractors take a smart way for keep their all type of employee under the same roof.

117. CTM recognizes the inherent & operational hazards associated with construction projects and clearly belief that a strong, effective & employment driven HSE Management Systems with commitment, support and share responsibility from all project personnel are the basic requisites to achieve the injury & illness free construction work.

7.3 Managing Risk in the workplace

118. CTM persons are using “risk management” approach to address workplace health and safety issues. This involves:

- Identifying the hazards
- Assessment of risks
- Eliminate or control the risk
- Monitoring control measures

119. These are the elements of a risk management process and is being done in consultation with the people most likely to be affected, such as employees, sub-contractors of contractor, and vendors who may also be working on the same work site.

7.4 Providing of Safety Tools

120. The contractors have provided for their own staff, and the engineer, all appropriate protective clothing, including safety vests, helmets, and steel capped boots, and other equipment for the work to be done, and ensured proper use of the protective clothing. All safety and rescue equipment are always being fully maintained and made available at site.

7.5 Training, awareness and supervision

121. The contractor is taking all reasonable steps for training and promote safety awareness. The training includes the following:

- Training and record keeping
- General health and safety induction training
- Work activity-based health and safety induction training
- Site specific health and safety induction

122. CTM conducts every week general safety awareness training to their officers, engineers, supervisors and workers. They try to keep update their employees HSE knowledge.

7.6 Welfare facilities

123. Contractor is making available site welfare facilities for his people. Contractor people who shall work on any site shall have access to adequate toilet and washing facilities. The welfare facilities shall be made enough for everybody who is working in the site. Welfare facilities shall be made easily available to people working on the site.

7.7 Sanitary conveniences

124. Adequate numbers of toilets have been provided for people working on site. Toilet shall be flushed by water and connected to a mains drainage system. Men and women shall use the separate toilet. A washbasin with water, soap and towels shall be located close to the toilets.

7.8 Washing facilities

125. Contractor is being provided basins in all sites to allow people to wash their faces, hands and forearms. All basins shall have a supply of clean hot or cold or warm, running water.

7.9 Drinking water

126. Contractor has supplied of safe drinking water for the workers in the site. A tap direct from the mains shall be made available, and also bottles or tanks of water shall be used for storage. If water is stored, it shall be protected from possible contamination and changed often enough to prevent it from becoming stale or contaminated.

7.10 Precautions to prevent fire

127. All types of measures for precaution have been taken to prevent fires. The following precautions have been taken to prevent fires:

- Use less-easily ignited and fewer flammable materials
- Low-solvent adhesives and paint
- Keep the quantity of flammables at the workplace to a minimum
- Always keep and carry flammable e liquids in suitable closed containers
- To minimize the risk of gas leaks and fires involving gas-fired plant
- Store flammable solids, liquids and gases safety
- Have an extinguisher to hand when doing hot work such as welding or using a disc cutter that produces sparks

7.11 Precaution in case of fire

128. People shall be able to escape from fire if a fire shall break out. Where hot work is to be conducted in an area surrounding bush land or scrubland, extreme care shall be taken. Control shall be in place to prevent sparks and hot material contacting combustible material prior to the ignition source occurring.

7.12 First aid

129. First aid can save lives, reduce pain and help an injured person make a quicker recovery. First aid box for all sites has been provided with enough equipment to cope with the number of workers on site. An appointed person has taken charge of first-aid arrangements.

7.13 Site Security

130. The contractor is responsible for the security of the site and for maintaining it as a safe-working environment at all sites. The overall site boundary as well as the specific boundaries of the various site facilities is being identified by contractor and be submitted to the Engineer for approval, complete details of the contractor's proposed method or methods for maintaining the security of the various boundaries and for the security of the buildings, personnel, material and equipment contained therein.

7.14 Work in the Rail Corridor

131. The work site protection plan is in place which identifies any pedestrian, commuter, or traffic management issues. There remains watchman. It is the responsibility of the site supervisor to ensure controls documented in the worksite protection plan are implemented.

7.15 Safety measures during construction period

132. On behalf of the contractor a safety officer is supervising the safety arrangement at the site of work. From starting to completion of the embankment, bridge/culvert and track construction work, many safety measures are being taken by contractor. They are providing safety barricade for protect the public. CTM has installed safety caution signboards. They have installed heavy barricade by galvanizing sheets in bridge work site. They also have installed barricade for protect their sensitive works.

133. During the reporting period July-November 2021, the Project has shown good performance in terms of prevention of accidents in the workplace. No fatal accidents had occurred, no lost time injuries (LTI) was recorded, no worker was in need of major medical treatment with the exception 14 cases that only require first-aid treatment for minor cuts and bruises. With the exception of the ALDLP Project Director and his family getting infected by Covid-19 in Dhaka, no field personnel were recorded to have been diagnosed with the Corona virus during the reporting period. Moreover, there were a total of 661 tool box meetings conducted by the contractor and their workers prior to the start of the work to help insure they (workers) are reminded of the health and safety protocols that are in effect in the Project. **Table 7.1** below contains a summary of accidents/incidents that had been recorded during the reporting period of July - November 2021.

Table 7.1. Summary of Accidents/Incidents (July-November 2021)

No.	Description of Report Items	CTM-JV-TOMA		CTM-JV-MAX		Overall	
		Jul-Nov	Cumulative	Aug-Nov	Cumulative	Jul-Nov	Cumulative
1	Total manpower (engaged daily average)	1,021	1,021	1,222.6	1,121.3	2,244	2,142
2	Total man-hours worked	1,173,282	9,196,744	1,409,384		2,582,666	9,196,744
3	Cumulative Man-hours worked since start	0	9,196,744		16,415,832	0	25,612,576
4	Total man-hours worked without Loss Time Accidents (LTA)	1,173,282	9,196,744	1,427,944	16,415,688	2,601,226	25,612,432
5	Total Man-days lost due to Loss-Time Accidents (LTA)	0	4	0	18	0	22
6	Number of Reported LTA	0	0.1744	0	10	0	10.1744
7	Number of minor injury/first-aid cases	0	0	14	139	14	139
8	Number of Reportable Accident/Incident	0	1	0	16	0	17
9	Number of near miss incidents	0	0	0	10	0	10
10	Number of Major Injury	0	0	0	0	0	0
11	Number of Fatal Accident	0	0	0	2	0	2
12	Number of Dangerous Occurrence	0	0	0	0	0	0
13	Frequency Rate = (Number of Reportable LTA x 1000000)/Man-hours Worked	0.0000	0.0297	0.0000	0.6100	0.0000	0.6397

No.	Description of Report Items	CTM-JV-TOMA		CTM-JV-MAX		Overall	
		Jul-Nov	Cumulative	Aug-Nov	Cumulative	Jul-Nov	Cumulative
14	Severity rate = (Man-days Lost due to Reportable LTA x 1000000)/Man-hours Worked	0.0000	1.4000	0.0000	1.0000	0.0000	2.4000
15	Incidence rate = (Number of Reportable LTA x 1000)/Average number of persons employed	0.0000	0.2950	0.0000	8.8000	0.0000	9.0950
16	Cumulative AIR (Accident Incident Rate), AIR = (Number of Reportable Accident, Incident X 1000)/Average Daily Manpower	0.0000	2.4520	0.0000	13.9500	0.0000	16.4020

7.16 Safety Notice Board

134. The contractor has set up adequate safety notice board located within their workplace. Relevant safety information that has been displayed is:

- Caution of workplace
- Color post demarcation of Rail Track 3m apart
- Toe line demarcation
- Signs of level crossing
- Signs of work on-going
- First aid kit locations
- Emergency contact details
- Evacuation procedures
- Site maps
- Existing hazards in the workplace
- Meeting minutes Name of first aiders and the safety representative

7.17 PPE requirements and Training

135. The relevant mandatory safety equipment shall be issued to all employees. Minimum PPE requirements for projects include:

- Medium impact safety glasses
- Steel capped boots (with lace up ankle supports)
- Long pants
- Long sleeved safety orange shirt
- Safety orange vest
- Safety helmet with brim
- Stay safe booklets
- Water containers

7.18 Safety promotional event

136. Based on the HSE principle CTM organize safety promotional event and carry out other promotional activities. They are giving various HSE training and visual presentation for their employee by this event. The safety promotional events content elements such as – Awareness Training, Fire Fighting Training, Emergency Procedure Training, First Aid Training and Safety related heart touching video presentations. They have also installed many type of safety promotional poster in their workplace.

7.19 Orientation session on HIV/AIDS and STI Awareness Activities

- Managing, monitoring of HIV/AIDS prevention program
- Presentation of awareness orientation session on HIV/AIDS prevention program
- Provision of medical and counseling services.

- Condom and IEC materials distribution.
- Posters provided for all railway stations and work sites.

Description

137. Many Project personnel are deployed in the ALDLP site, where large number of local community members are also residing and working. The workers and the community people are not aware of the dangers of HIV/AIDS based on the result of an awareness survey conducted by the contracted NGO UDOY. Orientation session on HIV/AIDS and STI Awareness/Prevention under ALDLP has been conducted in the construction sites, that was attended in by Project construction workers and members of the local communities. The NGO UDOY had been subcontracted to hold the HIV/AIDS Awareness and Prevention seminars. During the reporting period, a total of 10 seminars where held, that was attended by 140 workers and 44 community members. Of these total number, about 40 participants are females (21.7%). **Table 7.2** contains the summary of the orientation sessions on HIV/AIDS STD awareness/prevention that were conducted during the reporting period.

Table 7.2. Orientation Seminars on HIV/AIDS and STI Awareness/Prevention

Sl No	Location	Date	Participants		
			Workers	Community Members	Total
01	Comilla Station and Bridge	25-26 August 2021	58	19	77
02	Sadar Rasulpur Station	28 September 2021	29	6	35
03	Comilla Station and Bridge	24-25 October 2021	53	19	72
	Total		140	44	184

7.20 Status of implementation of the safety execution plan

138. CTM organize safety promotional event based on the safety execution plan and carry out other promotional activities. They are giving various training and visual presentation on safety for their employee by this event. The safety promotional events content elements such as –awareness training, firefighting training, emergency procedure training, first aid training and safety related heart touching video presentations. They have also installed many type of safety promotional poster in their workplace. In order to minimize incidence of non-wearing of PPEs issued to the construction workers, more awareness trainings will be conducted and additional Health and Safety posters will be installed on strategic locations. When adequate, it is encouraged accident reports/incident reports can be shared with the workers. They are also trying to ensure use of personal protective equipment for workers' safety.

7.21 COVID -19 Strategy

139. The coronavirus disease 2019 (COVID‐19) pandemic is exacting a huge toll on individuals, families, communities, and societies across the world. Daily lives have been profoundly changed, economies have fallen into recession, and many of the traditional social, economic, and public health safety nets that many people rely on in times of hardship have been put under unprecedented strain.

140. Speed, scale, and equity must be our guiding principles. Speed, because the explosive nature of the virus means every day lost in implementing effective response capacities and behaviors costs lives; scale, because everyone in society has a part to play in building the capacities required to control this pandemic; and equity, because everyone is at risk until the virus is controlled everywhere in the world: collective resources must be directed to where there is greatest risk. COVID-19 is a truly global crisis: the only way to overcome it is together, in global solidarity.

7.22 Action taken against the spreading of Covid-19

141. Several numbers of COVID-19 awareness program executed following WHO guideline. Distribution of masks and gloves, spraying of disinfectant at potential entry points, Installation of hand washing facilities and Disinfectant tunnels at several key points within project sites have been performed by the Contractor with direct supervision from CSC.

- Regular and thorough hand washing with soap and water or hand
- Hand hygiene stations, such as hand washing and hand rub dispensers are provided
- Face masks and paper tissues are provided
- Measures to keep a distance of at least 1 meter between people and avoid direct physical contact has been introduced
- Awareness program held on Covid-19 among workers and engineer several time
- Regular environmental cleaning and disinfection introduced
- WHO developed symptoms consistent with COVID-19 were kept self-isolated, and contacted a medical professional or the local COVID-19 information line for advice on testing and referral.
- Enhance cleaning and disinfection of objects and surfaces that are touched regularly, including all shared rooms, surfaces, floors, bathrooms, and changing rooms
- Provide PPE and training on its proper use—e.g., masks, disposable gowns, and disposable gloves or heavy-duty gloves that can be disinfected. Provide face or eye protection (medical mask) during cleaning procedures that generate splashes (e.g., washing surfaces)
- Enhance hand hygiene—regular hand washing with soap and water or use of alcohol-based hand rub— before entering and after leaving enclosed machinery, vehicles, confined spaces, and before putting on and after taking off PPE
- Provide posters, videos, and electronic message boards to increase awareness of COVID-19 among workers, and promote safe individual practices at the workplace and engage workers in providing feedback on the preventive measures and their effectiveness
- Provide regular information about the risk of COVID-19 using official sources such as government agencies and the World Health Organization, and emphasize the effectiveness of adopting protective measures and counteracting rumors and misinformation
- Body temperature checked by Thermal body temperature machine at potential entry points

VIII. Conclusion

142. On the basis of the environmental monitoring reports submitted by the third-party monitor EQMS that had been duly verified by the CSC Environment team, it can be concluded that the Contractor has generally complied with the mitigation measures provided in the Environmental Management Plan (EMP).

143. There are however, site specific deficiencies of the contractor that needs to be addressed which include: a) noise abatement measures for heavy equipment and “silent zones” such as railway mosques; b) dust control; c) proper storage of petroleum products and disposal of waste oil; c) wearing of PPE at the workplace; and d) orientation of workers most especially those subcontracted labor that are engaged in hazardous task.

144. The results of environmental monitoring of surface and ground water quality, air quality, and noise levels are generally compliant to the standards set by the Department of Environment. Only 5 monitoring sites located in 5 railway station mosques had exceeded the acceptable noise level threshold for quiet and mixed zone areas. Possible noise attenuation would be the planting of trees between the quiet zone and the noise generators.

145. The Compensation Tree Plantation Establishment and Rehabilitation Program had performed poorly during the reporting period. Of the total 87,000 tree saplings targeted for planning in 2020, about 96,547 were planted but only 72,547 had survived (75.8% survival rate) primarily due to delayed start of plantation work, poor quality saplings procured and handled prior to planting, and internal financial problem within the Contractor resulting in delays of worker’s pay. Watch guards that also serve as plantation maintenance persons have been deployed wherein one guard is responsible for every 2 km of Project plantation.

146. A corrective action plan (Table 5.1) was proposed for action by CTM JV in the previous EMR Semi-Annual Report (Jan-Jun 2021) that aims to resolve the site specific non-compliant or partially compliant mitigation measures. The CAP implementation status show that majority

of the reported issues is still in the process of being resolved. Dust control specifically on covering of hauling trucks and watering of unpaved roads and stock piles had not been fully done since the possible dust sources are normally wet during the rainy season. Storage and disposal of waste oil had some backlogs due to the slow retrieval of the spent oil by subcontractors, resulting in the exceedances in the capacity of established storage areas such that oil-filled drums were temporarily placed in the open and protected only by polyethelyn covers. While personnel directly hired by the Contractor comply with the “no PPE, no work” regulation; however, subcontracted labor are delinquent in this respect. These local recruits also lack appropriate health and safety orientations, unlike the CTM direct hires. Workers exposed to resuspended dust need to be provided with dust masks and not surgical masks used for Covid-19 transmission prevention.

147. This Semi-Annual Report (July to December 2021) is the second report that used the new Environmental Monitoring system for the Contractor’s compliance to the EMP implementation as main reference material. Further refinement of the system and its application in the preparation of semi-annual reports is forthcoming based on the comments of the report users such as ADB, EIB, DOE and BR-PIU.

148. Grievance redress had been kept at the Project site level with CSC Environment team doing the resolution of cases with environmental concerns. During the reporting period, only one relevant case was referred to the CSC Safeguards team, specifically on the dangerous Doiyra rail crossing (Comilla City Corporation) where a train and CNG collision occurred. The case was investigated and referred to the Employer for action. The case was resolved the day following the complaint and this intersection had been included in the list of official level crossings to be upgraded under the Project that is currently awaiting approval by the Employer.

149. The Project has put in place Covid-19 preventive measures. This includes implementation of government prescribed health protocols at the workplace, conduct of awareness seminars for construction workers on prevention measures against the virus, distribution of face mask and hand sanitizers, posting of informative materials on Covid-19 prevention, installation of hand washing stations and provision of clean water at the construction sites; disinfection booths at the field offices, available ambulance on stand-by 24/7 ready to convey sick personnel to nearby health facilities, arrangements for RT-PR Swab test for possible infected persons and assigned isolation rooms at site for confirmed cases.

ANNEXES

ANNEX 1. DETAILED EMP COMPLIANCE STATUS

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF November 2021

	Mitigation Measures		SECTION 1																													
			STATION BUILDINGS					BRIDGES			CULVERTS																	TRACK WORK					AVERAGE RATING
			Uaksamn Station	Alishahar Station	Lalmai Station	Mainamati Station	Comilla Station	Bridge 231	Bridge 232	Bridge 234	Culvert226	Culvert227	Culvert228	Culvert229	Culvert230	Culvert233	Culvert235	Culvert236	Culvert237	Culvert238	Culvert239	Culvert240	Culvert241	Culvert242	km 130+67 STD x 3-6x675	km 135+67 5 to 140+675	km 140+67 5 to 145+675	km 145+67 5 to 150+675	km 150+67 5 to 155+200	AVERAGE
1	**Noise and Attenuation Measures**																															
1	Use of appropriate modern plant and/or equipment, that are properly maintained following the manufacturer's specifications and original manual, specifically on the control of noise and smoke emissions.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2	All powered mechanical equipment and machineryto be fitted with noise abating gear such as mufflers for effective noise control, in compliance with DoE regulations.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	Locate rock crushing, concrete mixing and aggregate materials storage facilities, construction yards away from noise sensitive areas such as residential sites, schools, colleges and hospitals; to a distance that attenuates the disturbance to a level conforming with DOE standards.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
4	Install temporary noise barriers near sensitive locations such as schools, religious places and hospitals; whenever ambient noise generated by Project Construction exceeds DOE prescribed thresholds.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	Construction Workers and supervisors exposed to extremely noisy working environment, to be provided with suitable noise protection equipment like ear muffs, etc.		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0
6	Noise level monitoring to be carried out as per the prescribed schedule in the environmental monitoring plan.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating		4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
2	**Dust Control**																															
1	Vehicles transporting construction and waste material to be covered		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0
2	Construction equipment and vehicles to be properly maintained in good working condition following manufacturer's standards, and idling of engines discouraged.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	Machineryemitting visible smoke to be banned from construction sites.		5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	3.6
4	Contractor to prepare and implement upon the approval of the Engineer, a dust suppression programdetailing action to be taken to minimize dust generation (e.g. spraying of roads with water), and the equipment to be used.		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0
5	Dust masks to be provided to workers where dust hazards exist.		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0
6	Air quality monitoring to be carried out as per the schedule in the environmental monitoring plan.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
7	All roads, permanent or temporary, pukka or katcha, that become dusty and all areas where construction related activities are carried out, shall be subject to necessary dust suppression measures such as watering, sweeping, prevention of speeding vehicles on unpaved roads or other measures approved or directed by the Engineer.		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0
8	Contractor shall not allow waste oil, lubricant or other petroleum derivatives to be used as dust suppressants and shall take all reasonable precautions to prevent accidental spillage of petroleum products, contamination of such materials with soil or surface/ground water, through discharge run-off, and/or seepage.		5	3	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
9	Contractor shall take all reasonable measures to minimize dust-blowing from areas under his control by spraying water on stockpile, bare soil, haul road, un-surfaced traffic route and any other source of dust when conditions require dust suppression.		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0
	Average Rating		3.4	3.2	3.4	3.2	3.0	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.3
3	**Watercourse Impats in Wetlands/Ponds/Rivers**																															
1	All waterways where Construction activities are conducted, shall be maintained open at all times, else a temporary diversion works adequate to convey surface water flow will be installed. The wetland is to be restored, after the completion of the works.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2	Earth moving in the vicinity of watercourses shall be kept to a minimum to avoid sedimentation and contamination from fuel and lubricants.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	Proper and prompt disposal of construction wastes such as soil, broken bricks, concrete, and steel reinforcement which are dismantled from structures, in connection to the reconstruction of bridges/ culverts. These spoils should not to block stream flow.		5	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	3.6
4	Temporary erosion and sedimentation control measures (i.e. sedimentation pond, etc.) during rehabilitation of drainage structures, shall be undertaken to ensure that sediment laden run-off does not enter the adjoining watercourses.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	Construction materials and wastes shall not be dumped into watercourse during construction of bridges/culverts, and instead deposited in designated disposal sites approved by the Engineer.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating		5	5	5	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	5	5	5	5	5	5	5	5	4.7

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF November 2021

	Mitigation Measures	SECTION 1																													
		STATION BUILDINGS					BRIDGES			CULVERTS																TRACK WORK						AVERAGE RATING
		Laksam Station	Akhaihar Station	Lalmai Station	Mainamati Station	Comilla Station	Bridge 231	Bridge 232	Bridge 234	Culvert 226	Culvert 227	Culvert 228	Culvert 229	Culvert 230	Culvert 233	Culvert 235	Culvert 236	Culvert 237	Culvert 238	Culvert 239	Culvert 240	Culvert 241	Culvert 242	km 130+675TO 135+675	km 135+675 to 140+675	km 140+675 to 145+675	km 145+675 to 150+675	km 150+675 to 155+200	AVERAGE
4	**Borrow and Dredging Site Impacts**																														
1	Secure and properly rehabilitate borrow sites, to prevent soil erosion/sedimentation and serve as breeding grounds for rodents and insect vectors.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	**Disposal of Construction Debris and other Waste Materials**																														
1	No burning shall be allowed.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2	No construction-related debris shall be left lying on the surface of the ground, pond or buried in any agricultural land.	5	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
3	Man-made construction-related debris shall be deposited in disposal areas, the location and nature of such site, shall be subject to the approval of the Engineer.	5	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	3.7
4	Before abandoning disposal areas, these shall be covered with earth and leveled in a manner that these blend with the surrounding environment.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	5	4.5	4.5	4	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	5	5	5	5	5	5	5	5	5	4.6
6	**Servicing and Operating Equipment**																														
1	Whenever possible, avoid servicing machines or equipment near rivers, streams or other bodies of water. If unavoidable, servicing shall be carried out in such a manner, as to avoid pollution of the water body with gasoline, diesel fuel, oil, grease, and/or other related waste materials (i.e. oil filter, radiator coolant, etc.).	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2	The Contractor shall ensure that all hydraulic, fuel and lubricating systems, are maintained in good working condition to avoid leakage of petroleum products into the environment.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	Fuel spills will not be tolerated and care shall be taken to avoid overfilling machines.	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	3.8
4	The Contractor shall have the appropriate equipment to transport fuel so that spillage will be avoided. Automatic shut-off nozzles shall be installed on all fuel dispensing units.	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
5	The Contractor shall have oil spill abatement equipment such as oil drip pans among others, on the site at all times. Persons assigned to operate these equipment are to be properly trained on its use.	5	1	1	1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.5
6	All type of equipment to be used in the Project, shall be subject to the approval of the Engineer, and shall be maintained in good working condition following the manufacturer's standards.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
7	Disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP or as directed by the Engineer.	3	1	3	1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.5
	Average Rating	4.7142857	3.2857143	3.8571429	3.5714286	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	5	5	5	5	5	5	5	5	5	4.7
7	**Control of Petroleum Products**																														
1	All petroleum products shall be stored in a suitable facility where any spillage can be safely controlled to avoid contamination of the surrounding areas. Storage of petroleum products shall not be permitted in the vicinity of streams, rivers or other bodies of water. To avoid groundwater contamination, impermeable liner shall be placed on subsurface of the petroleum products storage area.	5	1	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	3.8
	Average Rating	5	1	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	3.8
8	**Protection of Topsoil and Soil Erosion**																														
1	Topsoil of storage areas must be covered by suitable material especially during the dry season, to prevent wind erosion	5	5	5	1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	1	5	5	5	5	5	5	4.7
2	Promptly protect open soil erosion-prone areas such as embankment slopes using appropriate methods such as vegetative measures, hydro-seeding and others.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	Open embankment slopes are to be planted with suitable vegetation such as grasses, cover crop or fast-growing tree species. In some cases concrete blocks will be used instead.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
4	In the selection of sites for the use of stockpiling and disposal of construction materials, natural drainage, storm drain or ponds should be avoided in order to prevent water logging.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	Topsoil and/or any organic materials excavated from the construction site, is to be stockpiled in a suitable area as defined in item 8.4 above, for use in the Project's compensatory tree plantation program; or when in excess amounts, these soil can be donated/sold to interested parties or deposited in approved disposal sites	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	5	5	5	4.2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.2	5	5	5	5	5	5	4.9

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF November 2021

	Mitigation Measures	SECTION 1																												
		STATION BUILDINGS				BRIDGES			CULVERTS																TRACK WORK					AVERAGE RATING
		Likisam Station	Alishahar Station	Lalmai Station	Mainamati Station	Comilla Station	Bridge 231	Bridge 232	Bridge 234	Culvert 226	Culvert 227	Culvert 228	Culvert 229	Culvert 230	Culvert 233	Culvert 235	Culvert 236	Culvert 237	culvert 238	Culvert 239	Culvert 240	Culvert 241	Culvert 242	km 130+675TO 135+675	km 135+675 to 140+675	km 140+675 to 145+675	km 145+675 to 150+675	km 150+675 to 155+200	AVERAGE
9	Occupational Health and Safety																													
1	Provide personal protection equipment appropriate to the construction workers' job; which may include among others, safety vest, safety shoes, helmets, gloves, welding protective eye glasses, harness, safety goggles and ear protection, and others; and enforce its proper use.		3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1.3
2	Prepare, submit and implement a Health and Safety Program acceptable to the Engineer.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	All Construction Workers are to be trained in general health and safety guidelines, especially on how to manage hazards specific to their respective work. Tool-box health & Safety sessions are to be conducted by the construction foremen with the workers prior to starting the work day.		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0
4	Must not hire Child labor, or persons with ages 14 and below.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	No persons with age between 17 and 15, are to be hired for hazardous duties.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
6	Provide adequate number of toilet and other sanitation facilities in the offices, workplace, and worker's accommodations.,		5	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3
7	Prepare and implement an HIV/AIDS STD prevention Program, acceptable to the Engineer.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
8	Hiring of personnel, job assignment and pay scale, shall be done irrespective of gender, race, creed, political affiliation, and social status.		5	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	3.4
	Average Rating		4.50	4.25	4.25	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.75	4.00	3.6
	Overall all Ratimg		4.20	3.55	4.04	3.54	3.76	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.99	4.02	4.02	4.02	4.07	4.13	4.05	4.13	4.15	4.18	3.9

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF November 2021

	Mitigation Measures	SECTION 2																											
		STATION BUILDINGS				BRIDGES					CULVERTS												Track Work				Gumti Nursery	AVERAGE RATING
		Sadar Rasulpur Station	Rajapur Station	Shahidal Station	Salda Nadi Station	Bride 243	Bridge 246	Bridge 249	Bridge 259	Bridge 261	Culvert 244	Culvert 245	Culvert 247	Culvert 248	Culvert 250	Culvert 251	Culvert 252	Culvert 253	Culvert 254	Culvert 255	Culvert 241 A	km 155+200 to 160+200	km 160+200 to 165+200	km 165+200 to 170+200	170+200 to 175+200	Gumti Nursery	AVERAGE RATING
1	**Noise and Attenuation Measures**																												
	1 Use of appropriate modern plant and/or equipment, that are properly maintained following the manufacturer's specifications and original manual, specifically on the control of noise and smoke emissions.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	2 All powered mechanical equipment and machinery to be fitted with noise abating gear such as mufflers for effective noise control, in compliance with DoE regulations.	3	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.1
	3 Locate rock crushing, concrete mixing and aggregate materials storage facilities, construction yards away from noise sensitive areas such as residential sites, schools, colleges and hospitals; to a distance that attenuates the disturbance to a level conforming with DOE standards.	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
	4 Install temporary noise barriers near sensitive locations such as schools, religious places and hospitals; whenever ambient noise generated by Project Construction exceeds DOE prescribed thresholds.	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
	5 Construction Workers and supervisors exposed to extremely noisy working environment, to be provided with suitable noise protection equipment like ear muffs, etc.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5	5	5	5	5	1.8
	6 Noise level monitoring to be carried out as per the prescribed schedule in the environmental monitoring plan.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	40	4.3	4.0	4.0	3.3	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.1
2	**Dust Control**																												
	1 Vehicles transporting construction and waste material to be covered	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0
	2 Construction equipment and vehicles to be properly maintained in good working condition following manufacturer's standards, and idling of engines discouraged.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	3 Machinery emitting visible smoke to be banned from construction sites.	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	3.2
	4 Contractor to prepare and implement upon the approval of the Engineer, a dust suppression program detailing action to be taken to minimize dust generation (e.g. spraying of roads with water), and the equipment to be used.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0
	5 Dust masks to be provided to workers where dust hazards exist.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0
	6 Air quality monitoring to be carried out as per the schedule in the environmental monitoring plan.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	7 All roads, permanent or temporary, pukka or katcha, that become dusty and all areas where construction related activities are carried out, shall be subject to necessary dust suppression measures such as watering, sweeping, prevention of speeding vehicles on unpaved roads or other measures approved or directed by the Engineer.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0
	8 Contractor shall not allow waste oil, lubricant or other petroleum derivatives to be used as dust suppressants and shall take all reasonable precautions to prevent accidental spillage of petroleum products, contamination of such materials with soil or surface/ground water, through discharge run-off, and/or seepage.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	9 Contractor shall take all reasonable measures to minimize dust-blowing from areas under his control by spraying water on stockpile, bare soil, haul road, un-surfaced traffic route and any other source of dust when conditions require dust suppression.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	3.0
	Average Rating	34	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.7	3.5

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF November 2021

	Mitigation Measures	SECTION 2																										
		STATION BUILDINGS				BRIDGES					CULVERTS												Track Work				Gumti Nursery	AVERAGE RATING
		Sadar Rasulpur Station	Rajpur Station	Shaphidal Station	Salda Nadi Station	Bride 243	Bridge 246	Bridge 249	Bridge 259	Bridge 261	Culvert 244	Culvert 245	Culvert 247	Culvert 248	Culvert 250	Culvert 251	Culvert 252	Culvert 253	Culvert 254	Culvert 255	Culvert 241 A	km 155+200 to 160+200	km 160+200 to 165+200	km 165+200 to 170+200	170+200 to 175+200	Gumti Nursery	AVERAGE
3	**Watercourse Impats in Wetlands/Ponds/Rivers**																											
	1 All waterways where Construction activities are conducted, shall be maintained open at all times, else a temporary diversion works adequate to convey surface water flow will be installed. The wetland is to be restored, after the completion of the works.	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
	2 Earth moving in the vicinity of watercourses shall be kept to a minimum to avoid sedimentation and contamination from fuel and lubricants.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	3 Proper and prompt disposal of construction wastes such as soil, broken bricks, concrete, and steel reinforcement which are dismantled from structures, in connection to the reconstruction of bridges/ culverts. These spoils should not to block stream flow.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	3.6
	4 Temporary erosion and sedimentation control measures (i.e. sedimentation pond, etc.) during rehabilitation of drainage structures, shall be undertaken to ensure that sediment laden run-off does not enter the adjoining watercourses.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	5 Construction materials and waste shall not be dumped into watercourse during construction of bridges/culverts, and instead deposited in designated disposal sites approved by the Engineer.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	4.6	4.2	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	5	5	5	5	5	5	5	5	4.7
4	**Borrow and Dredging Site Impacts**																											
	1 Secure and properly rehabilitate borrow sites, to prevent soil erosion/sedimentation and serve as breeding grounds for rodents and insect vectors.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	5	5	5.0
	Average Rating	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	5	5	5.0
5	**Disposal of Construction Debris and other Waste Materials**																											
	1 No burning shall be allowed.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	2 No construction-related debris shall be left lying on the surface of the ground, pond or buried in any agricultural land.	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.5
	3 Man-made construction-related debris shall be deposited in disposal areas, the location and nature of such site, shall be subject to the approval of the Engineer.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	3.2
	4 Before abandoning disposal areas, these shall be covered with earth and leveled in a manner that these blend with the surrounding environment.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	4	4	4	4	4	4	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	5	5	5	5	4.4
6	**Servicing and Operating Equipment**																											
	1 Whenever possible, avoid servicing machines or equipment near rivers, streams or other bodies of water. If unavoidable, servicing shall be carried out in such a manner, as to avoid pollution of the water body with gasoline, diesel fuel, oil, grease, and/or other related waste materials (i.e. oil filter, radiator coolant, etc.).	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
	2 The Contractor shall ensure that all hydraulic, fuel and lubricating systems, are maintained in good working condition to avoid leakage of petroleum products into the environment.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
	3 Fuel spills will not be tolerated and care shall be taken to avoid overfilling machines.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	3.6
	4 The Contractor shall have the appropriate equipment to transport fuel so that spillage will be avoided. Automatic shut-off nozzles shall be installed on all fuel dispensing units.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
	5 The Contractor shall have oil spill abatement equipment such as oil drip pans among others, on the site at all times. Persons assigned to operate these equipment are to be properly trained on its use.	1	1	1	1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.5
	6 All type of equipment to be used in the Project, shall be subject to the approval of the Engineer, and shall be maintained in good working condition following the manufacturer's standards.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
	7 Disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP or as directed by the Engineer.	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
	Average Rating	3.9	3.9	3.9	3.9	4.4	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	5	5	5	5	5	5	5	4.8

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF November 2021

	Mitigation Measures	SECTION 2																										
		STATION BUILDINGS				BRIDGES					CULVERTS											Track Work				Gumti Nursery	AVERAGE RATING
		Sadar Rasulpur station	Rajapur Station	Shapidal Station	Salda Nadi Station	Bride 243	Bridge 246	Bridge 249	Bridge 259	Bridge 261	Culvert 244	Culvert 245	Culvert 247	Culvert 248	Culvert 250	Culvert 251	Culvert 252	Culvert 253	Culvert 254	Culvert 255	Culvert 241 A	km 155+200 to 160+200	km 160+200 to 165+200	km 165+200 to 170+200	170+200 to 175+200	Gumti Nursery	AVERAGE
7	Control of Petroleum Producrts																											
1	All petroleum products shall be stored in a suitable facility where any spillage can be safely controlled to avoid contamination of the surrounding areas. Storage of petroleum products shall not be permitted in the vicinity of streams, rivers or other bodies of water. To avoid groundwater contamination, impermeable liner shall be placed on subsurface of the petroleum products storage area.	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	3.8
	Average Rating	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	3.8
8	Protection of Topsoil and Soil Erosion																											
1	Topsoil of storage areas must be covered by suitable material especially during the dry season, to prevent wind erosion	5	5	1	1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
2	Promptly protect open soil erosion-prone areas such as embankment slopes using appropriate methods such as vegetative measures, hydro-seeding and others.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
3	Open embankment slopes are to be planted with suitable vegetation such as grasses, cover crop or fast-growing tree species. In some cases concrete blocks will be used instead.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
4	In the selection of sites for the use of stockpiling and disposal of construction materials, natural drainage, storm drain or ponds should be avoided in order to prevent water logging.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
5	Topsoil and/or any organic materials excavated from the construction site, is to be stockpiled in a suitable area as defined in item 8.4 above, for use in the Project's compensatory tree plantation program; or when in excess amounts, these soil can be donated/sold to interested parties or deposited in approved disposal sites	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	5	5	4.2	4.2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.1
9	Occupational Health and Safety																											
1	Provide personal protection equipment appropriate to the construction workers' job; which may include among others, safety vest, safety shoes, helmets, gloves, welding protective eye glasses, harness, safety goggles and ear protection, and others; and enforce its proper use.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	3	1.2		
2	Prepare, submit and implement a Health and Safety Program acceptable to the Engineer.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5.1	
3	All Construction Workers are to be trained in general health and safety guidelines, especially on how to manage hazards specific to their respective work. Tool-box health & Safety sessions are to be conducted by the construction foremen with the workers prior to starting the work day.	3	3	1	1	1	1	1	1	1	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	2.7		
4	Must not hire Child labor, or persons with ages 14 and below	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5.1	
5	No persons with age between 17 and 15, are to be hired for hazardous duties.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5.1	
6	Provide adequate number of toilet and other sanitation facilities in the offices, workplace, and worker's accommodations.,	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	4.6	
7	Prepare and implement an HIV/AIDS STD prevention Program, acceptable to the Engineer.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5.1	
8	Hiring of personnel, job assignment and pay scale, shall be done irrespective of gender, race, creed, political affiliation, and social status.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5.1	
	Average Rating	400	4.00	3.75	3.75	3.75	3.75	4.00	4.00	4.00	4.50	4.50	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.50	4.25	4.25	4.25	4.25	3.00	4.3		
	Overall all Ratimg	389	3.66	3.56	3.56	3.63	3.73	3.80	3.80	3.80	3.85	3.85	3.83	3.83	3.83	3.83	3.83	3.83	3.83	4.07	4.12	3.96	3.96	4.01	4.01	4.13	4.0	

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF November 2021

		Mitigation Measures	SECTION 3																															
			STATION BUIDINGS					BRIDGES				CULVERTS																						AVERAGE RATING
			Mandalbag Station	Quasba Station	Imambari Station	Gangasagar Station	Akhaura Station	Bridge 262	Bridge 263	Bridge 272	Brige 276	Culvert 256	Culvert 260	Culvert 264	Culvert 265	Culvert 266	Culvert 267	Culvert 268	Culvert 269	Culvert 270	Culvert 271	Culvert 273	Culvert 274	Culvert 275	Culvert 277	Culvert 281	Culvert 282	Culvert 1	Culvert 2	km 175+200 to 180+200	km 180+200 to 185+200	km185+200 to 190+200	km190+200 to 195+200	km 195+200 to 202+650	
1		**Noise and Attenuation Measures**																																	
	1	Use of appropriate modern plant and/or equipment, that are properly maintained following the manufacturer's specifications and original manual, specifically on the control of noise and smoke emissions.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	2	All powered mechanical equipment and machinery to be fitted with noise abating gear such as mufflers for effective noise control, in compliance with DoE regulations.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	3	Locate rock crushing, concrete mixing and aggregate materials storage facilities, construction yards away from noise sensitive areas such as residential sites, schools, colleges and hospitals; to a distance that attenuates the disturbance to a level conforming with DOE standards.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	4	Install temporary noise barriers near sensitive locations such as schools, religious places and hospitals; whenever ambient noise generated by Project Construction exceeds DOE prescribed thresholds.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	5	Construction Workers and supervisors exposed to extremely noisy working environment, to be provided with suitable noise protection equipment like ear muffs, etc.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5	5	5	5	3.0
	6	Noise level monitoring to be carried out as per the prescribed schedule in the environmental monitoring plan.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
		Average Rating	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	5.0	5.0	5.0	5.0	5.0	4.7
2		**Dust Control**																																	
	1	Vehicles transporting construction and waste material to be covered	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0
	2	Construction equipment and vehicles to be properly maintained in good working condition following manufacturer's standards, and idling of engines discouraged.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	3	Machinery emitting visible smoke to be banned from construction sites.	5	5	5	5	3	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	1	1	5	5	5	5	5	4.6
	4	Contractor to prepare and implement upon the approval of the Engineer, a dust suppression program detailing action to be taken to minimize dust generation (e.g. spraying of roads with water), and the equipment to be used.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0
	5	Dust masks to be provided to workers where dust hazards exist.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0
	6	Air quality monitoring to be carried out as per the schedule in the environmental monitoring plan.	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
	7	All roads, permanent or temporary, pukka or katcha, that become dusty and all areas where construction related activities are carried out, shall be subject to necessary dust suppression measures such as watering, sweeping, prevention of speeding vehicles on unpaved roads or other measures approved or directed by the Engineer.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0
	8	Contractor shall not allow waste oil, lubricant or other petroleum derivatives to be used as dust suppressants and shall take all reasonable precautions to prevent accidental spillage of petroleum products, contamination of such materials with soil or surface/ground water, through discharge run-off, and/or seepage.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	9	Contractor shall take all reasonable measures to minimize dust-blowing from areas under his control by spraying water on stockpile, bare soil, haul road, un-surfaced traffic route and any other source of dust when conditions require dust suppression.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0
		Average Rating	3.4	3.4	3.2	3.4	3.2	3.4	3.4	3.2	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.0	3.0	3.4	3.4	3.4	3.4	3.4	3.4
3		**Watercourse Impats in Wetlands/Ponds/Rivers**																																	
	1	All waterways where Construction activities are conducted, shall be maintained open at all times, else a temporary diversion works adequate to convey surface water flow will be installed. The wetland is to be restored, after the completion of the works.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	2	Earth moving in the vicinity of watercourses shall be kept to a minimum to avoid sedimentation and contamination from fuel and lubricants.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	3	Proper and prompt disposal of construction wastes such as soil, broken bricks, concrete, and steel reinforcement which are dismantled from structures, in connection to the reconstruction of bridges/ culverts. These spoils should not to block stream flow.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	3.3
	4	Temporary erosion and sedimentation control measures (i.e. sedimentation pond, etc.) during rehabilitation of drainage structures, shall be undertaken to ensure that sediment laden run-off does not enter the adjoining watercourses.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	5	Construction materials and waste shall not be dumped into watercourse during construction of bridges/culverts, and instead deposited in designated disposal sites approved by the Engineer.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
		Average Rating	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	5	5	5	5	5	4.7

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF November 2021

No.	Mitigation Measures	Mandabag Station	Quasba Station	Imambari Station	Gangasagar Station	Akhaura Station	Bridge 262	Bridge 263	Bridge 272	Brige 276	Culvert 256	Culvert 260	Culvert 264	Culvert 265	Culvert 266	Culvert 267	Culvert 268	Culvert 269	Culvert 270	Culvert 271	Culvert 273	Culvert 274	Culvert 275	Culvert 277	Culvert 281	Culvert 282	Culvert 1	Culvert 2	km 175+200 to 180+200	km 180+200 to 185+200	km185+200 to 190+200	km190+200 to 195+200	km 195+200 to 202+650	AVERAGE RATING
		SECTION 3																																
		STATION BUIDINGS					BRIDGES				CULVERTS																							
4	**Borrow and Dredging Site Impacts**																																	
1	Secure and properly rehabilitate borrow sites, to prevent soil erosion/sedimentation and serve as breeding grounds for rodents and insect vectors.	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
	Average Rating	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
5	**Disposal of Construction Debris and other Waste Materials**																																	
1	No burning shall be allowed.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2	No construction-related debris shall be left lying on the surface of the ground, pond or buried in any agricultural land.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	Man-made construction-related debris shall be deposited in disposal areas, the location and nature of such site, shall be subject to the approval of the Engineer.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	3.4
4	Before abandoning disposal areas, these shall be covered with earth and leveled in a manner that these blend with the surrounding environment.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	5	5	5	5	5	5	5	4.6
6	**Servicing and Operating Equipment**																																	
1	Whenever possible, avoid servicing machines or equipment near rivers, streams or other bodies of water. If unavoidable, servicing shall be carried out in such a manner, as to avoid pollution of the water body with gasoline, diesel fuel, oil, grease, and/or other related waste materials (i.e. oil filter, radiator coolant, etc.).	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2	The Contractor shall ensure that all hydraulic, fuel and lubricating systems, are maintained in good working condition to avoid leakage of petroleum products into the environment.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	Fuel spills will not be tolerated and care shall be taken to avoid overfilling machines.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3.9
4	The Contractor shall have the appropriate equipment to transport fuel so that spillage will be avoided. Automatic shut-off nozzles shall be installed on all fuel dispensing units.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	The Contractor shall have oil spill abatement equipment such as oil drip pans among others, on the site at all times. Persons assigned to operate these equipment are to be properly trained on its use.	1	1	1	1	1	5	5	1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.3
6	All type of equipment to be used in the Project, shall be subject to the approval of the Engineer, and shall be maintained in good working condition following the manufacturer's standards.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
7	Disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP or as directed by the Engineer.	1	1	1	1	1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.4
	Average Rating	3.5714286	3.5714286	3.5714286	3.5714286	3.5714286	4.7142857	4.7142857	4.1	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	4.7142857	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.6
7	**Control of Petroleum Products**																																	
1	All petroleum products shall be stored in a suitable facility where any spillage can be safely controlled to avoid contamination of the surrounding areas. Storage of petroleum products shall not be permitted in the vicinity of streams, rivers or other bodies of water. To avoid groundwater contamination, impermeable liner shall be placed on subsurface of the petroleum products storage area.	5	1	5	1	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	3.8
	Average Rating	5	1	5	1	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	3.8
8	**Protection of Topsoil and Soil Erosion**																																	
1	Topsoil of storage areas must be covered by suitable material especially during the dry season, to prevent wind erosion	5	1	5	1	1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.6
2	Promptly protect open soil erosion-prone areas such as embankment slopes using appropriate methods such as vegetative measures, hydro-seeding and others.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	Open embankment slopes are to be planted with suitable vegetation such as grasses, cover crop or fast-growing tree species. In some cases concrete blocks will be used instead.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
4	In the selection of sites for the use of stockpiling and disposal of construction materials, natural drainage, storm drain or ponds should be avoided in order to prevent water logging.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	Topsoil and/or any organic materials excavated from the construction site, is to be stockpiled in a suitable area as defined in item 8.4 above, for use in the Project's compensatory tree plantation program; or when in excess amounts, these soil can be donated/sold to interested parties or deposited in approved disposal sites	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	5	4.2	5	4.2	4.2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF November 2021

	Mitigation Measures	Mandabag Station	Quasba Station	Imambari Station	Gangasagar Station	Akhaura Station	Bridge 262	Bridge 263	Bridge 272	Brige 276	Culvert 256	Culvert 260	Culvert 264	Culvert 265	Culvert 266	Culvert 267	Culvert 268	Culvert 269	Culvert 270	Culvert 271	Culvert 273	Culvert 274	Culvert 275	Culvert 277	Culvert 281	Culvert 282	Culvert 1	Culvert 2	km 175+200 to 180+200	km 180+200 to 185+200	km185+200 to 190+200	km190+200 to 195+200	km 195+200 to 202+650	AVERAGE RATING
		SECTION 3																																
		STATION BUIDINGS					BRIDGES				CULVERTS																							
9	Occupational Health and Safety																																	
1	Provide personal protection equipment appropriate to the construction workers' job; which may include among others, safety vest, safety shoes, helmets, gloves, welding protective eye glasses, harness, safety goggles and ear protection, and others; and enforce its proper use.	1	1	1	1	1	1	1	1	5	1	3	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1.3
2	Prepare, submit and implement a Health and Safety Program acceptable to the Engineer.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	All Construction Workers are to be trained in general health and safety guidelines, especially on how to manage hazards specific to their respective work. Tool-box health & Safety sessions are to be conducted by the construction foremen with the workers prior to starting the work day.	1	1	1	1	1	1	1	1	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.6
4	Must not hire Child labor, or persons with ages 14 and below.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	No persons with age between 17 and 15, are to be hired for hazardous duties.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
6	Provide adequate number of toilet and other sanitation facilities in the offices, workplace, and worker's accommodations.,	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0
7	Prepare and implement an HIV/AIDS STD prevention Program, acceptable to the Engineer.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
8	Hiring of personnel, job assignment and pay scale, shall be done irrespective of gender, race, creed, political affiliation, and social status.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	3.1
	Average Rating	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	4.25	3.50	3.75	3.50	3.75	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	4.00	3.5
	Overall all Rating	3.87	3.39	3.85	3.39	3.57	3.78	3.78	3.70	3.88	3.81	3.83	3.81	3.83	3.81	3.81	3.81	3.81	3.81	3.84	3.84	4.04	4.04	4.04	4.04	4.04	4.04	4.04	4.19	4.19	4.19	4.19	4.24	3.9

ANNEX 2
WEEKLY TREE PLANTATION ESTABLISHMENT PROGRESS

PROGRESS OF TREE PLANTATION ESTABLISHMENT & MAINTENANCE AS OF 30 NOVEMBER 2021 FOR SECTION 1 & 2

		ACTIVITIES		Unit	Overall Target	June '21	Month of July 21				Aug. '21				Sep-21				Oct-21			21-Nov	Total	%	Weight	Weighted Average
						W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3					
1		**Nursery Operation**																							15%	
	1	Sapling Production & Maintenance																								
		a. Timber Trees	Target	Saplings	14,500	375	1,275	1,500	1,500	1,500	1,500	1,000	1,000	1,000	1,000	1,500	1,500	1,500	1,500	1,000	500	0	19,150		7.8%	10.3%
			Actual	Saplings		0	0	0	0	0	0	0	7,000	5,000	1,000	1,500	4,150	1,500	1,500	1,000	500	300	23,450	161.7%		12.6%
		b. Fruit Trees	Target	Saplings	8,500	225	765	900	900	900	900	600	600	600	600	900	900	900	900	600	300	0	11,490		4.6%	6.2%
			Actual	Saplings		0	0	0	0	0	0	0	1,400	3,000	600	900	2,490	900	900	600	300	180	11,270	132.6%		6.0%
		c. Medicinal Trees	Target	Saplings	2,600	75	255	300	300	300	300	200	200	200	200	300	300	300	300	200	100	0	3,830		1.4%	2.1%
			Actual	Saplings		0	0	0	0	0	0	0	1,000	1,125	200	300	830	300	300	200	100	60	4,415	169.8%		2.4%
		d. Fuel Wood	Target	Saplings	2,400	75	255	300	300	300	300	200	200	200	200	300	300	300	300	200	100	0	3,830		1.3%	2.1%
			Actual	Saplings		0	0	0	0	0	0	0	1,000	1,000	200	300	830	300	300	200	100	60	4,290	178.8%		2.3%
		Total	Target	Saplings	28,000	750	2,550	3,000	3,000	3,000	3,000	2,000	2,000	2,000	2,000	3,000	3,000	3,000	3,000	2,000	1,000	0	38,300		15.0%	20.5%
			Actual	Saplings		0	0	0	0	0	0	0	10,400	10,125	2,000	3,000	8,300	3,000	3,000	2,000	1,000	600	43,425	155.1%		23.3%
	2	**Sapling Procurement & Maintenance**																							15%	
		a. Timber Trees	Target	Saplings	15,000	1,500	2,250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,750	25.0%	7.8%	1.9%
			Actual	Saplings		2,000	16,000	0	0	0	5,000	0	0	0	1,500	1,250	0	0	0	0	0	0	25,750	171.7%		13.3%
		b. Fruit Trees	Target	Saplings	8,500	900	1,350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,250	26.5%	4.4%	1.2%
			Actual	Saplings		1,000	3,500	0	0	0	2,000	0	0	0	900	750	0	0	0	0	0	0	8,150	95.9%		4.2%
		c. Medicinal Trees	Target	Saplings	2,700	300	450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	750	27.8%	1.4%	0.4%
			Actual	Saplings		200	500	0	0	0	1,000	0	0	0	300	250	0	0	0	0	0	0	2,250	83.3%		1.2%
		d. Fuel Wood	Target	Saplings	2,800	300	450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	750	26.8%	1.4%	0.4%
			Actual	Saplings		300	500	0	0	0	500	0	0	0	300	250	0	0	0	0	0	0	1,850	66.1%		1.0%
		Total	Target	Saplings	29,000	3,000	4,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7,500	25.9%	15.0%	3.9%
			Actual	Saplings		3,500	20,500	0	0	0	8,500	0	0	0	3,000	2,500	0	0	0	0	0	0	38,000	131.0%		19.7%
2		**Plantation Establishment**																							50%	
	1	Site preparation (Staking/hole digging/fertilization)	Target	hectares/ holes	57,000	7,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	1,000	0	71,500	125.4%	11.0%	13.8%
			Actual	hectares/ holes		0	600	950	2,100	3,800	10,200	6,400	9,480	10,125	4,610	5,341	8,205	3,000	3,000	2,000	1,000	600	71,411	125.3%		13.8%
		Location		chainage		130+675 to 133+100																				
	2	Outplanting (Replacement of Plantation mortality)	Target	hectares/ holes	22,500	7,500	4,500	4,500	4,500	4,500	4,500	4,500	1,500	1,500	1,500	0	0	0	0	0	0	0	39,000	173.3%	19.5%	33.8%
			Actual	hectares/ holes		0	300	729	1,616	3,500	9,832	200	3,999	1,883	2,249	18,200	0	0	0	0	0	0	42,508	188.9%		36.8%
		Location		chainage		130+675 to 133+100																				
	3	Outplanting (2021 New Plantation)	Target	hectares/ holes	34,500							2,000	3,000	3,000	3,000	3,000	3,000	3,000	2,000	2,000	1,000	0	25,000	72.5%	19.5%	14.1%
			Actual	hectares/ holes								950	5,481	6,625	2,306	2,702	2,375	3,000	3,000	2,000	1,000	600	30,039	87.1%		17.0%
		Location										142+0 to 158+300														
3		**Plantation Maintenance & Protection***																							20%	
	1	Fencing	Target	km	33	1.2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0	23.70	70.8%	7.0%	5.0%
			Actual	km		0	0	0	0.3	3.7	1	0.2	0.2	0	1.5	1.5	2	2	0	0	0.7	5	18.10	54.1%		3.8%
		Location		chainage		130+675 to 133+100																				
	2	Ring weeding/fertilization	Target	Saplings	57,000	7,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	2,000	2,000	1,000	0	66,500	116.7%	7.0%	1.0%
			Actual	Saplings		0	300	0	2,800	3,500	9,832	1,150	9,480	10,125	4,610	5,341	6,830	3,000	3,000	2,000	1,000	600	63,568	111.5%		1.0%
		Location		chainage		130+675 to 133+100																				
	3	Protection/Patrolling	Target	hectares/ holes	57,000	7,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	3,000	1,000	600	70,000	122.8%	6.0%	0.9%
			Actual	hectares/ holes	57,000	0	300	729	2,634	6,134	15,966	17,116	26,596	36,721	41,431	44,133	44,747	47,747	50,747	52,747	53,747	54,347	54,347	95.3%		0.7%
		Location		chainage		130+600 to 141+00 up and down line;																				
5		**Plantation Survival Rate**																								
	1	Total Saplings Planted		Saplings																		72,547				
	2	Dead Saplings		Saplings																		18,800				
	3	Survival Rate		%																		74.1%				

PROGRESS OF TREE PLANTATION ESTABLISHMENT & MAINTENANCE AS OF 30 NOVEMBER 2021 FOR SECTION 3

		ACTIVITIES		Unit	Overall Target	Jun-21	Month of July 2021				Month of August 2021				Month of September 2021				Oct-21	Nov-21	Total	%	Weight	Weighted Average
						W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4						
1	1	**Nursery Operation**																					15%	
		Sapling Production					3,000	2,500	2,500	2,800	2,800	3,500	3,500	2,500	3,000	2,000	1,000	900						
		a. Timber Trees	Target	Saplings	7,000	0	1,500	1,250	1,250	1,400	1,400	1,750	1,750	1,250	1,500	1,000	500	0	0	0	14,550	207.9%	7.5%	15.6%
			Actual	Saplings		0	0	0	0	0	0	0	0	0	0	1,500	0	700	0	0	2,200	31.4%		0.0%
		b. Fruit Trees	Target	Saplings	4,200	0	900	750	750	840	840	1,050	1,050	750	900	600	300	0	0	0	8,730	207.9%	4.5%	9.4%
			Actual	Saplings		0	0	0	0	0	0	0	0	0	0	200	0	100	0	0	300	7.1%		0.0%
		c. Medicinal Trees	Target	Saplings	1,400	0	300	250	250	280	280	350	350	250	300	200	100	0	0	0	2,910	207.9%	1.5%	3.1%
			Actual	Saplings		0	0	0	0	0	0	0	0	0	0	300	0	100	0	0	400	28.6%		0.0%
		d. Fuel Wood	Target	Saplings	1,400	0	300	250	250	280	280	350	350	350	300	200	100	0	0	0	3,010	215.0%	1.5%	3.2%
			Actual	Saplings		0	0	0	0	0	0	0	0	0	0	300	0	0	0	0	300	21.4%		0.3%
		Total	Target	Saplings	14,000	0	3,000	2,500	2,500	2,800	2,800	3,500	3,500	2,600	3,000	2,000	1,000	0	0	0	29,200	208.6%	15.0%	31.3%
			Actual	Saplings	0	0	0	0	0	0	0	0	0	0	0	2,300	0	900	0	0	3,200	22.9%		0.3%
	2	**Sapling Procurement**																					15.0%	
		a. Timber Trees	Target	Saplings	8,000	0	1,500	1,250	0	0	0	1,750	1,750	1,250	1,500	1,000	500	450	0	0	10,950	136.9%	7.5%	10.3%
			Actual	Saplings		0	2,000	1,300	0	0	0	200	1,800	4,500	900	300	1,200	600	0	0	12,800	160.0%		12.0%
		b. Fruit Trees	Target	Saplings	4,800	0	900	750	0	0	0	0	1,050	750	900	600	300	270	0	0	5,520	115.0%	4.5%	5.2%
			Actual	Saplings		0	200	200	0	0	0	0	100	500	100	50	200	100	0	0	1,450	30.2%		1.4%
		c. Medicinal Trees	Target	Saplings	1,600	0	300	250	0	0	0	0	350	250	300	200	100	90	0	0	1,840	115.0%	1.5%	1.7%
			Actual	Saplings		0	700	600	0	0	0	0	600	1,250	300	200	700	300	0	0	4,650	290.6%		4.4%
		d. Fuel Wood	Target	Saplings	1,600	0	300	250	0	0	0	350	350	250	300	200	100	90	0	0	2,190	136.9%	1.5%	2.1%
			Actual	Saplings		0	600	400	0	0	0	50	700	800	200	150	400	300	0	0	3,600	225.0%		3.4%
		Total	Target	Saplings	16,000	0	3,000	2,500	0	0	0	2,100	3,500	2,500	3,000	2,000	1,000	900	0	0	20,500	128.1%	15.0%	19.2%
			Actual	Saplings		0	3,500	2,500	0	0	0	250	3,200	7,050	1,500	700	2,500	1,300	0	0	22,500	140.6%		21.1%
2	3	**Plantation Establishment**																					50.0%	
	1	Site preparation (Staking/hole digging/fertilization)	Target	hectares/ holes	30,000	0	2,500	3,000	2,300	2,300	2,300	2,300	2,300	3,000	2,300	2,300	2,300	800	0	0	27,700	92.3%	11.0%	10.2%
			Actual	hectares/ holes		0	3,000	3,100	0	0	0	900	3,500	7,000	1,500	2,900	2,500	0	0	0	24,400	81.3%		8.9%
		Location	chainage			km 195+300 to 192+300 and km191+400 to 188+600					*	**	***											
	2	Outplanting for New Tree Plantations	Target	hectares/ holes	30,000	0	2,500	3,000	2,300	2,300	2,300	2,300	2,300	3,000	2,300	2,300	2,300	0	0	0	26,900	89.7%	13.0%	11.7%
			Actual	hectares/ holes		0	0	0	0	0	0	0	3,000	6,950	1,500	2,850	2,500	0	0	0	16,800	56.0%		7.3%
		Location	chainage			km195+300 to 192+300 and km191+400 to 188+600					*	**	***											
		Outplanting for Replacement of dead trees Saplings	Target	hectares/ holes	3,000	0	2500	3,000	2,300	2,300	2,300	2,300	2,300	3,000	2,300	2,300	2,300	0	0	0	26,900	896.7%	13.0%	116.6%
			Actual	hectares/ holes		0	3000	2,900	0	0	0	900	400	0	0	0	0	0	0	0	7,200	240.0%		31.2%
	3	Location																						
3	4	**Plantation Maintenance & Protection**																					20.0%	
	1	Fencing	Target	km	24.675	0	3	2.8	1.5	1.5	1.5	2	1.5	2	2	2	2	2	6	6	35.8	145.1%	7.0%	10.2%
			Actual	km		0	0.5	0	0.7	0.8	0.9	1	0	0	0	0	0	0	0	0	3.9	15.8%		1.1%
		Location		chainage		195+300 to 193+150																		
	2	Ring weeding/fertiliza	Target	Saplings	30,000	0	2400	2300	2300	2300	2300	2300	2300	3000	2300	2300	2300	900			27,000	90.0%	7.0%	6.3%
			Actual	Saplings		0	0	0	0	0	0	0	0	0	0	0	0	0	0	191	191	0.6%		0.0%
		Location		chainage		1.195+300 to 192+300. 2.191+400 to 188+600																		

PROGRESS OF TREE PLANTATION ESTABLISHMENT & MAINTENANCE AS OF 30 NOVEMBER 2021 FOR SECTION 3

		ACTIVITIES		Unit	Overall Target	Jun-21	Month of July 2021				Month of August 2021				Month of September 2021				Oct-21	Nov-21	Total	%	Weight	Weighted Average
						W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4						
1		**Nursery Operation**	Target	hectares/ holes	30,000	0	2,400	5,400	7,700	10,000	12,300	14,600	16,900	19,900	22,200	24,500	26,800	27,700	27,700	27,700	27,700	92.3%	6.0%	5.5%
	3	Protection/Patrolling	Actual	hectares/ holes		0	3,000	5,900	5,900	5,900	5,900	6,800	10,200	12,700	14,200	17,050	19,550	19,550	19,550	19,741	19,741	65.8%		3.9%
		Location		chainage		1.195+300 to 192+300. 2.191+400 to 188+600																		
4	5	**Plantation Survival Rate**																						
	1	Total Saplings Planted		Saplings										24,000										
	2	Dead Saplings		Saplings										4450										
	3	Survival Rate		%										81.5%										

ANNEX 3. PHOTOGRAPHS

ANNEX 3A. ENVIRONMENTAL MONITORING

Plate 1. Ambient air quality monitoring at Comilla Station. Picture taken on 12 September 2021.

Plate 2. Ambient noise level monitoring at Rajapur station. Picture taken on 11 July 2021.

Plate 3. Surface water sample taken from Gunaiajuri station being tested for pH and TDS. Picture taken on 17 October 2021.

ANNEX 3 B. DUST CONTROL

Plate 4. Photograph of watering of unpaved hauling road near Mandabag station. Picture taken on 17 November 2021.

Plate 5. Photograph of watering of unpaved track embankments at Akhaura yard. Picture taken on 15 November 2021.

Plate 6. Photograph of watering of unpaved track embankment at the Gangasagar station yard. Picture taken on 9 September 2021.

ANNEX 3C. WATERCOURSE IMPACT MITIGATION IN WETLANDS/PONDS/CANALS

Plate 7. Photograph of clearing waterway of Bridge No. 1 at the Akhaura Station Yard. Picture taken on 8 July 2021.

Plate 8. Photograph of clearing waterway as part of the construction of culvert No. 258. Picture taken on 22 December 2021.

Plate 9. Photograph of clearing waterway as part of the construction of culvert No. 256. Picture taken on 8 December 2021.

ANNEX 3D. DISPOSAL OF CONSTRUCTION DEBRIS AND OTHER WASTE MATERIALS

Plate 10. Photograph of unsuitable materials that were deposited at the Comilla City Corporation Dump site. Picture taken on 22 December 2021.

Plate 11. Photograph of construction solid waste that were deposited at the Comilla City Corporation Dump site. Picture taken on 22 December 2021.

Plate 12. Photograph of solid waste from demolished structures that were temporarily placed beside the haul road, ready to be transported to the Comilla City Corporation Dump site. Picture taken on 20 December 2021.

ANNEX 3E. CONTROL OF PETROLEUM PRODUCTS

Plate 13. Photograph of a heavy equipment being filled at the construction site. Picture taken on 23 December 2021.

Plate 14. Photograph of the fuel filling station at the Gumti bridge Construction yard. Picture taken on 22 December 2021.

Plate 15. Photograph of the covered drums filled with waste oil awaiting disposal at the Gumti bridge Construction yard. Picture taken on 20 December 2021.

ANNEX 3F. OCCUPATIUONAL HEALTH AND SAFETY

Plate 16. Training on Safe Driving and Road Safety for Contractor's Drivers and equipment operators Picture taken on 12 September 2021.

Plate 17. Tool Box meetings held prior to starting the work. Picture taken on 28 November 2021.

Plate 18. Gateman deployed at a temporary rail level crossing where active construction work is on-going, to regulate the movement of traffic Picture taken on 6 August 2021.

Plate 19. Maintenance of cleanliness at the worker's camps. Picture taken on 22 December 2021.

Plate 20. Toilets installed at the construction site. Picture taken on 08 August 2021.

Plate 21. Hand washing station installed at the construction site. Picture taken on 21 December 2021.

ANNEX 3G. COMPENSATORY TREE PLANTATION AND REHABILITATION PROGRAM

Plate 22. Ring weeding done at the plantation in chainage km138+000. Photograph taken on 02 December 2021.

Plate 23. Ring weeding done at the plantation in chainage km134+000. Photograph taken on 28 September 2021.

Plate 24. Tree plantation at chainage km146+000 that had already undergone maintenance work. Photograph taken on 30 November 2021.

Plate 25. Individual fencing installed at planted saplings at chainage km151+000.Photograph taken on 06 December 2021.

Plate 26. Worker watering a newly established plantation site at Alishahar station. Photograph taken on 6 December 2021.

Plate 27. Informative sign installed along the tree plantation site. Photograph taken on 05 December 2021.

ANNEX 3H. HIV/AIDS STD AWARENESS AND PREVENTION SEMINARS

Plate28. HIV/AIDS Awareness & Preventive Seminar held at Sadar Rasulpur Station. Photograph taken on 28 September 2021.

Plate29. HIV/AIDS Awareness & Preventive Seminar held at Bridge 263 for members of local Community. Photograph taken on 25 October 2021.

Plate 30. Mobile clinic benefiting construction and community members adjacent to Sadar Rasulpur Station. Photograph taken on 28 September 2021.

ANNEX 4. LABORATORY TEST

All Test Results | July 2021

SL No: **5694**

Ref: EQMS/Air Quality/202104271041

EQMS ENVIRONMENTAL LABORATORY

Test Results of Ambient Air Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Air Quality
Sampling Date : 13 July 2021 to 15 July 2021
Reporting Date : 29 July 2021
Monitoring Location : Rajapur and Akhaura Railway Station

Result of Ambient Air Quality Test

Sampling Code	Sampling Location	GPS Coordinate	$PM_{2.5}$ µg/m³	PM_{10} µg/m³	SPM µg/m³	SO_2 µg/m³	NO_x µg/m³	CO ppm
AAQ-1	Rajapur Railway Station	23°34'50.0"N 91°09'08.0"E	16.39	29.12	71.04	2.72	12.68	0.03
AAQ-2	Akhaura Railway Station	23°52'08.7"N 91°12'21.3"E	32.41	55.13	96.62	7.68	21.13	0.05
Bangladesh Standard**			**65**	**150**	**200**	**365**	**100***	**9**
Duration (Hours)			**24**	**24**	**8**	**24**	**24**	**8**

* The Bangladesh Standards for Oxides of Nitrogen (NO_x) is annually.
** The Bangladesh National Ambient Air Quality Standards have been taken from the Environment Conservation Rules, 1997 which was amended on 19 July 2005 vide S.R.O. No. 220-Law/2005

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ISO 9001:2015
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SL No: **5695**

Ref: EQMS/Noise Level/202104271042

EQMS ENVIRONMENTAL LABORATORY

Test Results of Noise Level

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Noise Level
Sampling Date : 13 July 2021 to 15 July 2021
Reporting Date : 29 July 2021
Monitoring Location : Rajapur and Akhaura Railway Station, and sensitive receptor

Result of Noise (dB)

S/N	Sampling Code	Sampling Location	GPS Coordinate	Leq dB(A)	Zone*	Bangladesh Standard at day Time dB(A)	Remarks
1	ANL-1	Rajapur Railway Station	23°34'49.8"N 91°09'08.2"E	57.29	Mixed	60	Low
2	ANL-2	Rajapur Railway Station Jame Mosque	23°34'51.5"N 91°09'10.7"E	49.14	Silent	50	Low
3	ANL-3	Akhaura Railway Station	23°52'10.7"N 91°12'21.4"E	57.18	Mixed	60	Low
4	ANL-4	Akhaura Railway Station Jame Mosque	23°52'07.6"N 91°12'21.7"E	54.11	Silent	50	High
Bangladesh Standard*							
	Silent area					50	
	Residential area					55	
	Mixed area					60	
	Commercial area					70	
	Industrial area					75	

*Noise Pollution (Control) Rules, 2006

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SL No: **5696**

Ref: EQMS/Water Quality/202104271043

EQMS WET LABORATORY

Test Results of Surface Water Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Surface Water Quality
Sampling Date : 15 January 2021
Reporting Date : 29 July 2021
Monitoring Location : Haora River

Result of Surface Water Quality

Sampling Code	Sampling Location	GPS Coordinate	pH	Temp (°C)	EC (mS)	TDS (mg/L)	DO (mg/L)	BOD (mg/L)	COD (mg/L)	TSS (mg/L)
SWQ-1	Haora River (Upstream)	23°50'01.3"N 91°11'54.1"E	7.20	27.5	0.16	80	6.1	1.2	41	38
SWQ-2	Haora River (Downstream)	23°50'03.3"N 91°11'51.8"E	7.15	28.2	0.16	80	6.0	1.0	44	34
Bangladesh Standard*										
Source of drinking water for supply only after disinfecting			6.5-8.5	-	-	-	6 or above	-	-	-
Water usable for recreational activity			6.5-8.5	-	-	-	5 of more	-	-	-
Source of drinking water for supply after conventional treatment			6.5-8.5	-	-	-	6 or above	-	-	-
Water usable by fisheries			6.5-8.5	-	-	-	5 or more	-	-	-
Water usable by various process and cooling industries			6.5-8.5	-	-	-	5 or more	-	-	-
Water usable for irrigation			6.5-8.5	-	-	-	5 or more	-	-	-

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Inland Surface Water)

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SL No: **5697**

Ref: EQMS/Water Quality/202104271044

EQMS WET LABORATORY

Test Results of Groundwater Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Date : 13 July 2021 to 15 July 2021
Reporting Date : 29 July 2021
Monitoring Location : Rajapur and Akhaura Railway Station

Result of Groundwater Quality

Sampling Code	Sampling Location	GPS Coordinate	pH	Temp (°C)	Phosphate (mg/L)	Manganese (mg/L)	Arsenic (mg/L)	Iron (mg/L)	Fecal Coliform, FC (N/100mL)
GWQ-1	Rajapur Railway Station	23°34'49.7"N 91°09'07.5"E	6.71	26.8	0.04	0.02	<0.01	0.01	0
GWQ-2	Akhaura Railway Station	23°52'10.5"N 91°12'23.4"E	6.44	27.2	0.02	0.01	<0.01	0.04	0
Bangladesh Standard*			**6.5-8.5**	**20-30**	**6.0**	**0.1**	**0.05**	**0.3-1**	**0**

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Drinking Water)

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All Test Results | August 2021

Sl No: 5853

Ref: EQMS/Water Quality/202104271294

EQMS WET LABORATORY

Test Results of Surface Water Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Surface Water Quality
Sampling Date : 26 August 2021
Reporting Date : 9 September 2021
Monitoring Location : Gomti River

Result of Surface Water Quality

Sampling Code	Sampling Location	GPS Coordinate	pH	Temp (°C)	EC (mS)	TDS (mg/L)	DO (mg/L)	BOD (mg/L)	COD (mg/L)	TSS (mg/L)
SWQ-1	Gomti River (Upstream)	23°29'08.9"N 91°09'47.3"E	7.01	29.0	0.11	60	6.7	1.1	24	31
SWQ-2	Gomti River (Downstream)	23°29'08.6"N 91°09'42.3"E	6.84	29.4	0.11	60	7.0	0.9	23	34
Bangladesh Standard*										
Source of drinking water for supply only after disinfecting			6.5-8.5	-	-	-	6 or above	-	-	-
Water usable for recreational activity			6.5-8.5	-	-	-	5 of more	-	-	-
Source of drinking water for supply after conventional treatment			6.5-8.5	-	-	-	6 or above	-	-	-
Water usable by fisheries			6.5-8.5	-	-	-	5 or more	-	-	-
Water usable by various process and cooling industries			6.5-8.5	-	-	-	5 or more	-	-	-
Water usable for irrigation			6.5-8.5	-	-	-	5 or more	-	-	-

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Inland Surface Water)

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Sl No: 5854

Ref: EQMS/Water Quality/202104271295

EQMS WET LABORATORY

Test Results of Groundwater Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Date : 26 August 2021 to 29 August 2021
Reporting Date : 9 September 2021
Monitoring Location : Sadar Rasulpur and Akhaura Railway Station

Result of Groundwater Quality

Sampling Code	Sampling Location	GPS Coordinate	pH	Temp (°C)	Phosphate (mg/L)	Manganese (mg/L)	Arsenic (mg/L)	Iron (mg/L)	Fecal Coliform, FC (N/100mL)
GWQ-1	Sadar Rasulpur Railway Station	23°31'09.1"N 91°10'07.5"E	6.67	27.6	0.01	0.02	<0.01	0.06	0
GWQ-2	Gangasagar Railway Station	23°49'30.8"N 91°11'36.2"E	6.58	27.6	0.03	0.01	<0.01	0.01	0
Bangladesh Standard*			6.5-8.5	20-30	6.0	0.1	0.05	0.3-1	0

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Drinking Water)

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All Test Results | September 2021

SL No: 5984

Ref: EQMS/Air Quality/202104271405

EQMS ENVIRONMENTAL LABORATORY

Test Results of Ambient Air Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Air Quality
Sampling Date : 12 September 2021 to 14 September 2021
Reporting Date : 28 September 2021
Monitoring Location : Cumilla and Kasba Railway Station

Result of Ambient Air Quality Test

Sampling Code	Sampling Location	GPS Coordinate	$PM_{2.5}$ µg/m³	PM_{10} µg/m³	SPM µg/m³	SO_2 µg/m³	NO_X µg/m³	CO ppm
AAQ-1	Cumilla Railway Station	23°27'48.5"N 91°10'00.1"E	11.19	24.84	48.89	10.23	16.25	0.04
AAQ-2	Kasba Railway Station	23°44'24.9"N 91°09'20.4"E	25.75	50.37	93.08	6.13	15.02	0.02
Bangladesh Standard**			65	150	200	365	100*	9
Duration (Hours)			24	24	8	24	24	8

* The Bangladesh Standards for Oxides of Nitrogen (NO_2) is annually.
** The Bangladesh National Ambient Air Quality Standards have been taken from the Environment Conservation Rules, 1997 which was amended on 19 July 2005 vide S.R.O. No. 220-Law/2005.

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SL No: 5985

Ref: EQMS/Noise Level/202104271406

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Test Results of Noise Level

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Noise Level
Sampling Date : 12 September 2021 to 14 September 2021
Reporting Date : 28 September 2021
Monitoring Location : Cumilla and Kasba Railway Station, and sensitive receptor

Result of Noise (dB)

S/N	Sampling Code	Sampling Location	GPS Coordinate	Leq dB(A)	Zone*	Bangladesh Standard at day Time dB(A)	Remarks
1	ANL-1	Cumilla Railway Station	23°27'49.9"N 91°09'59.9"E	58.21	Mixed	60	Low
2	ANL-2	Cumilla Railway Station Jame Mosque	23°27'48.6"N 91°10'02.4"E	56.37	Silent	50	High
3	ANL-3	Kasba Railway Station	23°44'23.9"N 91°09'19.9"E	54.11	Mixed	60	Low
4	ANL-4	Kasba Railway Station Jame Mosque	23°44'27.9"N 91°09'20.6"E	49.65	Silent	50	Low
Bangladesh Standard*							
	Silent area					50	
	Residential area					55	
	Mixed area					60	
	Commercial area					70	
	Industrial area					75	

*Noise Pollution (Control) Rules, 2006

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SL No: 5986

Ref: EQMS/Water Quality/202104271407

EQMS WET LABORATORY

Test Results of Surface Water Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Surface Water Quality
Sampling Date : 14 September 2021
Reporting Date : 28 September 2021
Monitoring Location : Sindai River

Result of Surface Water Quality

Sampling Code	Sampling Location	GPS Coordinate	pH	Temp (°C)	EC (mS)	TDS (mg/L)	DO (mg/L)	BOD (mg/L)	COD (mg/L)	TSS (mg/L)
SWQ-1	Sindai River (Upstream)	23°46'51.3"N 91°09'58.7"E	6.83	27.2	0.09	50	6.1	1.8	31	23
SWQ-2	Sindai River (Downstream)	23°46'52.5"N 91°09'56.9"E	6.56	27.4	0.09	40	6.0	1.5	31	27
Bangladesh Standard*										
Source of drinking water for supply only after disinfecting			6.5-8.5	-	-	-	6 or above	-	-	-
Water usable for recreational activity			6.5-8.5	-	-	-	5 of more	-	-	-
Source of drinking water for supply after conventional treatment			6.5-8.5	-	-	-	6 or above	-	-	-
Water usable by fisheries			6.5-8.5	-	-	-	5 or more	-	-	-
Water usable by various process and cooling industries			6.5-8.5	-	-	-	5 or more	-	-	-
Water usable for irrigation			6.5-8.5	-	-	-	5 or more	-	-	-

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Inland Surface Water)

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SL No: 5987

Ref: EQMS/Water Quality/202104271408

EQMS WET LABORATORY

Test Results of Groundwater Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Date : 12 September 2021 to 14 September 2021
Reporting Date : 28 September 2021
Monitoring Location : Cumilla and Kasba Railway Station

Result of Groundwater Quality

Sampling Code	Sampling Location	GPS Coordinate	pH	Temp (°C)	Phosphate (mg/L)	Manganese (mg/L)	Arsenic (mg/L)	Iron (mg/L)	Fecal Coliform, FC (N/100mL)
GWQ-1	Cumilla Railway Station	23°27'48.7"N 91°10'01.4"E	7.20	26.4	1.7	0.02	<0.01	0.15	0
GWQ-2	Kasba Railway Station	23°44'26.4"N 91°09'19.7"E	6.80	27.1	0.8	0.01	<0.01	0.88	0
Bangladesh Standard*			**6.5-8.5**	**20-30**	**6.0**	**0.1**	**0.05**	**0.3-1**	**0**

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Drinking Water)

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All Test Results | October 2021

SL No: 9592

Ref: EQMS/Air Quality/202104271514

EQMS ENVIRONMENTAL LABORATORY

Test Results of Ambient Air Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Air Quality
Sampling Date : 17 October 2021 to 20 October 2021
Reporting Date : 2 November 2021
Monitoring Location : Mainamati and Mandabag Railway Station

Result of Ambient Air Quality Test

Sampling Code	Sampling Location	GPS Coordinate	$PM_{2.5}$ µg/m³	PM_{10} µg/m³	SPM µg/m³	SO_2 µg/m³	NO_x µg/m³	CO ppm
AAQ-1	Mainamati Railway Station	23°25'57.4"N 91°10'16.3"E	13.74	19.22	45.17	2.86	17.48	0.04
AAQ-2	Mandabag Railway Station	23°41'18.1"N 91°09'08.2"E	10.28	17.83	37.41	2.37	9.12	0.02
Bangladesh Standard**			**65**	**150**	**200**	**365**	**100***	**9**
Duration (Hours)			**24**	**24**	**8**	**24**	**24**	**8**

* The Bangladesh Standards for Oxides of Nitrogen (NO_2) is annually.

** The Bangladesh National Ambient Air Quality Standards have been taken from the Environment Conservation Rules, 1997 which was amended on 19 July 2005 vide S.R.O. No. 220-Law/2005.

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SL No: 9593

Ref: EQMS/Noise Level/202104271515

EQMS ENVIRONMENTAL LABORATORY

Test Results of Noise Level

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Noise Level
Sampling Date : 17 October 2021 to 20 October 2021
Reporting Date : 2 November 2021
Monitoring Location : Mainamati and Mandabag Railway Station, and sensitive receptor

Result of Noise (dB)

S/N	Sampling Code	Sampling Location	GPS Coordinate	Leq dB(A)	Zone*	Bangladesh Standard at day Time dB(A)	Remarks
1	ANL-1	Mainamati Railway Station	23°26'03.2"N 91°10'15.7"E	58.17	Mixed	60	Low
2	ANL-2	Mainamati Railway Station Jame Mosque	23°25'57.9"N 91°10'16.7"E	55.82	Silent	50	High
3	ANL-3	Mandabag Railway Station	23°41'17.8"N 91°09'08.4"E	54.37	Mixed	60	Low
4	ANL-4	Mandabag Railway Station Jame Mosque	23°41'19.3"N 91°09'06.7"E	48.27	Silent	50	Low

Bangladesh Standard*	
Silent area	50
Residential area	55
Mixed area	60
Commercial area	70
Industrial area	75

*Noise Pollution (Control) Rules, 2006

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Sl No: 9594

EQMS

Ref: EQMS/Water Quality/202104271516

EQMS WET LABORATORY

Test Results of Surface Water Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Surface Water Quality
Sampling Date : 17 October 2021
Reporting Date : 7 November 2021
Monitoring Location : Goniajuri River

Result of Surface Water Quality

Sampling Code	Sampling Location	GPS Coordinate	pH	Temp (°C)	EC (mS)	TDS (mg/L)	DO (mg/L)	BOD (mg/L)	COD (mg/L)	TSS (mg/L)
SWQ-1	Goniajuri River (Upstream)	23°22'50.0"N 91°09'28.5"E	7.06	30.5	0.38	190	2.8	12.5	24	56
SWQ-2	Goniajuri River (Downstream)	23°22'49.6"N 91°09'30.2"E	7.01	31.1	0.28	140	2.7	13.1	18	48
Bangladesh Standard*										
Source of drinking water for supply only after disinfecting			6.5-8.5	-	-	-	6 or above	-	-	-
Water usable for recreational activity			6.5-8.5	-	-	-	5 of more	-	-	-
Source of drinking water for supply after conventional treatment			6.5-8.5	-	-	-	6 or above	-	-	-
Water usable by fisheries			6.5-8.5	-	-	-	5 or more	-	-	-
Water usable by various process and cooling industries			6.5-8.5	-	-	-	5 or more	-	-	-
Water usable for irrigation			6.5-8.5	-	-	-	5 to more	-	-	-

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Inland Surface Water)

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EQMS WET LABORATORY

Test Results of Groundwater Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Date : 17 October 2021 to 20 October 2021
Reporting Date : 7 November 2021
Monitoring Location : Mainamati and Mandabag Railway Station

Result of Groundwater Quality

Sampling Code	Sampling Location	GPS Coordinate	pH	Temp (°C)	Phosphate (mg/L)	Manganese (mg/L)	Arsenic (mg/L)	Iron (mg/L)	Fecal Coliform, FC (N/100mL)
GWQ-1	Mainamati Railway Station	23°25'56.8"N 91°10'16.2"E	7.37	27.8	0.04	0.02	<0.01	0.01	0
GWQ-2	Mandabag Railway Station	23°41'17.2"N 91°09'08.7"E	6.71	27.6	1.4	0.01	<0.01	0.89	0
Bangladesh Standard*			**6.5-8.5**	**20-30**	**6.0**	**0.1**	**0.05**	**0.3-1**	**0**

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Drinking Water)

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SL No: 9674

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Ref: EQMS/Air Quality/202104271596

EQMS ENVIRONMENTAL LABORATORY

Test Results of Ambient Air Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Air Quality
Sampling Date : 14 November 2021 to 16 November 2021
Reporting Date : 29 November 2021
Monitoring Location : Lalmai and Saldanodi Railway Station

Result of Ambient Air Quality Test

Sampling Code	Sampling Location	GPS Coordinate	$PM_{2.5}$ µg/m³	PM_{10} µg/m³	SPM µg/m³	SO_2 µg/m³	NO_x µg/m³	CO ppm
AAQ-1	Lalmai Railway Station	23°21'23.2"N 91°09'06.0"E	19.63	39.81	78.65	2.61	15.93	0.06
AAQ-2	Saldanodi Railway Station	23°40'15.4"N 91°09'21.2"E	14.27	27.22	56.69	3.87	12.10	0.08
Bangladesh Standard**			65	150	200	365	100*	9
Duration (Hours)			24	24	8	24	24	8

* The Bangladesh Standards for Oxides of Nitrogen (NO_2) is annually.

** The Bangladesh National Ambient Air Quality Standards have been taken from the Environment Conservation Rules, 1997 which was amended on 19 July 2005 vide S.R.O. No. 220-Law/2005.

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SL No: 9675

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Ref: EQMS/Noise Level/202104271597

EQMS ENVIRONMENTAL LABORATORY

Test Results of Noise Level

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Noise Level
Sampling Date : 14 November 2021 to 16 November 2021
Reporting Date : 29 November 2021
Monitoring Location : Lalmai and Saldanodi Railway Station, and sensitive receptor

Result of Noise (dB)

S/N	Sampling Code	Sampling Location	GPS Coordinate	Leq dB(A)	Zone*	Bangladesh Standard at day Time dB(A)	Remarks
1	ANL-1	Lalmai Railway Station	23°21'22.7"N 91°09'05.8"E	57.31	Mixed	60	Low
2	ANL-2	Lalmai Railway Station Jame Mosque	23°21'23.1"N 91°09'03.5"E	55.93	Silent	50	High
3	ANL-3	Saldanodi Railway Station	23°40'14.9"N 91°09'21.0"E	54.08	Mixed	60	Low
4	ANL-4	Ganganagar Jame Mosque	23°40'14.2"N 91°09'17.9"E	49.17	Silent	50	Low
Bangladesh Standard*							
	Silent area					50	
	Residential area					55	
	Mixed area					60	
	Commercial area					70	
	Industrial area					75	

*Noise Pollution (Control) Rules, 2006

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Ref: EQMS/Water Quality/202104271598

EQMS WET LABORATORY

Test Results of Surface Water Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Surface Water Quality
Sampling Date : 16 November 2021
Reporting Date : 29 November 2021
Monitoring Location : Salda River

Result of Surface Water Quality

Sampling Code	Sampling Location	GPS Coordinate	pH	Temp (°C)	EC (mS)	TDS (mg/L)	DO (mg/L)	BOD (mg/L)	COD (mg/L)	TSS (mg/L)
SWQ-1	Salda River (Upstream)	23°40'17.3"N 91°09'24.4"E	6.95	24.4	0.10	50	5.6	1.6	14	40
SWQ-2	Salda River (Downstream)	23°40'18.6"N 91°09'21.3"E	6.88	24.3	0.09	50	5.8	1.7	11	36
Bangladesh Standard*										
Source of drinking water for supply only after disinfecting			6.5-8.5	-	-	-	6 or above	-	-	-
Water usable for recreational activity			6.5-8.5	-	-	-	5 of more	-	-	-
Source of drinking water for supply after conventional treatment			6.5-8.5	-	-	-	6 or above	-	-	-
Water usable by fisheries			6.5-8.5	-	-	-	5 or more	-	-	-
Water usable by various process and cooling industries			6.5-8.5	-	-	-	5 or more	-	-	-
Water usable for irrigation			6.5-8.5	-	-	-	5 or more	-	-	-

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Inland Surface Water)

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EQMS WET LABORATORY

Test Results of Groundwater Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Date : 14 November 2021 to 16 November 2021
Reporting Date : 29 November 2021
Monitoring Location : Lalmai and Saldanodi Railway Station

Result of Groundwater Quality

Sampling Code	Sampling Location	GPS Coordinate	pH	Temp (°C)	Phosphate (mg/L)	Manganese (mg/L)	Arsenic (mg/L)	Iron (mg/L)	Fecal Coliform, FC (N/100mL)
GWQ-1	Lalmai Railway Station	23°21'23.0"N 91°09'05.9"E	6.68	26.7	0.01	0.03	0.01	0.46	0
GWQ-2	Saldanodi Railway Station	23°40'16.8"N 91°09'20.7"E	6.76	27.1	0.03	0.09	0.025	0.93	0
Bangladesh Standard*			6.5-8.5	20-30	6.0	0.1	0.05	0.3-1	0

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Drinking Water)

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Appendix 5

ANNEX 6A. WATER QUALITY MONITORING METHODOLOGY

EQMS WET LABORATORY WATER TESTING METHOD

SN	Parameters	Analysis Method
1	Arsenic, As	Modified Gutzeit method
2	Biochemical Oxygen Demand, BOD_5	5 Days Incubation
3	Chemical Oxygen Demand, COD	USEPA 410.4
4	Dissolve Oxygen, DO	DO Meter
5	Electric Conductivity, EC	Hanna Combo Meter
6	Fecal Coliform	Membrane Filtration
7	Iron, Fe	Phhenantroline Method
8	Manganese, Mn	Periodate Oxidation
9	pH	Hanna Combo Meter
10	Phosphate	Amino Acid Method
11	Temperature	Hanna Combo Meter
12	Total Dissolved Solids, TDS	Hanna Combo Meter
13	Total Suspended Solid, TSS	Dry and Filtration

ANNEX 6B

AMBIENT AIR QUALITY MONITORING METHODOLOGY

A total of 2 (two) ambient air samples were collected from the railway station areas of the project rail corridor between Akhaura and Laksam. The ambient status of major air pollutants viz. Particulate Matter (SPM, PM_{10}, and $PM_{2.5}$), Sulfur Dioxide (SO_2), Oxides of Nitrogen (NO_x), and Carbon Monoxide (CO) have been assessed by monitoring air quality at two railway stations of the project.

The portable wireless HAZ-SCANNER ™ HIM-6000 Hazardous Incident Monitor was used to scan, measure, and document critical pollutants including nitrogen dioxide, carbon monoxide, sulfur dioxide, and particulates. Sampling and analysis of ambient air quality was conducted by referring to the recommendation of the United States Environmental Protection Agency (USEPA). The Haz-Scanner Environmental Perimeter Air Station (EPAS) was used to collect ambient air monitoring data. Sampling rate or air quality data was measured automatically every one to five minutes and directly recorded onsite for measured parameters (SO_2, NO_2, CO, PM_{10}, $PM_{2.5}$ and SPM) as shown in Table 1-1. Different analysis methods are integrated in the instrument, such as Particulates 90 Infrared Light Scattering for particulate matters (PM_{10}, $PM_{2.5}$ and SPM), filter for lead analysis and electrochemical sensors for toxic gases (CO, NO_2, and SO_2).

Table 1-1. Methods of Air Quality Sampling and Analysis

Parameter	Machine Name	Methods of Testing	Analysis Method
$PM_{2.5}$	Hazz Scanner HIM 6000	On site recording	Light Scanner Nephotometer
PM_{10}	Hazz Scanner HIM 6000	On site recording	Light Scanner Nephotometer
SPM	Hazz Scanner HIM 6000	On site recording	Light Scanner Nephotometer
NO_x	Hazz Scanner HIM 6000	On site recording	Light Scanner Nephotometer
SO_2	Hazz Scanner HIM 6000	On site recording	Light Scanner Nephotometer
CO	Hazz Scanner HIM 6000	On site recording	Light Scanner Nephotometer

As per the national standard, CO and SPM were monitored for 8 hours to compare with the national standard. For PM_{10}, $PM_{2.5}$, and SO_2, the standard duration is 24-hour data whereas the standard duration for NOx is annual. So, standard duration varies from parameter to parameter. So the Hazz Scanner HIM 6000 was operated for 8 hours in peak traffic time (mostly from 10:00am to 6:00pm) and a conversion equation (given below) was used to convey the data from specific time period to expected time period. The equation has been used in many approved EIA report and is as follows:

$$C_{long} = C_{short} (t_{short}/t_{long})^p$$

Where, C_{long} = Expected output in specific time
C_{short} = Outcome during Monitoring Period
T_{short} = Specific time period during monitoring (in minutes)
T_{long} = Expected time period (in minutes)
P = Exponential factor where the value is 0.30

ANNEX 6C

AMBIENT NOISE LEVEL MONITORING METHODOLOGY

In all cases, the sound level meter (SLM) was mounted on a tripod at 1.5 m above ground level and at least 3.5 m away from any sound reflecting surfaces. The SLM was oriented towards the facility of interest for each measurement taken. The measurements were made using a Noise data logger (Digital Noise Meter: Model no. SLM25TK). The SLM was calibrated before the noise monitoring survey was carried out. The sound level is recorded in form of A-weighted equivalent continuous sound pressure level (Leq) values with the use of A-weighing filters in the noise measuring instrument.

Then noise level data will be analyzed to Leq. Noise level data are also compared with the DoE standard ECR 1997.

ANNEX 7. CALIBRATION CERTIFICATE

Peerless
Calibration Services

CALIBRATION CERTIFICATE

FR-QT-21					Page 1 of 1
Certificate No	:	PCSL-201013-1-1	Date of Issue	:	15-Oct-20
Date of Calibration	:	13-Oct-20	Valid Up To	:	12-Oct-21
Customer Details	:		Receipt No.	:	PCSL-201013-1
EQMS Consulting Ltd.			Challan No	:	Form
Flat# F1, H# Ta-134/A, Boishakhi Sarani,			Date of Receipt	:	13-Oct-20
Gulshan-Badda Link Road,			Cond. On Receipt	:	Satisfactory
Dhaka- 1212, Bangladesh.			Location	:	--
Description	:	Air Quality Monitor			
Range	:	As Per Report	Identification No.	:	EQMS 136
Least Count	:	As Per Report	Make	:	LATA ENVIROTECH
Serial No	:	--	Model	:	APM 250

Details of Standard Used:

Name	SR/ID NO	Valid upto	Traceability
Digital Stop Watch	PCSL_ET_02	25-Feb-21	G&B Mumbai
Digital Anemometer	PCSL_ENV_07	20-Jan-21	Askib Engineers Pvt. Ltd

Environmental Details: Temperature: (25±5) °C Relative Humidity: (50±15)%

Calibration Results

Flow Totalizer (PM2.5)

Time Interval	STD Readings	UUC Reading	Error	Uncertainty(±)
	in m^3	in m^3	in m^3	in m^3
Start	0.00	0.000	0.000	0.01
10 min	0.10	0.102	0.002	
30 min	0.29	0.293	0.003	
1 hour	0.59	0.595	0.005	
2 hour	1.23	1.236	0.006	
3 hour	1.95	1.956	0.006	

Flow Totalizer (PM10)

Time Interval	STD Readings	UUC Reading	Error	Uncertainty(±)
	in m^3	in m^3	in m^3	in m^3
Start	0.00	0.000	0.000	0.01
10 min	0.12	0.124	0.004	
30 min	0.32	0.325	0.005	
1 hour	0.64	0.644	0.004	
2 hour	1.33	1.336	0.006	
3 hour	2.03	2.021	-0.009	

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

Peerless
Calibration Services

CALIBRATION CERTIFICATE

FR-QT-21 Page 1 of 1

Certificate No : PCSL-201013-1-1 Date of Issue : 15-Oct-20

Date of Calibration : 13-Oct-20 Recom. Due Date : 12-Oct-21

Calibration Results

Time :

UUC Reading in hrs:min:sec	Standard reading in hrs:min:sec:sec/1000	Error in hrs:min:sec:sec/1000	Uncertainty in sec
00:10:00	00:10:00:231	-00:00:00231	0.5
00:30:00	00:30:00:532	-00:00:00532	0.5
01:00:00	01:00:00:453	-00:00:00453	1.0
02:00:00	02:00:01:634	-00:00:01:634	2.0
03:00:00	03:00:01:275	-00:01:00:275	4.0
04:00:00	04:00:02:212	-00:00:02:212	4.0

Remarks:

1) Calibration results given are the average of 3 readings.
2) Calibration points are taken as per customer request.
3) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor k=2
4)The Certificate Is Issued Subject To Conditions Stated Overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

NOTE

- Equipment used for calibration were calibrated & traceable to National & International Standards.
- This certificate refers only to particular item(s) submitted for calibration.
- Peerless Calibration Service Ltd. is not liable for any change in calibration data & performance specification on account of malfunctioning of Standards/instruments/Equipment covered by this certificate due to damage caused to it after issuance of this certificate.
- The calibration results reported are valid at the time of and under the stated conditions ot the measurements.
- This certificate shall not be reproduced in full/part without prior permission of Peerless Calibration Service Ltd. Satisfactory calibration report in on ways implies that the equipment calibrated is appoved by Accreditation body.
- All precautions have been taken for any error or omission while calibrating the instruments and issuing this
- certificate. Peerless Calibration Service Ltd. shall not be liable for any loss or liability that may be arise to any party in this regards.

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No	: PCSL-200914-1-1	Date of Issue	: 16-Sep-20
Date of Calibration	: 15-Sep-20	Valid Upto	: 14-Sep-21
Customer Details	:	Receipt No	: PCSL-200914-1
EQMS Consulting Ltd.		Calibrated at	: Onsite
Flat# F1, H# Ta–134/A, Boishakhi Sarani,		Date of Receipt	: 14-Sep-20
Gulshan–Badda Link Road,		Cond. On Receipt	: Satisfactory
Dhaka- 1212, Bangladesh.			

Details of Under Calibration Instrument:

Description	: Digital Weighing Balance	Model No.	: KD-TN
Range	: 0.1000 to 200 g	Serial No	: G611017001
Least Count	: 0.0001 g	Identification No.	: EQMS # 187
Make	: -	Accuracy	: Class I

Details of Standard Used :

Name	Sr./ Id No.	Valid upto	Traceability
Weight Set (E2)	WT/AS-II/2019/3147	21-Nov-22	WMCL,Delhi

Environmental Details : : Temperature : 23.7 °C Relative Humidity : 59.3 % RH

Remarks :

1) This calibration certificate will not be legal for the purpose of the Standard of "Weights & Measure (enforcement) act 1985".
2) This calibration certificate is issued as per customer request.
3) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor $k=2$
4) This calibration certificate is valid for scientific & industrial purpose only.
5) Overall uncertainty of weighing balance ± 0.0860 g
6) The Certificate Is Issued Subject To Conditions Stated Overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

NOTE

- Equipment used for calibration were calibrated & traceable to National & International Standards.
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- Peerless Calibration Service Ltd. is not liable for any change in calibration data & performance specification on account of malfunctioning of Standards/instruments/Equipment covered by this certificate due to damage caused to it after issuance of this certificate.
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- All precautions have been taken for any error or omission while calibrating the instruments and issuing this
- certificate. Peerless Calibration Service Ltd. shall not be liable for any loss or liability that may be arise to any party in this regards.

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Calibration Services

CALIBRATION CERTIFICATE

Certificate No : PCSL-200914-1-1

Calibration Results(Mechanical-Mass)

1. Repeatability Test :

50 % of Range : 100 g

100 % of Range : 200 g

Sl. No	50% of Range	100% of Range
	g	g
1	99.9527	199.9148
2	99.9529	199.9148
3	99.9529	199.9147
4	99.9529	199.9148
5	99.9528	199.9147
6	99.9528	199.9147
7	99.9529	199.9149
8	99.9527	199.9149
9	99.9528	199.9148
10	99.9529	199.9148
Mean	99.9528	199.9148
Standard Deviation	0.0001	0.0001
Max. Drift	-0.0472	-0.0852

2. Linearity Test :

S.No.	Applied Mass (g)	Test Reading (g)	Error (g)	Uncertainty ± (g)
1	0.100004	0.0200	-0.080004	0.0007
2	0.500005	0.5000	-0.000005	0.0007
3	1.000012	1.0000	-0.000012	0.0007
4	2.000017	1.9999	-0.000117	0.0007
5	5.000021	4.9996	-0.000421	0.0007
6	10.000006	9.9992	-0.000806	0.0007
7	20.000027	19.9973	-0.002727	0.0007
8	49.999999	49.9725	-0.027499	0.0007
9	100.000022	99.9527	-0.047322	0.0007
10	200.000073	199.9148	-0.085273	0.0007

Verified by:

Mujammil HossenAsst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal HussainDirector & CEO

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No : PCSL-200914-1-1 Page 3 of 3

Calibration Results(Mechanical-Mass)

3. Eccentricity Test :

S.No.	Position of Weights used	Test Reading (g)	Error between centre(1) and Other points (g)
1	Top Left	99.9528	0.0000
2	Top Right	99.9528	0.0000
3	Centre	99.9528	0.0000
4	Bottom Left	99.9527	0.0001
5	Bottom Right	99.9528	0.0000

Maximum Error between centre and other points = 0.0001 g

Verified by:

Mujammil HossenAsst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal HussainDirector & CEO

NOTE

- Equipment used for calibration were calibrated & traceable to National & International Standards.
- This certificate refers only to particular item(s) submitted for calibration.
- Peerless Calibration Service Ltd. is not liable for any change in calibration data & performance specification on account of malfunctioning of Standards/instruments/Equipment covered by this certificate due to damage caused to it after issuance of this certificate.
- The calibration results reported are valid at the time of and under the stated conditions ot the measurements.
- This certificate shall not be reproduced in full/part without prior permission of Peerless Calibration Service Ltd. Satisfactory calibration report in on ways implies that the equipment calibrated is appoved by Accreditation body.
- All precautions have been taken for any error or omission while calibrating the instruments and issuing this
- certificate. Peerless Calibration Service Ltd. shall not be liable for any loss or liability that may be arise to any party in this regards.

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CALIBRATION CERTIFICATE

Certificate No	: PCSL-210204-68-2	Date of Issue	: 13-Feb-21
Date of Calibration	: 12-Feb-21	Valid Up To	: 12-Feb-22
Customer Details	:	Receipt No.	: PCSL-210204-68
EQMS Consulting Ltd.		Challan No	: PCSL-CH-0053
2nd & 3rd Floor, House # 53		Date of Receipt	: 4-Feb-21
Road # 4, Block # C, Banani,		Cond. On Receipt	: Satisfactory
Dhaka - 1213, Bangladesh.		Location	: ---

Details of Under Calibration Instrument:

Description	: HAZ-Scanner		
Range	: (SO2 0-5, NO2 0-5, NO 0-25) ppm	Identification No.	: ---
Least Count	: As Per Report	Serial No	: 919118
Make	: Environmental Divice Corporation	Model	: HIM-6000

Details of Standard Used:

Name	SR/ID NO	Valid upto	Traceability
Portable Flue Gas Analyzer	'PCSL_ENV_16	20-Dec-21	PCSL, Dhaka

Environmental Details: Temperature: (25±5) °C Relative Humidity: (50±15)%

Inspection Results

Parameter / Range	DUC value		Std Value		Error in ppm
	Coverted Value in ppm	in ppb	In ppm	Converted Value In ppb	
Gas Conc.					
NO	4	4000	5	5000	-1
NO_2	3	3000	4	4000	-1
SO_2	5	5000	6	6000	-1

Remarks:

1) Test results given are the average of 3 readings.
2) The Certificate Is Issued Subject To Conditions Stated Overleaf.
3) Here, Standard Gas Mixture Was Used As Calibration Source.
4) Test points are taken as per customer's request. DUC = Device Under Calibration.

Peerless Calibration Services Ltd

Authorized Signatory : Afzal Hussain
Designation : QM
Calibrated By : Mujammil Hossen
Designation : Asst. Technical Manager

= =End of Certificate = =

Peerless

CALIBRATION CERTIFICATE

Certificate No	: PCSL-210204-68-1	Date of Issue	: 5-Feb-21
Date of Calibration	: 4-Feb-21	Recom. Due Date	: 4-Feb-22
Customer Details :		Receipt No.	: PCSL-210204-68
EQMS Consulting Ltd.		Date of Receipt	: 4-Feb-21
2nd & 3rd Floor, House # 53		Challan No	: PCSL-CH-0053
Road # 4, Block # C, Banani,		Challan Date	: 2-Feb-21
Dhaka - 1213, Bangladesh.		Calibrated At	: Inhouse
		Cond. On Receipt	: Satisfactory
		Location	: --
Description	: Flue Gas Analyzer		
Range	: As Per Report	Identification No.	: Q-ID-10192
Least Count	: As Per Report	Make	: Testo
Serial No	: 6172352	Model	: Testo 340

Details of Standard Used:

Name	Ref. No	Batch No.	Valid Up To
Standard Calibration Gas Mixture	CSL-150320-102426-2-1	102426	15-Mar-21
Standard Calibration Gas Mixture	CSL-150320-102426-3-1	102426	15-Mar-21

Environmental Details: Temperature: (25±5) °C Relative Humidity: (50±15)%

Inspection Results

Parameter / Range	Unit	DUC value	Std Value	Error
Gas Conc.				
NO	ppm	154	158	-4
NO_2	ppm	246	251	-5
SO_2	ppm	2519	2508	11

Remarks:

1) Test results given are the average of 3 readings.
2) The Certificate Is Issued Subject To Conditions Stated Overleaf.
3) Test points are taken as per customer's request. DUC = Device Under Calibration.

Authorized Signatory : Afzal Hussain
Designation : QM
Calibrated By : Mujammil Hossen
Designation : Asst. Technical Manager

= =End of Certificate = =

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No.	:	PCSL-200914-1-8	Date of Issue	:	16/Sep/20
Date of Calibration	:	15/Sep/20	Valid Upto	:	14/Sep/21
Customer Details	:		Receipt No.	:	PCSL-200914-1
EQMS Consulting Ltd.			Challan No	:	PCSL/CH/035
Flat# F1, H# Ta–134/A, Boishakhi Sarani,			Date of Receipt	:	14/Sep/20
Gulshan–Badda Link Road,			Cond. On Receipt	:	Satisfactory
Dhaka- 1212, Bangladesh.					
Details of Under Calibration Instrument:			Sr. No.	:	2019018235
Description	:	Sound Level Meter	Identification No.	:	EQMS # 263
Range	:	30 to 130 dBA	Least Count	:	0.1 dB
Make / Model	:	KASUNTEST/KT-200	Accuracy	:	-

Details of Standard Used:

Name	Sr./ID No.	Valid upto	Traceability
Sound Level Calibrator	PCSL_SD_01	15-Oct-20	IDEMI,Mumbai

Environmental Details: Temperature: 23.6 °C Relative Humidity: 59.8 %RH

Calibration Results

Std. Readings in dBA	UUC Readings in dBA	Error in dBA	Uncertainty(±) in dBA
94	93.5	-0.5	1.3
114	113.8	-0.2	1.3

Remarks:

1) UUC = Unit Under Calibration.
2) Calibration results given are the average of 3 readings.
3) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor k=2
4) The certificate is issued subject to conditions stated overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No.	: PCSL-200914-1-7	Date of Issue	: 16/Sep/20
Date of Calibration	: 15/Sep/20	Valid Upto	: 14/Sep/21
Customer Details	:	Receipt No.	: PCSL-200914-1
EQMS Consulting Ltd.		Challan No	: PCSL/CH/035
Flat# F1, H# Ta–134/A, Boishakhi Sarani,		Date of Receipt	: 14/Sep/20
Gulshan–Badda Link Road,		Cond. On Receipt	: Satisfactory
Dhaka- 1212, Bangladesh.			
Details of Under Calibration Instrument:		Sr. No.	: 070404820
Description	: Sound Level Meter	Identification No.	: EQMS # 170
Range	: 30 to 130 dB	Least Count	: 0.1 dB
Make / Model	: CENTER / 322 DATA LOGGER		

Details of Standard Used:

Name	Sr./ID No.	Valid upto	Traceability
Sound Level Calibrator	PCSL_SD_01	15-Oct-20	IDEMI,Mumbai

Environmental Details: Temperature: 23.6 °C Relative Humidity: 59.8 %RH

Calibration Results

Std. Readings	UUC Readings	Error	Uncertainty(±)
dB	dB	dB	dB
94	94.4	0.4	1.3
114	115.1	1.1	1.3

Remarks:

1) UUC = Unit Under Calibration.
2) Calibration results given are the average of 3 readings.
3) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor k=2
4) The certificate is issued subject to conditions stated overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No.	: PCSL-200914-1-6	Date of Issue	: 16/Sep/20
Date of Calibration	: 15/Sep/20	Valid Upto	: 14/Sep/21
Customer Details	:	Receipt No.	: PCSL-200914-1
EQMS Consulting Ltd.		Challan No	: PCSL/CH/035
Flat# F1, H# Ta–134/A, Boishakhi Sarani,		Date of Receipt	: 14/Sep/20
Gulshan–Badda Link Road,		Cond. On Receipt	: Satisfactory
Dhaka- 1212, Bangladesh.			
Details of Under Calibration Instrument:		Sr. No.	: 160324209
Description	: Sound Level Calibrator	Identification No.	: EQMS # 134
Range	: As Per Report	Least Count	: As Per Report
Make / Model	: REED INSTRUMENT/R8090		

Details of Standard Used:

Name	Sr./ID No.	Valid upto	Traceability
Sound Level Meter	PCSL_ENV_05	18-Feb-21	G & B, Mumbai

Environmental Details: Temperature: 23.2 °C Relative Humidity: 59.7 %RH

Calibration Results

Std. Readings in dB (at 1kHz)	UUC Readings in dB (at 1kHz)	Error in dB (at 1kHz)	Uncertainty(±) in dB
94	94.2	0.2	1.3
114	114.3	0.3	1.3

Remarks:

1) UUC = Unit Under Calibration.
2) Calibration results given are the average of 3 readings.
3) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor k=2
4) The certificate is issued subject to conditions stated overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Azal Hussain
Director & CEO

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No	: PCSL-200914-1-3	Date of Issue	: 16/Sep/20
Date of Calibration	: 15/Sep/20	Valid upto	: 14/Sep/21
Customer Details	:	Receipt No.	: PCSL-200914-1
EQMS Consulting Ltd.		Challan No	: PCSL/CH/035
Flat# F1, H# Ta–134/A, Boishakhi Sarani,		Date of Receipt	: 14/Sep/20
Gulshan–Badda Link Road,		Cond. On Receipt	: Satisfactory
Dhaka- 1212, Bangladesh.			
Description	: Dissolved Oxygen (DO) Meter	Identification No.	: EQMS # 99
Range	: 0 to 20.0 mg/L	Least Count	: 0.1 mg/L
Make/Model	: Lutron/DO-5509	Sr. No.	: R.027879

Details of Standard Used:

Name	Sl/ID	Valid upto	Traceabelity
Zero Oxygen Solution (0.0 mg/L)	SO127 /79	Nov-24	Hanna Instrument

Environmental Details: Temperature: 23.5 °C Relative Humidity: 58.9 % RH

Calibration Result

Do Value :

UUC Readings (in mg/L)	STD Readings (in mg/L)	Error (in mg/L)	Uncertainty(±) (in %)
00.1	0.0	0.1	0.5 %

Remarks:

1) Calibration results given are the average of 3 readings..

2) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor *k*=2

3) UUC = Unit Under Calibration.

4) The Certificate Is Issued Subject To Conditions Stated Overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No	: PCSL-200914-1-2	Date of Issue	: 16/Sep/20
Date of Calibration	: 15/Sep/20	Valid upto	: 14/Sep/21
Customer Details	:	Receipt No.	: PCSL-200914-1
EQMS Consulting Ltd.		Challan No	: PCSL/CH/035
Flat# F1, H# Ta–134/A, Boishakhi Sarani,		Date of Receipt	: 14/Sep/20
Gulshan–Badda Link Road,		Cond. On Receipt	: Satisfactory
Dhaka- 1212, Bangladesh.			
Description	: Digital Hygrometer	Identification No.	: EQMS # 21
Range	: As Per Report	Least Count	: 0.1 °C & 1 %RH
Make/Model	: ZEAL/---	Sr. No.	: -

Details of Standard Used:

Name	Sl/ID	Valid upto	Traceabelity
Temp. & Humidity Meter	201511008711/PCSL_TH_05	02-Dec-20	G & B,Mumbai

Environmental Details: Temperature: 23.9 °C Relative Humidi 57.9 % RH

Calibration Results

Range of UUC	UUC Readings	Corrected Std. Readings	Error	Uncertainty(±)
	(in °C)	(in °C)	(in °C)	(in °C)
10 to 50°C@50%rh	20.3	20.2	0.1	0.80
	23.6	23.4	0.2	0.80
	30.6	30.3	0.3	0.80
	45.8	45.5	0.3	0.80
Range of UUC	UUC Readings	Corrected Std. Readings	Error	Uncertainty(±)
	(in %rh)	(in %rh)	(in %rh)	(in %rh)
10 to 99%@25°C	50	50.52	-0.52	2.2
	55	55.97	-0.97	2.2
	60	61.03	-1.03	2.2
	65	66.10	-1.10	2.2

Remarks:

1) Calibration results given are the average of 3 readings..
2) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor *k*=2
3) UUC = Unit Under Calibration.
4) The Certificate Is Issued Subject To Conditions Stated Overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

OTS
when accuracy matters..

AJA EUROPE ISO 9001:2015 0273
Certificate No. AJAEU/19/14788A

CERTIFICATE of CALIBRATION

Issued by **OTS (Pvt.) Limited**

Navana DH Tower, Level 3, 6 Panthapath, Dhaka-1215
Tel : +880 1755585553-7, +88-02-58154510-11, 58156837
Fax: +88 02 58156739, E-mail: info@otsbd.com, www.otsbd.com

Certificate No. 020/(14-09)/5246
Issue Date 15/09/2020

Customer Details:

Name	**EQMS Consulting Ltd., Bangladesh.**
Address	Flat# F1, House# Ta-134/A, Boishakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.
Tel	+880 1882 231338
E-mail	saifur.rahman@eqms.com.bd

Details of Unit Under Calibration (UUC):

Description	Combo Meter
Manufacturer	HANNA
Model/Type	HI-98130
Serial Number	N/A
ID No.	**EQMS#97**
Range/working Range	(PH:0.00 to) (14.00 EC: 0.00 to MS/CM) (TDS: 0.00 to 10.00 ppt)
Least Count	Ref. On Obs.
Accuracy	As Per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Inst. Receipt	14/09/2020
Date of Calibration	14/09/2020
Suggested Due Date	13/09/2021
Service Request No.	5246
Calibration Procedure	The calibration has been performed under controlled conditions using OTS Laboratory reference standards, which are periodically referenced to one or more of the primary standards traceable to NPL/NIST or other national physical measures as equivalent to NIST. The calibration had been performed in accordance with calibration procedure COP/OTS/35. (Procedure based on Comparison Method).
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2 & 3.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (˚C)	25±4
Relative Humidity (%RH)	<70

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

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AJA EUROPE ISO 9001:2015 0273
Certificate No. AJAEU/19/14788A

CERTIFICATE of CALIBRATION

Issued by **OTS (Pvt.) Limited**
Navana DH Tower, Level 3, 6 Panthapath, Dhaka-1215
Tel : +880 1755585553-7, +88-02-58154510-11, 58156837
Fax: +88 02 58156739, E-mail: info@otsbd.com, www.otsbd.com

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Lot Number	Validity	Calibrated By
01	pH 4	HANNA	OTS/PH/04	3714	31/12/2023	HANNA
02	pH 7	HANNA	OTS/PH/07	4214	31/05/2024	HANNA
03	pH 10	HANNA	OTS/PH/10	4243	31/05/2021	HANNA
04	Conductivity Solution 5(µs)	Traceable Standard Solution				
05	Conductivity Solution 10(µs)	Traceable Standard Solution				
06	TDS Solutions	Traceable Standard Solution				
07	RTD Sensor With Indicator	Tempsens; Eurotherm	OTS/RTD/6482; OTS/TUSR/01	FL/C/TH/24012020-C001	28/01/2021	FARELABS
08	Distilled Water	Grade 3, Complying with ISO 3696 grade 3 water				

Guidance Notes:

Status A The measurement is within tolerance, due allowances having been made for the uncertainty of the measurement.

Status B The measurement may be out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status C The measurement is out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status D No conclusion can be drawn, because the standard(s) do(es) not specify a tolerance for this measurement.

OBSERVATION:

Calibration Data For pH Electrode

Sl. No.	Solution (pH)	U.U.C Value (pH)	Error (pH)	Tolerance	Status	Uncertainty
01	4.01	4.01	0.00	N/S	D	±0.234% of rdg
02	7.01	7.02	0.01	N/S	D	
03	10.01	10.02	0.01	N/S	D	

Conductivity : (verified against calibrated equipment)

Obs. No.	Conductivity Solution	Target (µs)	Observed Value(µs)	Tolerance	Status	Uncertainty
1	5(µs)	5	4.97	N/S	D	±0.05% of rdg
2	10 (µs)	10	9.95			

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TDS : (verified against calibrated equipment)

Obs. No.	TDS Solution	Target (ppt)	Observed Value (ppt)	Tolerance	Status	Uncertainty
1	3 (ppt)	3	3.02	N/S	D	±0.03% of rdg
2	5 (ppt)	5	5.01			
3	10 (ppt)	10	10.01			

The overall uncertainty shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. No adjustment was done during the calibration.
3. Any section marked, "N/A" means Not Applicable, "N/P" means Not Provided, "N/R" means Not Readable, "N/S" means Not Specifiec

Calibrated By:
Md. Golam Rabbani
(Calibration Engineer)

Checked By:
Md. Shohel Sardar
(Calibration Engineer)

Authorized By:
Md. Reza Hossain
(Asst.Technical Manager)

OTS Pvt. Ltd. Dhaka-1215 6 Panthapath

F01(7.8/01/C) Rev No. 01 Date of Rev. :26/12/2018

END

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AJA REGISTRARS ISO 9001:2015 0273
Certificate No. AJAEU/19/14788A

CERT.NO.02.004.15 BAB
BANGLADESH ACCREDITATION BOARD
Accredited for ISO/IEC 17025:2005

CERTIFICATE of CALIBRATION

Issued by **OTS (Pvt.) Limited**
Navana DH Tower, Level 3, 6 Panthapath, Dhaka-1215
Tel: +88-02-58154510-11, 58156837, 01755585553-7
Fax: +88 02 58156739, E-mail: info@otsbd.com, www.otsbd.com

Certificate No. 020/(14-09)/5250
Issue Date 15/09/2020

Customer Details:

Name	**EQMS Consulting Ltd., Bangladesh.**
Address	Flat# F1, House# Ta-134/A, Boishakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.
Tel	+880 1882 231338
E-mail	saifur.rahman@eqms.com.bd

Details of Unit Under Calibration (UUC):

Description	Beaker
Manufacturer	Indian
Model/Type	Pyrex
Serial Number	N/P
ID No.	**EQMS#251**
Range/working Range (ml)	100
Least Count (ml)	10
Accuracy Class	As Per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Inst. Receipt	14/09/2020
Date of Calibration	14/09/2020
Suggested Due Date	13/09/2021
Service Request No.	5250
Calibration Procedure	The calibration has been performed under controlled conditions using OTS Laboratory reference standards, which are periodically referenced to one or more of the primary standards traceable to NPL/NIST or other national physical measures as equivalent to NIST. The calibration had been performed in accordance with calibration procedure OTS.WI-011M (Procedure based on IS/ISO 4787:2010 glasswares, graviemetric method at 27°C).
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (°C)	25 ± 3
Relative Humidity (%RH)	40 to 60

Change in temperature and relative humidity of the Laboratory were during the calibration less than 0.3°C per hour and 5.0% per 4 hours respectively.

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

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CERTIFICATE of CALIBRATION

Issued by **OTS (Pvt.) Limited**
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Tel: +88-02-58154510-11, 58156837, 01755585553-7
Fax: +88 02 58156739, E-mail: info@otsbd.com, www.otsbd.com

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	Weighing Balance(Upto 125g)	Swiss Made	OTS/BL/05	020/(22-08)/OTS/WB/05	21/02/2021	OTS
02	RTD Sensor With Indicator	Tempsens; Eurotherm	OTS/RTD/6482; OTS/TUSR/01	FL/C/TH/24012020-C001	28/01/2021	FARELABS
03	D-ionized/ Distilled Water	Grade 3, Complying with ISO 3696 grade 3 water				
04	Digital Thermo Hygrometer	Testo	OTS/DL/01	020/(25-03)/OTS/DL/01	24/03/2021	OTS

Guidance Notes:

Status A The measurement is within tolerance, due allowances having been made for the uncertainty of the measurement.

Status B The measurement may be out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status C The measurement is out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status D No conclusion can be drawn, because the standard(s) do(es) not specify a tolerance for this measurement.

OBSERVATION:

Volume: (verified against calibrated master equipment)

Sl. No.	Target Value (ml)	Actual Value (ml)	Error (ml)	Tolerance	Status	Uncertainty (ml)
01	10.00000	9.99989	0.00011	N/S	D	±0.05
02	30.00000	29.99972	0.00028	N/S	D	
03	50.00000	49.99965	0.00035	N/S	D	
04	80.00000	79.99958	0.00042	N/S	D	
05	100.00000	99.99939	0.00061	N/S	D	

The overall uncertainty shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. No adjustment was done during the calibration.
3. Any section marked, "N/A" means Not Applicable, "N/P" means Not Provided, "N/R" means Not Readable, "N/S" means Not Specified.

Calibrated By:
Md. Golam Rabbani
(Calibration Engineer)

Checked By:
Md. Shohel Sardar
(Calibration Engineer)

Authorized By:
OTS Pvt. Ltd. Dhaka-1215
Md. Reza Hossain
(Asst. Technical Manager)

F01(7.8/01/C) Rev No. 01 Date of Rev. :26/12/2018

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Accreditated
Certificate No. CC-2409

Certificate No. 020/(14-09)/5258
Issue Date 15/09/2020

Customer Details:

Name	**EQMS Consulting Ltd., Bangladesh.**
Address	Flat# F1, House# Ta-134/A, Boishakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.
Tel	+880 1882 231338
E-mail	saifur.rahman@eqms.com.bd

Details of Unit Under Calibration (UUC):

Description	Thermometer
Manufacturer	ZEAL
Model/Type	Glass Type
Serial Number	N/P
ID No.	**EQMS#262**
Range/Working Range (°C)	0 to 360
Least Count (°C)	2
Accuracy	As Per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Inst. Receipt	14/09/2020
Date of Calibration	14/09/2020
Suggested Due Date	13/09/2021
Service Request No.	5258
Calibration Procedure	The calibration has been performed under controlled conditions using OTS Laboratory reference standards, which are periodically referenced to one or more of the primary standards traceable to NPL/NIST or other national physical measures as equivalent to NIST. The calibration had been performed in accordance with calibration procedure OTS.WI-022. Temperature Scale: ITS-90.
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (°C)	25±2.5
Relative Humidity (%RH)	35 to 65

Change in temperature and relative humidity of the Laboratory during the calibration was less than 0.3°C per hour and 5.0% per 4 hours respectively.

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

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Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	RTD Sensor With Indicator	Tempsens; Eurotherm	OTS/RTD/6482; OTS/TUSR/01	FL/C/TH/24012020-C001	28/01/2021	FARELABS
02	Digital Thermo Hygrometer	Testo	OTS/DL/01	020/(25-03)/OTS/DL/01	24/03/2021	OTS

Guidance Notes:

Status A The measurement is within tolerance, due allowances having been made for the uncertainty of the measurement.

Status B The measurement may be out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status C The measurement is out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status D No conclusion can be drawn, because the standard(s) do(es) not specify a tolerance for this measurement.

OBSERVATION:

Temperature: (verified against calibrated instruments)

Sl. No.	Standard Value (°C)	U.U.C. Value (°C)	Error (°C)	Tolerance (°C)	Status	Uncertainty (°C)
01	0.000	0.00	0.000	N/S	D	±0.60
02	50.384	50.00	-0.384	N/S	D	
03	100.648	100.00	-0.648	N/S	D	
04	201.079	200.00	-1.079	N/S	D	
05	301.387	300.00	-1.387	N/S	D	

The overall uncertainy shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. No adjustment was done during the calibration.
3. Any section marked, "N/A" means Not Applicable, "N/P" means Not Provided, "N/R" means Not Readable, "N/S" means Not Specified.

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Authorized By:
Md. Reza Hossain
(Asst. Technical Manager)

F01(7.8/01/C) Rev No. 01 Date of Rev. :26/12/2018

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