Ref. No.: JV-ALDLP-BR-20- 120 Date: 30 July 2020

Mr. Md. Romzan Ali
Project Director
Bangladesh Railway, Rail bhaban
16 Abdul Gani 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: Revised Semi-Annual Environmental Monitoring Report (January – June 2020).

Dear Sir,

With reference to the subject, we do hereby submit the Semi-annual Environmental Monitoring Report (EMR) (as of 30 June 2020) after revising the Report as per the comments from ADB for your kind review.

Sincerely yours,

Mr. Raymond George Sawyer
Team Leader 30/7/2020
CSC of ALDLP
E-mail: raysey9@gmail.com

Attachment: 1. Revised Semi-Annual Environmental Monitoring Report January – June, 2020 (6 copies)

Bangladesh Railway
Ministry of Railways
Government of the People's Republic of Bangladesh

CONSULTING SERVICES CONTRACT FOR CONSTRUCTION SUPERVISIONOF AKHAURA-LAKSAM DOUBLE TRACK PROJECT

ADB Loan No.: 3170-BAN (SF)

2020

ENVIRONMENTAL MONITORING REPORT

Semi-Annual Environmental Report: January-June 2020

Prepared by: Dr. Md. Kabil Hossain

DOHWA Engineering Co. Ltd., Korealn Joint Venture with Korea Rail Network Authority, Korea;Oriental Consultants Global Co. Ltd., Japan;Balaji Railroad Systems Limited, India; andDevelopment Design Consultants Ltd., Bangladesh

7/15/2020

Government of the People's Republic of Bangladesh

MINISTRY OF RAILWAYS

BANGLADESH RAILWAY

CONSTRUCTION OF DUAL GAUGE DOUBLE RAIL LINE AND CONVERSION OF EXISTING RAIL LINE INTO DUAL GAUGE BETWEEN AKHAURA AND LAKSAM

Environmental Monitoring Report
January- June 2020

Submitted To : ADB BRM, Dhaka

Submitted By : Project Director, ALDLP, Bangladesh Railway

Prepared By : CSC, ALDLP, Bangladesh Railway

EXECUTIVE SUMMARY

Akhaura-Laksam, being a part of Dhaka-Chittagong Railway corridor, is a part of Trans-Asian Railway Network, SASEC, SAARC & BIMSTEC corridors in Bangladesh.

The project entails double tracking of a 72 km rail line, construction of 11 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 categorized as Category B, as project is basically extension of railway capacity and also environmental impact will be reversible and short-term with proper implementation of EMP. Accordingly an Initial Environmental Examination (IEE) has been prepared for the Project. The European Investment Bank (EIB) as a co-financier for this project requires the preparation of an Environmental Impact Assessment (EIA) in accordance with the requirements of EIB Environmental and Social Handbook, (2013). In accordance with the requirements of the Department of Environment (DoE), Ministry of Environment, Forests and Climate Change, Government of Bangladesh the project is classified as Red category and requires a full EIA. The project investment is more than 1 million taka and includes bridges longer than 100, and hence is a Red category project.

Environmental Safeguard is one of the most important issue in project funding and implementation. ADB is seriously concerned about this issue and strictly ensure that any development project financed by them will not affect the natural and social environment of the borrower/loan recipient country like Bangladesh. According to ADB's Safeguard Policy Statement (SPS-2009) borrowers need fulfill the safeguard policy requirements. So the Environment Management Plan (EMP) for Akhaura-Laksam Double Line project must have been prepared, implemented, monitored and reported semiannually so that the project does not impart any serious adverse impact on the natural and social environment.

Covid-19 Issue, Strategy and Impact on Project

The COVID-19 virus has introduced unprecedented challenges worldwide. As per order from the Government of Bangladesh in March 24, 2020 special and emergency situation announced and overall lockdown situation started throughout whole of Bangladesh to slow down the spread of the virus. As a result, construction works and projects throughout the country were suspended. ALDLP project activities was not an exception. Almost two months there were no activities at all. After two months when the Govt. decided to slowly come out from the lockdown, project authorities also took decision to start work. Situation was not safe enough for working as rate of infected people and death rate was not decreasing by that time. All these incidents have negative impact on project progress.

From the very beginning after the projects resumes several guidelines regarding COVID-19 from Director General of Health-Bangladesh and from World Health Organization have been adopted and followed. Workers and Engineers are supplied with set of PPE`s, hand sanitizer, masks, goggles etc. which are inadequate and of low qualities. Disinfectant spray arrangements provided at some work places and in the vehicles and also disinfectant tunnel has been installed at the important camp`s entry. Hand washing system with no touch also have been facilitated. Arrangement of quarantine room also has been ensured before resuming the project works. Awareness guidelines have been circulated to all. COVID-19 awareness program have been arranged maintaining social distance, using mask and hand gloves.

All these initiatives have ensured less negative impact on the health situation of all who are closely related to this huge project activity. As a result, no symptoms of COVID-19 are observed among the persons of ALDLP CSC and CTM JV except two persons who were in isolation for two weeks and recovered accordingly. This will surely minimize the negative impact occurred on project progress during lockdown for COVID-19.

Project Status

Contractor had submitted their Programme on 29th November 2016 as per SubClause 8.3.

The Programme was reviewed and returned for remaking with comments because the Programme had not been comply with the Contract on 14 December 2016.

Engineer was able to issue Instruction only on 31st October, 2016 to commence from 1st November, 2016 as the commencement of the works were delayed.

Physical works had been started.

On-going activities (in Up & down Lines)

Clearing Grabbing and Stripping works,
Embankment bed preparation / Filling,
Laying Geotextile / Sand Drainage / Sand Blanket preparation, PVD installation
Sand Compaction Pile (SCP) construction (Variation Works) Sub-Grade Construction
Sub-Ballast Construction
Supply of special equipment and materials for track work is ongoing. All rails are stacked at different stockyards of the project. Ballast supply is ongoing and paid quantity based on approved frequency tests and delivery Chalan is 331, 218.0 cum (83%) received to date.Sleeper production & supply are ongoing and about 294,868 nos. (All types) being produced/ supplied to the project.

Contractor had prepared Mobilization for followings:

(i) All construction plant and equipment as stated in the bid proposal: 229 nos, of Heavy Equipment from Plan 579 Nos. mobilized as of 30 November 2016 and continued more Equipment mobilization in March 2018.

(ii) Construct and equip the site laboratory: Materials Testing Laboratory has been set up in Cumilla.

Environmental Monitoring

All impacts, mitigation measures and monitoring requirements have been defined in Environment Management Plan (EMP), included in the EIA. Monitoring works focus on inspection of contractor work areas, their waste disposal sites, their rehabilitation/re-vegetation, proper landscaping, re-establishment of local access, debris clearance from reconstructed station buildings, culverts as well as the Engineers Main Office, etc. BR is being implemented an air and noise quality monitoring programme during construction years to establish the noise and air quality degradation (if any) at sensitive sites, identified during the Environmental Impact Assessment and to implement proper noise and air quality attenuation measures. In this regard, the contractor is being conducted a regular air, water and noise quality monitoring programme, specified in the Environmental Management Plan and submitting reports on a monthly, quarterly, semi-annually and annually basis. Environmental sampling photographs and site monitoring photographs are presented in **14.2 Appendix-B and 14.3 Appendix-C respectively.**

Water Quality Monitoring

Surface water quality monitoring had been performed monthly during January to June 2020. There is a possibility to pollute the surface water during the construction period from housekeeping garbage, construction debris discharged by the workers, spillage of fuel and other chemicals from construction equipment, accidental spillage of oil and other noxious chemicals. The quality of surface water tested and analyzed in the project area is compared with baseline and DOE standard**.** In some month the result of the parameters found more than the baseline but acceptable limit. The contractor is requested to take necessary measures for mitigation through not throwing waste into the water body.

Groundwater sources can be contaminated by the seepage of wastes from workers' camps through the soil profile into the ground water aquifer when wells access the shallow aquifer. Groundwater contamination also occurs when gasoline, oil, lubricants, petroleum products and chemicals get into the groundwater and cause it to become unsafe and unfit for human use. Materials from the land's surface can move through the soil and end up in the groundwater. The quality of groundwater is being tested and analyzed in the project area monthly basis by CTM JV. The result of the parameters of ground water found little bit more than the baseline in some month but within the standard limit. The contractor is advised to take necessary measures for mitigation by not to contaminate soil with gasoline, oil, lubricants, petroleum products and chemicals.

Air Quality Monitoring

A total of 11 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. Previously air sample was collected for 8 hours but at present they are taking the sample for 24 hours.

Noise Level Monitoring

Ambient noise levels have been monitored from Railway Stations of the ALDLP project. Twenty two (22) noise level sampling locations had been selected from the nearby sensitive receptor of the stations. Before noise level was monitoring for 2 hours but at present noise level is being measured for 24 hours at every location and was recorded. Potential noise impacts vary and are based on the noise amplitude, frequency, distance from receivers, site landscape features, topography, presence of obstacles and meteorological effects. Project related key noise sources are train traffic, generators, vehicles, construction equipment and people. In some station noise level found little bit more than baseline and DoE standard. Noise attenuation measure is suggested for mitigation specially use of earplugs and earmuffs.

Compensatory Tree Plantation

More than 55,000 trees had been cut down. Three times that is 1,65,000 trees will be planted to compensate the loss. These trees will keep the ecological balance.

Tree plantation had been started in the month of May 2019. In May about 1700 saplings had been planted. Plantation had been started from Zero point at Laksam end. As of December 2019 it was found that 15% saplings are alive and rest of 85% plants have been died. These saplings have been replaced by fresh ones. A training program on tree plantation had been performed on 22 December 2019 at Lalmai Railway Station. Local people participated in this program. The training program was organized by CTM JV. ADB BRM and Bangladesh Railway officials along with ALDLP Project Director visited during training session. CSC's Acting Team Leader was also present during visit. CSC Environmental Specialists assisted the training program. More training program will be performed next time involving female persons.

This year about 1,08,000 trees would be planted during rainy season 2020. But ready track may cover 80,000 saplings plantation.

Gomoti Nursery near Gomoti Bridge in Cumilla has been selected for planting trees this year. Tree planation has been started in the month of June 2020 following the approved plantation plan. 30-40 workers both male and female are engaged in planation activities. About 20,300 saplings have been planted already.

Results of Environmental Monitoring and Compliance Measures

The monitoring results revealed that there were some major significant environmental issues that are being raised during the reporting period. But there are a number of working sites where more mitigation action is need to be taken by the contractor to meet up full compliance with the EMP, as many more activities have been started on site already. In respect to location, work type and status of compliance contractor should mention the environmental issues and mention their mitigation measures taken.

Conclusions

Akhaura-Laksam Double Track project could generate a number of environmental impacts, such as those associated with the embankment construction, the river crossings or workers poor campsite housekeeping by the contractor. The EMP provides the specific guidelines which BR has put in place to prevent or mitigate these effects. BR is committed to implement these measures have fully endorsed into the EIA which is the basis for the EMP. BR will ensure that the work is carried out in an environmentally acceptable manner and the monitoring and reporting are completed in a compliant and timely fashion, acceptable to DoE, ADB and EIB.

Further Action Required

Bangladesh Railway needs to initiate a station cleaning protocol that addresses garbage and solid waste strewn around the station and on the tracks beside the platforms.

BR needs to fully address the mitigation and monitoring actions defined in the EMP, starting with the management of stations and the provision of clean toilet facilities and maintaining adequate separation of male and female toilet facilities.

BR needs to seriously consider installing sewage collection tanks on its trains, thereby stopping the present practice of dumping raw sewage onto the tracks.

Lessons Learned

The Engineer needs to be given authority through more workable provisions in the contract to act very quickly when non-compliance is observed whereby it is clear to the contractor that serious consequences including financial penalties are possible should the contractor decide to be non-responsive to Environmental Safeguard Issues.

In some cases contractors fail to recover the non-compliance issues though they are insisted several times. They always agree with the non-compliance and committed to rectify the issue but later on become very reluctant.

Identified issues are: a) dust pollution b) water course impacts c) disposal of construction debris d) servicing and operating equipment e) control of petroleum products f) waste oil and lubricants g) occupational health and safety h) housekeeping and toilet facility i) Drinking water facility j) use of personal protective equipment (PPE) and k) Compensatory tree plantation

Resolved issues are: a) dust pollution b) water course impacts c) disposal of construction debris d) servicing and operating equipment e) control of petroleum products f) waste oil and lubricants g) housekeeping and toilet facility and h) Drinking water facility

Pending issues are: a) occupational health and safety b) use of personal protective equipment (PPE) and c) Compensatory tree plantation

Corrective Action Plan for pending issues: Time to time CAP is being provided.

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
ALDLP	Akhaura- Laksam Double Line Project
BR	Bangladesh Railway
BG	Broad Gauge
CSC	Construction Supervision Consultancy
DG	Dual Gauge
DPP	Development Project Proforma /Proposal
EIA	Environment Impact Assessment
EIB	European Investment Bank
GOB	Government of Bangladesh
ITC	Instruction to Commence
LA	Land Acquisition
LAR	Land Acquisition and Resettlement
LC	Level Crossing
MG	Meter Gauge
MOF	Ministry of Finance
MOR	Ministry of Railways
MPR	Monthly Progress Report
PAM	Project Administrative Manual
PVD	Prefabricated Vertical Drain
RoB	Rail Over bridge
RoW	Right-of-Way
SAARC	South Asian Association for Regional Co-operation
SASEC	South Asia Sub-regional Economic Cooperation
TL	Team Leader of DOHWA Joint Venture
TOR	Terms of Reference
DOHWA JV	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

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SECTION I: INTRODUCTION

1. Project Background

1.1 Purpose of the Report And Rationale

1. The Contract for implementation of Consulting Services between Bangladesh Railways (BR) and Dohwa Engineering Co., Ltd and 4 Joint partners mandates submission of "Semi-annual Environmental Report" in compliance with Sub-Clause 26.1 Reporting Obligation of the General Conditions of Contract and Appendix A.

Appendix –A, Item C – "Scope of Work" of the Terms of Reference(TOR) of the Consultancy Services Contract relates to the Construction Supervision Activities where in the Consultant, according to the Contract will work as "the Engineer" to provide the following major categories of services.

Part 1: Project Management, Administration and Planning

Part 2: Technical Support

Part 3: Construction Supervision, Testing and Inspection

Part 4: Environmental Aspects

Part 5: Gender and Other Social Aspect

Part 6 : Resettlement Aspects

Part 7: Defect Liability Period

2. Most important requirement for this phase is to submit semi-annual Environmental Reports with emphasis mainly on the details of construction activies and progress of the Works. Construction Contract has commenced according to the Instruction to Commence(ITC) issued by the Engineer on 31st October, 2016 for the Contractor to commence the Works from 1st November, 2016. However even if ITC was delayed due to non-payment of some part of Advance Payment since the Agreement of Construction Contract was made on 15th June, 2016 the Contractor actually has started mobilization in various provisional disciplines' area.

3. During this period Contractor had been busy performing their duties imposed on Contract for preparation and submission of required documentations and procurement of materials.

This report has been prepared by Project Team of Dohwa Engineering Co., Ltd and 4 Joint partners as the project implementation consultant.

1) Sector Objective

4. Government of the People's Republic of Bangladesh adopted the National Land Transport Policy (NLTP) in April 2004 following recommendations from DFID and other agencies, through which the Institutional and Operational Capacity of Bangladesh Railway are to be enhanced and improved. The Asian Development Bank (ADB) and European Investment Bank (EIB) is financing to achieve the targets set in the NLTP.

5. Bangladesh Railway (BR) needed both reform and investment before it can achieve the targets set for the railway sector, the GOB requested the ADB to help finance a Railway Sector Investment Program. This financial support is being extended through a multi-tranche financing facility (MFF). The Government committed to implement a Roadmap and Investment Program that consists of two components viz:

- The Reform Project to improve the performance of the railway sector through organizational, institutional strengthening & policy reforms;
- The Investment Project to finance implementation of priority investments ("Investment Subprojects") to overcome capacity bottlenecks in areas of the railway network where such investments are both economically and financially viable (e.g. the Dhaka-Chittagong Corridor.)

2) Project Inception

6. Under ADB's TA-Loan-2688-BAN (SF), the Sub regional Transport Project Preparatory Facility(STPPF), a design project is going on for feasibility study and detailed design for 7(seven) sub-projects. The feasibility study , detailed design and tendering services of the above sub-projects were carried out against STPPF.

7. The investment project will be funded by Asian Development(ADB), European Investment Bank(EIB) and Government of Bangladesh(GOB). Hence, the project will be guided by the guidelines of ADB, EIB and GOB.

3) Project Objectives

8. To convert Dhaka-Chittagong Railway corridor from Meter Gauge (MG) to Broad Gauge (BG) by constructing Dual Gauge and to construct the Double Tacks of the whole project segment.

To improve the traffic capacity by constructing double track of 72km section and to improve of existing track so that more trains can be introduced. After the implementation of the Project, the current capacity of 23 pairs of trains per day will be increased up to 72 pairs of trains per day.

9. By improving the load bearing capacity of railway track new locomotives of heavier axle load can be operated in Dhaka-Chittagong corridor.

10. This project will contribute to improve connectivity for regional and International Freight (Container) traffic along the Trans Asian Railway from India North East to Chittagong and will improve the punctuality of train services by clear off the temporary speed restrictions. Moreover, double track and improved section of existing track will save 25 minutes off the present travel time.

11. The improvement of the financial performance through lowering operating costs will provide a better quality of service for the passengers.

To improve reliability for freight services by providing capacity that affords container block trains with equal priority to intercity passenger trains.

To reduce traffic congestion and air pollution through diversion of some road traffic to rail.

4) Project Implementation

12. For Consultancy Services for the Construction Supervision of Akhaura-Laksam Double Track Project an International Tender was called on 19th May,2015. Dohwa Engineering Co., Ltd in joint venture with 4 other companies(Dohwa JV) was resulted in the successful tenderer and a consultancy contract was signed on 28th February, 2016.

13. The detailed design of Construction of Akhaura-Laksam Double Track Project was completed

in 2015. Based on the completed design, tender documents were prepared and issued to prequalified contractors in May, 2015. A contract for ALDLP was signed between BR and CTM JV(China Railway Group<CREC>,Toma Construction & CO. Ltd.<TCCL> and Max Infrastructure Limited.<MAX> on 15th June, 2016 for a Contract Amount of BDT 34,734,882,272.43(USD446,636,007 of which ADB will finance 68.3%, EIB,27.8% and GOB,3.9%).

14. After signing of the contract for construction works, Dohwa JV was appointed as the " Engineer" for the construction on 15th June, 2016.

15. Dohwa JV started mobilizing from 10th April, 2016 and CTM JV started mobilizing as from 15th June, formal Instruction to Commence of the Contract was given to CTM JV on 31st October, 2016 for their Commencement from 1st November, 2016 under the total construction period of 1,456 days (48months).

16. The whole line is devided into 3 sections with different completion dates as intermediate milestone term schedule.

1.2 Project Location And Components

1.2.1 Project Location

17. The Rail network is divided into two zones: east and west, separated by the Jamuna River. The network includes 659.33km of broad gauge track with the west zone, i.e., 1.676 meter width track. In addition the west zone gauge track has 534.67 km track and 374.83 km of dual gauge track (catering for both broad and meter gauge trains). The east zone has 1,273.38 km of meter gauge track, 34.89 km of dual gauge track. Jamuna multipurpose bridge, which has a dual gauge rail link, provides the only east-west rail link. Project location is given in **Table 1** and **Figure 1.**

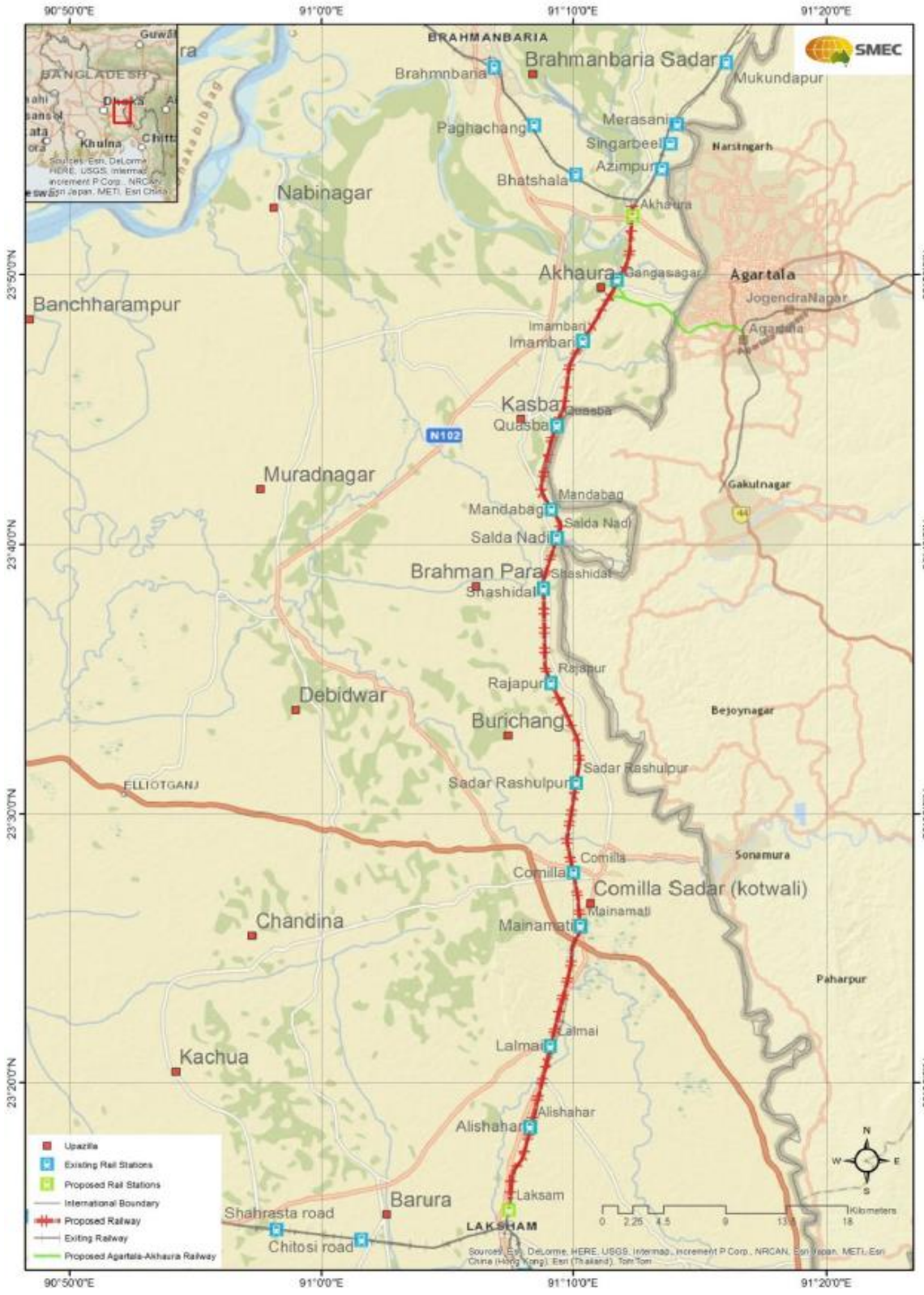
18. The project will support the Government of Bangladesh to upgrade about 72 km Akhaura-Laksam section of Dhaka Chittagong railway corridor to a double track railway line with modern signaling and telecommunication equipment. The section is part of a major sub-regional corridor and the Trans-Asia Railway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

19. The rainy season in this area starts between April and July and ends between September and November. The track passes through low, flat and alluvial land and crosses several major rivers viz, Titas River, Howrah River, Bijni River, Salda River and Gomoti River and many smaller rivers, streams and canals some of which become dry during the dry season.

Table 1. Location of the Laksam-Akhaura Double track Project

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

Figure 1. Akhauar-Laksam double line Project Location Plan



1.2.2 Project Components

20. The scope of the Akhaura-Laksam Double Line Project(ALDLP) and major activities are summarized as follows:

(i) Constructing a second track in dual gauge of 72 Km

(ii) Reconstructing 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

(vii) Construction of 11 new stations

21. A modern computer-based interlocking signaling system will be installed; this will be integrated with the Centralized Traffic Control system. Particulars of project component is given in **Table 2.**

Table 2. Particulars of Akhaura-Laksam Double Line Project components

Property	Qty	Properties	Qty
Major Bridge	12 Nos.	Level Crossing	23 Nos.
Minor Bridge (Culverts)	49 Nos.	Station to be modified In Signalling and Telecommunication	2 Nos.
New Station	11 Nos.	Station Building with Total plinth area and New station	11 Nos.
Route Km	72 Km	Other functional and Residential building With total plinth	54 Nos.
Track Km	180 290m		

1.3 Environmental Classification of the project and Responsibilities

1.3.1 Environmental Category

22. 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 and the project includes construction of tracks alongside an already existing track. Hence an Initial Environmental Examination (IEE) has been prepared.

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

24. 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. The 69 types of projects listed a red category in the Environmental Conservation Rules 1997 includes engineering works where the capital investment is more than 1 million Taka and construction of bridges longer than 100 m. The project investment is more than 1 million taka and includes bridges longer than 100 m, and hence is red category project.

2) Environmental Clearances

25. 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) needed to obtain Environmental Clearance Certificate (ECC) from the Department of Environment, Government of Bangladesh before commencement of the construction works.

26. The Environmental Clearance Certificate (ECC) for the project, valid for one year, was obtained by BR from the DOE on 2nd May 2016, according to their memo no. DOE/Clearance/ 5209/2013/188. Dated: 02/05/2016. Subsequently renewals of the ECC has been obtained before 02/05/2017 for the year 2017-1018 (1 year). BR had to lodge an application for a renewal of the environmental clearance certificate up to 30th Jun 2017. The previous year it was renewed on 29 May 2018 for year 2018-2019. Last year the renewal was found on 25 July 2019 for the year of 2019-2020. For the year 2020-2021 BR had applied to DOE in Cumilla at the end of June 2020.

3) Institutional Setup and Responsibilities

27. During the preparation and construction of the Project, BR's Project Director is giving the final approval for all administrative and technical decisions at all times. The key agencies or units which are playing major roles in the implementation of the EMP are:

- Bangladesh Railway's newly proposed Environmental and Social Safeguards Unit (ESSU)
- The Contractor;
- Engineer (usually an international firm);

28. The implementation oversight of all safeguard items in the EMP and indeed the construction contract are with BR and its ESSU. When the Engineer is appointed BR's technical management of the work is being delegated to the Engineer, but with final approval always passing through BR (Figure 21 in the EIA report**)** with annual audit reports submitted to ADB and EIB, who may undertake periodic inspection trips to confirm that safeguards are being fully implemented **(Figure 2).**

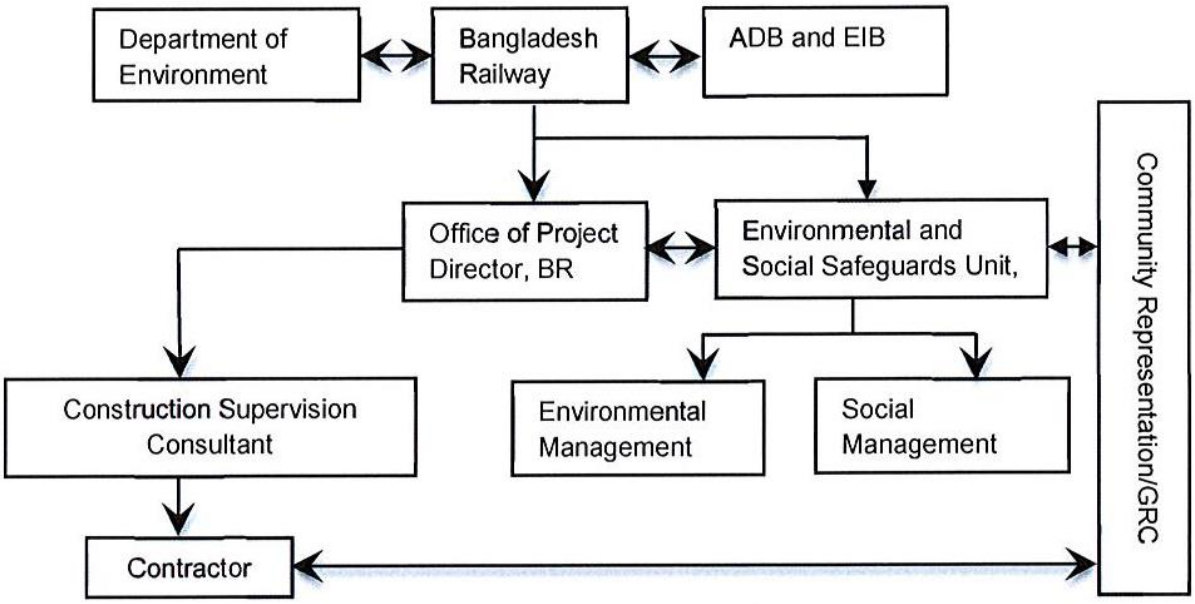


Figure 2. Safeguards Implementation and Reporting Work Flow

29. **BR's Environmental and Social Safeguards Unit (ESSU) –** 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. Therefore the ESSU's main tasks will be:

- Oversee the implementation of the LAP and RP;
- Implementing the EMP;
- Supervise and monitor the progress of the Consultant engaged by BR, for addressing safeguard requirements, such as air quality or resettlement plan implementation monitoring;
- Liaise with all regulatory agencies, including DoE and the public;
- Prepare all manner of safeguard monitoring and compliance reports; and
- Providing training to contractors and BR staff.

30. At this time BR is in the early stages of planning such a unit within its organization. During this planning stage BR will appoint at least one safeguards person to look after the Project safeguard needs, and be the direct contact for safeguard matters between stakeholders, regulators, donors and BR.

31. **BR's Regional Offices and Staff –** The day-to-day oversight of the construction work on this Project has not been decided but will likely be done by the Regional BR Office and its Chief Engineer in charge. Therefore, the Engineer will work closely with the BR's Regional office.

32. **Construction Supervision Consultant/The Engineer –** The proposed framework for implementation of the Project shall utilize consultancy services from both international and national companies for the overall management and supervision of construction work and for preparation of the associated documents.

33. **Contractor(s) –** A contractor selected on the basis of international completive bidding shall carry out construction work based on a contract containing a set of environmental clauses, conditions and/or specifications (Section 6, Subsection H of contract technical specifications and **Annex 11).** The contractor will need to demonstrate environmental capacity in the proposal submitted to BR, and be prepared to have that person(s) participate in the mandatory pre-construction training exercise delivered by BR's ESSU or its Consultant.

34. **Other GoB Organizations –** The organizations involved in regulating the project are Department of Environment (DoE), Bangladesh Water Development Board (BWDB), Roads and Highways Department (RHD) and Department of Forest (DF), Local Government Engineering Department (LGED), Bangladesh Inland Water Transport Authority (BIWTA), and local administration (UNO, DC, Police, etc.). They will provide supporting services as required.

4) Key Findings in the EIA report

35. The conclusion and recommendations of the EMP of 2016 are as follows:

The project involves the doubling of an existing rail line; therefore new impacts are really the magnification of impacts taking place along the corridor for many decades given that it has been in operation since the late 19th Century.

36. Most of the impacts associated with the project will occur during the construction period since a large and high embankment, between 2-6 n, will be put in place and requiring millions of tons of fill material. Much of that will be dredged from nearby rivers and pumped as slurry to the work sites. As much ballast, as possible will be hauled on roads. The problems arising when the contractor does not follow environmentally responsible operating procedures or does not provide proper housing or cleaning, hygienic quarters for the workers is also addressed in detail.

37. The EIA identified eight mitigation actions needing to be addressed during the pre-construction period, another 20 during the construction period and eight during the operating period of new rail line. To track the mitigation work an air, noise and surface water quality monitoring programme will be started during the construction period and carried through into the operating period for operating period for operating years 1, 3 and 5.

38. There is little chance that impacts will extend much beyond the 50 or 100 m wide corridor of impact centred over the rail line, given that all work will be strictly confined to the railways existing Right of Way.

39. Careful implementation of the pre-construction mitigation measure will make the likelihood or scale of the construction period impacts less.

40. The climate risk associated with sea level rise and the need to adjust bridge deck clearances was calculated and found to be negligible given the distance of the bridges to a location where sea level rese can be measured (Meghna River estuary).

41. The fuel saving, due to diversion of road use to rail travel during the first year of full operation, i.e. , 2020, will be 10,743,000 litre of fuel, with 6 additional train sets operating on the new track. However by 2023, with 44 train sets in operation, estimated fuel saving will be around 54 million litres/year (including the added fuel used by the larger number of train sets. After 2023 the diversion is expected to have peaked and no increase is predicted through 2044.

42. Based on these data, the diverted traffic in 2023, when 44 train sets are I operation an estimated 64.4 million litres of diesel fuel per year would be saved, with a net benefit, once train consumption is deducted, of 53.78 million litres/year. A net fuel saving of 53.78 million litres per year, translates into a saving of 145,000 metric tonnes of equivalent CO_2 per year. (Using an equivalent CO_2 emissions factor of 2.69 kg CO_2 per litre of diesel fuel consumed).

43. The establishment of BR's Environmental and Social Management Unit will be essential and will make the job of implementing environmental safeguards much easier and more credible, since some expertise will reside in BR, overseeing the entire EIA procedure, instead of it being only with outside Consultant.

44. Social impacts especially associated with land acquisition and the need to relocate people and to use productive agricultural lands, will be significant and will affect thousands of people. The procedure for determining entitlement and compensation is defined in the LAP and RP documents which the Project must follow closely. The actions defined in these two documents are being implemented by BR.

45. No red-flag environmental safeguard issues were identified and all likely impacts can be prevented or mitigated to an acceptable level.

46. BR will fully implement the EIA's environmental management plan and quarterly monitoring will be used to adjust the monitoring programme defined in the EIA. Should problems be noted with the data, BR will recommend immediate actions, and the annual reporting will be used to adjust mitigation actions. These activities, coupled with the timely reporting will provide the appropriate level of

environmental oversight and demonstrate to the ADB that the natural environment is being protected while the rail line is built and the system becomes operational.

47. The potential impacts on the Gomoti River Bridge were examined, focusing on pile driving in water, use of drilling lubricants, work camp operation near the shore and work over a navigation channel. To address these issues a separate EMP, designed to deal with all possible effects that might endanger the river's aquatic environment, was prepared and will be implemented.

48. The reconstruction of 11 stations and construction of other building s will be managed through a programme of maximum recycling of materials and management of all wastes and dust suppression. The design of each station and building, to accommodate sewage, waste, water, lighting and universal design features has been completed as a separate report and will be verified as part of the pre-construction check by BR and its ESSU.

49. BR concludes that this EIA is complete and addresses all relevant likely impacts and proposes a full set of time-bounded mitigation and monitoring actions, including assignment of responsibility. The application of the detailed EMP will ensure that the nature and socio-cultural environment are not unduly affected by the work or the operation of the second line. Therefore BR recommends that an environmental approval be granted by DoE, and that no additional studies be required.

50. The recommendations of the EMP were incorporated into the detailed design and the tender documents and have then became a part of the civil works contract. The cost for the implementation of the EMP was included in the contract and the approved Revised Development Project Proforma /Proposal (RDPP).

1.4 Project Status

1) Project Status as of 30 June 2020

64. Processing Status of Materials and Others:

(i) **Rails:** Approved manufacturer of rails as to "Inner Mongolia Baotou Steel Union Co, China"

(ii) **Third Party Inspector:** the Engineer approved NMCI for rails only, other track material not approved.

(iii) **Ballast source:** Approved 4 suppliers.

(iv) **Temporary Laboratory** has been set up in Cumilla at the end of November 2016.

(v) **Aggregate Source:** approved 4 suppliers

(vi) **Cement suppliers:** Approved 4 suppliers

(vii) **Rebar:** Approved 3 suppliers

(viii) **PSC Sleepers:** GPT Infra-project Technologies/India will be acceptable, but TOMA and MAX plants shall be checked in legal aspects.

(ix) **Embankment borrow source:** Private land and RoW is the borrow source.

(x) **Dumping yard:** Dumping yard has been selected and is under approval of DoE.

(xi) **Water purifiers** for Engineer's accommodation:

The Engineer concerned about the quality of ground water, so both planned to analyze the ground water quality to assure it to meet with the potable water criteria of user's country criteria. Overall project physical progress up to June 2020 is given in **Table 3.**

Table 3. Overall Project Physical Progress status as of 30 June 2020

SL. No.	Name of infrastructure/ works	Targeted Quantity	Completion as on 30 June 2020	Completion	Pending
1	Major Bridge	12 Nos.	9	83%	17%
2	Minor Bridge (Culverts)	49 Nos.	40	82%	18%
3	New Station	11 Nos	4	38%	62%
4	Route Km	72 Km	26	36%	64%
5	Track Km	180 290m	117188m	65%	35%
6	Level Crossing	23 Nos.	5	20%	80%
7	Station to be modified In Signaling and Telecommunication	2 Nos.	-	5%	95%
8	Station Building with Total plinth area and New station	11 Nos.	4	38%	62%
9	Other functional and Residential building With total plinth	54 Nos.	26	48%	52%
10	Tree plantation	1,65,000	20300	12.12%	87.88%

2) Environmental Management Plan

65. 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 mitigation 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 mitigation 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.

66. 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 mitigation and monitoring measures in a technically credible and timely manner. The mitigation 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. Mitigation measures are tracked via the monitoring programme, which is described in the second of two EMP tables, and focuses on construction and operating period impacts.

67. 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 mitigation and monitoring requirements. These details for the Gomoti River Bridge are provided in Chapter VI and Chapter IX in the EIA report.

68. 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.

3) Environmental Management Implementation Works Schedule (EMWS)

69. The approved EIA and the certificate from DoE will trigger the implementation phase for the EIA, i.e. the actions to mitigate and monitor the predicted impacts resulting from the building and operation of the Project.

70. BR is committed to exploring the establishment of an ESSU and has included that as an action item in the Project's feasibility study. BR will address this internally, to establish if such a staff compliment is available. The EMP has been integrated into the contract specifications, making it a mandatory set of task for the contractor to implement. By preparing and approving the EIA and its EMP, BR has already confirmed its commitment to following through on the EMP. Until an ESSU is established BR will assign at least one safeguards specialist to deal with Project safeguard matters.

71. During the pre-construction period BR will be responsible for implementing the seven mitigation and monitoring measures, according the timetable defined in the EMP and submitting a final monitoring checklist - Prior to the start of construction. BR will insure that the contractors receive all relevant safeguard documents and that a training workshop be held to help the contractors understand the EMP, how to prepare their mandatory work plan, and deliver the required documentation.

72. The contractors will implement all 20 mitigation and monitoring actions (See EMP), providing environmental safeguard compliance update as a section of the overall Project monthly progress report. The contractor will also submit semi-annual summaries of surveys, findings and compliance. During the pre-mobilization workshop BR or its Engineer will review all these requirements (which are all defined in the EIA and its EMP). Construction bid documents have been prepared with a specific environmental bill of quantity section, allowing for unambiguous calculation of environmental penalties.

73. Monthly and quarterly progress reports on EMP implementation are being prepared by the Contractor in cooperation with the Engineer appointed by BR. All reports are being submitted to BR via the Engineer. The quarterly reports are being included a compliance monitoring checklist reporting (Annex 12 of the EIA report) on the progress of all 20 constructions period actions. Incidents of significant contamination/pollution caused by the Contractor's activities shall be reported. Recommendation shall be made for mitigation of environmental damage and for prevention of any recurrences.

74. During the construction period (four years) the Engineer will prepare annual environmental due diligence reports, based on the monthly and quarterly submissions by the contractor. Additional details describing the implementation arrangements are provided in Chapter XI in the EIA report.

1.5 Environmental Mitigation and Monitoring Requirements

1) The Environmental Management Plan in different Phases of the Project

75. In pre-construction period BR identified eight impacts which if not properly addressed could lead to impact during the other two Project phases or totally eliminate the objective of completing an

EIA. These included, having a tree replacement plan in place, minimizing land requirements by fine tuning where the new alignment is placed, and giving a process in place that protects the three identify PCRs and the 46 community-level sites (CPR) identified during consultations as needing protection.

76. The Project will require the construction of several new stations as well as improved access. The EMP underscores BR's actions to make sure the designs and alignments are sensitive to local conditions and wishes.

77. During construction period BR identified 20 mitigation and monitoring actions that will need to be implemented if significant construction-related effects are to be minimized (EMP **Table 32 33).** The following nine construction activities are likely to trigger negative effects which have been addressed in the EMP:

- Unrestricted movement of construction, machinery and vehicles;
- Railway embankments construction;
- Construction of station buildings and EMO building;
- Rail and loop/siding development;
- Station access road construction;
- Bridges crossing structures, culverts and any training works;
- Installation of signaling and interlocking system, platforms, foot over bridges at stations, platform sheds and level crossing safety facilities; and
- Poor good housekeeping practices by the contractor and failure to properly implement an occupational health and safety programme.

78. Of these, the most important will be the effects stemming from the placement of the two-six meter high embankment paralleling the existing rail line for around 70 km. the movement of around 56,000 truck-loads of material and pumping of dredged sand, generating noise and dust as well as traffic bottlenecks, will need to be properly managed. Dust suppression, and limits to truck traffic during low noise periods, as well as care with fleet maintenance will be important. Insuring the trucks and construction machinery do not idle for more than three minutes if not in use will markedly reduce the emissions and provide considerable fuel savings.

79. The embankment slopes will easily erode if not re-vegetated quickly. Therefore, the contractor will implement a rehabilitation programme as the work is completed

80. To better track the air and noise pollution the contractor will be required to undertake a compliance monitoring programme, testing the parameters defined in Chapter IV of the EIA report and at the same station as shown in the strip maps (Annex 2 in EIA report) Noise monitoring will be completed at the three PCRs and selected CPRS (closest schools, mosques and residences). The schedule will be more or less the same as the sampling completed during the field work for this EIA.

81. Another common impact involves the failure of contractors to properly maintain work camps, allowing sewage to leak, garbage to be left unmanaged, fuel to leak and even bitumen to spill over the ground near the asphalt batch plant[57] occupational health and safety (OHS) practices are often ignored, the contractor either not providing adequate safety equipment or not enforcing its use. Contractors will be required to provide hard hats, ear plugs, dust masks and eye protection, and deliver OHS training sessions at least once a year.

82. Construction of one large bridge, 11 medium bridges and 49 culverts could result in impacts on surface water quality and to that end the Gomoti River crossing work will undertake water quality monitoring, according to the design used in this EIA. This is particularly true if bentonite drilling mud is used during the pile boring operations on the six larger rivers. Contractors will be required to provide a bentonite recovery plan, should this material be used.

83. Finally, the Project will require concrete since all piles; piers and large culverts will be cast at casting yards requiring the establishment of a mobile concrete batch plant, generating noise and dust. The contractor will be required to have dust and noise suppression features built into any concrete batch

plant. The plant will need to be located at a DoE approved site, at least 500 m from the nearest occupied dwelling.

84. Since the existing line has been in operation for over 100 years, producing noise, dust and air pollution, there will be added impact from the operation of a second line, but the extent of this impact should be compared with the establishment of a new railway line. Eight mitigation and monitoring actions will need to be implemented during the operating period. Three important impacts that BR will address are:

- Possible inadequate clean up and rehabilitation of contractors camps and yards and borrow areas;
- Added noise and air pollution from a doubling of the rail traffic, impacting on local sensitive receptors; and
- Lack of adequate new safety measures/equipment accounting for the large increase in train traffic across the level crossing.

85. These impacts, mitigation measures and monitoring requirements are listed in detail in the EMP.

2) Sampling Program

86. The extent of the impacts of environmental pollution related to surface water, ground water, air quality and noise level were determined in quantitative terms by sampling a range of related environmental parameters (sampling photographs is presented in **14.2 Appendix-B**) . The mitigation measures provided for in the EMP can be adjusted based on these results as well. The field sampling work was specified for the construction and operating period.

SECTION II: ENVIRONMENTAL MONITORING

2. Environmental Monitoring Activities

A. Pre-construction stage

87. Around 55,000 trees and saplings within 50m RoW of proposed alignment, workers camp setting, and station areas are being cut down during pre-construction period. Proper compensation to affected people is being provided with the house and property damage through resettlement activities of the project. The tree along the RoW were illegally planted and some are naturally grew. So compensatory tree will be planted to compensate the tree loss, keeping ecological balance and vegetation must be planted to protect erosion and potential ecological loss.

88. Based on preliminary topographical and social survey data of the project, the project involves land acquisition of around 37.38 hectares along the proposed alignment and station areas. A total of 2004 households will be affected. The detail guideline for land acquisition and compensation can be found in LAP and RP of this project.

89. Some utility lines such as electric transmission lines and water supply pipelines are being shifted or removed with proper agency approvals and permits. It will be confirmed that permits, Location and relocation site plans have been approved.

B. Construction Stage

90. Although to date many of the mitigation measures have been implemented there are some significant deficiencies that need to be addressed as the number and range construction activities has increased on site. One important area where deficiencies continue to exist and that needs further on-going action is the occupational health and safety practices. Further improvement of the general condition of the camps and work areas in relation to waste disposal, hygiene, medical facilities, etc. is still required and general cleanliness and tidiness needs attention. Personal safety including the provision and use of the range of Personal Protective Equipment (PPE) for the workforce is also an area that requires continual attention with frequent and regular training and awareness sessions for all staff. This in fact is now taking place, with the CSC taking a leading role. A CAP is provided as **Appendix 14.8-H**

91. Safety at the many work sites with the provision of signs and notices, warning flags, safety barriers and fences, shoring of excavations and general safe working practices is also an area that requires continual attention with regular maintenance and frequent replacement of many of the precautionary devices used. Until June 2020, the extent of the impacts on surface and ground water, air quality, noise and vibration from the various work activities could not be determined. The sampling requirements for surface water, ground water, air and noise have been maintained at the agreed frequency with the results up to 30 June 2020.

92. A number of impacts mentioned several times in the past and had been addressed partially, namely the completion of the clearing of all pond site debris and diversion material and the complete stabilization of embankments with vegetation, the provision of solid waste disposal facilities (garbage cans) at stations, and the removal of construction debris/equipment and materials from station platforms. Now they are taking necessary measures to mitigate the impact and tree plantation has been started which will prevent embankment erosion.

93. The clean-up and demobilization of the main subcontractor's construction yard has been started and the area is compliance, i.e. there is no waste oil spilled throughout the site as well as construction debris not scattered in the open, but some places creating partial stagnant water pools and mosquito breeding areas. Finally, the large borrow areas have been created fish ponds and the arrangement with local residents to hand over these sites for other uses. This is mainly at the private land sites.

C. Sampling Program Results and Analysis during January-June 2020

2.1 Water Quality Monitoring

2.2 Surface and Ground Water Quality

94. 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.

95. The quality of surface water was compared with the standards for Inland Surface Water, Environment Conservation Rules (ECR) and 1997-Schedule 3 whereas the groundwater was compared with the Drinking Water Standard ECR Schedule-3, 1997. The standards have been presented along with the monitoring results of surface and groundwater for comparison.

Results of Sampling and Analysis

96. During January to June 2020 some major works were being undertaken. There is a possibility to pollute the surface water during the construction and operation period from untreated sewage effluent discharged by passing trains, spillage of fuel and other chemicals from freight trains, accidental spillage of oil and other noxious chemicals. The quality of surface water tested and analyzed in the project area is provided in the following **Table 4.**

There is a possibility to pollute the surface water during the operating period from untreated sewage effluent discharged by passing trains, spillage of fuel and other chemicals from freight trains, accidental spillage of oil and other noxious chemicals. Following Table provides the quality of surface water in the study area.

Table 4. Surface Water Quality in the Study Area during January-June 2020

SL No.	Sampling Code	Location	pH	Temperature (^{0}C)	Electric Conductivity (EC)- µS/cm	Total Dissolve Solids (TDS)- mg/l	Dissolve Oxygen (DO) (mg/L)	Biochemical oxygen demand (BOD) (mg/L)	Chemical Oxygen Demand (COD) (mg/L)	Total Suspended Solid (TSS)- mg/l
January 2020										
1.	SW 1	Haora River Water (Upstream)	7.23	19.0	0.17	90	5.0	1.6	22	20
2.	SW2	Salda River Water (down-stream)	7.20	19.8	0.17	90	9.0	1.8	17	21
DOE Standard (ECR'97)		Water usable by fisheries	6.5-8.5	28-30	1200	300-600	5 of more	6 of less	5-20	25
February 2020										
1.	SW1	Gomti River Water (Upstream)	7.24	24.2	0.14	70	4.2	2.1	12	16
2.	SW2	Gomti River Water (Downstream)	7.21	24.6	0.14	70	4.1	1.8	14	17
DOE Standard (ECR'97)		Water usable by fisheries	6.5-8.5	28-30	1200	300-600	5 of more	6 of less	2-3	25
March 2020										
1.	SW1	Sindai River (Upstream)	6.73	27.9	0.06	30	5.1	1.4	24	21
2.	SW2	Sindai River (Downstream)	7.00	28.2	0.06	30	6.1	1.6	18	24
DOE Standard (ECR'97)		Water usable by fisheries	6.5-8.5	28-30	1200	300-600	5 of more	6 of less	2-3	25
April 2020		**Not sampling due to COVID 19 situation (Lock down)**								
May 2020										
1.	SWQ-1	Salda River Water (Upstream)	6.26	29.2	0.07	30	5.9	1.4	19	22
2	SWQ-2	Salda River Water (Downstream)	6.41	29.5	0.07	30	5.8	1.2	18	20
3.	SWQ-3	Sindai River Water (Upstream)	6.90	29.1	0.10	50	5.1	3.8	10	21
4.	SWQ-4	Sindai River Water (Downstream)	6.85	29.6	0.11	60	4.8	3.2	11	24
DOE Standard (ECR'97)		Water usable by fisheries	6.5-8.5	28-30	1200	300-600	5 of more	6 of less	2-3	25
June 2020										
1.	SWQ-1	Dakatia River Water (Upstream)	6.40	29.6	0.32	160	6.0	1.1	18	21
2.	SWQ-2	Dakatia River Water (Downstream)	6.45	29.6	0.32	160	6.7	1.3	19	23
	DOE	Water usable by fisheries	6.5-8.5	28-30	1200	300-600	5 of more	6 of less	2-3	25
Water usable for irrigation			6.5-8.5	28-30	1200	500-1000	5 of more	10 or less	2-3	25

2.3 Ground Water Quality

Results of Sampling and Analysis

97. Groundwater sources can be contaminated by the seepage of wastes from workers' camps through the soil profile into the GW aquifer when wells access the shallow aquifer. The contamination from train operations would be mostly bacteria, viruses and waste from the sewage-laden track runoff leaking into the well. The quality of groundwater tested and analyzed in the project area is provided in the following **Table 5.**

Table 5. Ground Water Quality in the Study Area during January-June 2020

SL No.	Sampling Code	Location	pH	Temperature (^{0}C)	Phosphate	Manganese (Mn)	Arsenic (As)	Iron (Fe)	Fecal Coliform (FC)
January 2020									
1.	GW 1	Rajapur Railway Station	6.49	25.7	1.5	0.40	<0.01	0.01	0
2.	GW 2	Akhaura Railway Station	6.04	27.7	1.4	0.02	<0.01	0.06	0
DOE Standard ECR'97)			**6.5- 8.5**	**20-30**	**6.0**	**0.1**	**0.05**	**0.3-1**	**0**
February 2020									
1.	GW 1	Sadar Rasulpur Railway Station	6.38	26.8	1.5	0.01	<0.01	0.00	0
2.	GW 2	Gangasagar Railway Station	6.31	26.9	1.4	0.04	<0.01	0.06	0
DOE Standard (ECR'97)			**6.5- 8.5**	**20-30**	**6.0**	**0.1**	**0.05**	**0.3-1**	**0**
March 2020									
1.	GW 1	Cumilla Railway Station	6.65	28.1	1.60	0.05	<0.01	0.31	0
2.	GW 2	Kasba Railway Station, tube-well water	6.44	28.8	0.04	0.03	<0.010	0.07	0
DOE Standard (ECR'97)			**6.5- 8.5**	**20-30**	**6.0**	**0.1**	**0.05**	**0.3-1**	**0**
April 2020		**Not sampling due to COVID 19 situation (Lock down)**							
May 2020									
1	GWQ-1	Lalmai Railway Station	5.28	27.9	1.3	0.11	<0.01	0.27	0
2	GWQ-2	Saldanodi Railway Station	6.31	27.3	1.2	0.23	<0.01	0.38	0
3	GWQ-3	Kasba Railway Station	6.45	27.5	1.9	0.30	<0.01	1.3	0
DOE Standard (ECR'97)			**6.5- 8.5**	**20-30**	**6.0**	**0.1**	**0.05**	**0.3-1**	**0**
June 2020									
1	GWQ-1	Alishahar Railway Station	6.28	27.0	1.8	0.50	<0.01	3.91	0
2	GWQ-2	Shashidal Railway Station	6.34	27.7	1.0	0.05	<0.01	0.18	0
DOE Standard (ECR'97)			**6.5- 8.5**	**20-30**	**6.0**	**0.1**	**0.05**	**0.3-1**	**0**

2.4 Air Quality Monitoring

Results of monitoring and Analysis

98. A total of 11 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 eleven railway stations of the project. Results of Air quality monitoring is given in **Table 6.**

Table 6. Air Quality monitoring during January-June 2020

SL No.	Sampling Code	Sampling Location	$PM_{2.5}$ µg/m³	PM_{10} µg/m³	SPM µg/m³	SO_2 µg/m³	NOx µg/m³	CO ppm
	January 2020							
1	AQ 1	Rajapur Railway Station	15.09	20.68	48.45	4.25	9.78	0.01
2	AQ 2	Akhaura Railway Station	17.78	24.07	57.16	5.59	9.25	0.24
DOE standard (2006)			**65**	**150**	**200**	**365**	**100**	**9**
	February 2020							
1	AQ 1	Sadar Rasulpur Railway Station	19.21	34.87	63.29	23.48	12.17	<1
2	AQ 2	Gangasagar Railway Station	18.21	31.52	56.29	18.25	16.25	<1
DOE standard (2006)			**65**	**150**	**200**	**365**	**100**	**9**
	March 2020							
1	AQ 1	Cumilla Railway Station	44.21	76.18	114.29	8.52	17.56	<1
2	AQ 2	Kasba Railway Station	26.53	56.21	107.59	5.18	16.25	<1
DOE standard (2006)			**65**	**150**	**200**	**365**	**100**	**9**
	April 2020	**Not sampling due to COVID 19 situation (Lock down)**						
	May 2020							
1	AQ 1	Lalmai Railway Station	4.12	6.89	11.27	14.28	6.92	<2
2	AQ 2	Saldanodi R/Station	11.34	21.53	35.17	7.28	8.61	<2
3	AQ 3	Kasba Railway Station	8.46	18.19	32.23	4.81	6.13	<2
DOE standard (2006)			**65**	**150**	**200**	**365**	**100**	**9**
	June 2020							
1	**AQ-1**	Alishahar Railway Station	18.22	38.61	56.83	4.71	8.28	
2	**AQ-2**	Shashidal Railway Station	13.27	29.53	42.22	3.97	7.91	
DOE standard (2006)			**65**	**150**	**200**	**365**	**100**	**9**

2.5 Noise Level Monitoring

99. Ambient noise levels have been monitored from railway stations of the ALDLP project. Noise data logger (Digital Noise Meter: Model no. GM 1357) has been used to monitor of ambient noise levels. Twenty two (22) noise level sampling locations had been selected from the nearby sensitive receptor of the stations. The detail list of sampling location has been shown in **table 7**. Noise level was measured for 2 hours before but at present it is done for 24 hours at every location on different time.

Potential noise impacts vary and are based on the noise amplitude, frequency, distance from receivers, site landscape features, topography, presence of obstacles and meteorological effects. In this project key project related noise source are train traffic, generators, vehicles, construction equipment and people. Noise level found more than EMP and DoE. Noise attenuation measure is suggested for mitigation. During the monitoring phase of the project, field measured value of noise quality is being given in monthly environmental inspection report. Results of noise level monitoring is given in **Table 7**.

Table 7. Results of noise level monitoring during January - June 2020

SL No.	Sample Code	Location	Noise Level Leg (dBA)	Base line Leg (dBA)	Zone (according to DoE)	Bangladesh Standard at day Time Leg(dBA)	Remarks
January 2020							
1.	**NL1**	Rajapur Railway Station	57.78	66.84	Mixed	60	Low
2.	**NL2**	Rajapur Railway Station Jame Moaque	53.29	60.98	Silent	50	High
3.	**NL3**	Akhaura Railway Station	67.82	66.23	Mixed	60	High
4.	**NL4**	Akhaura Railway Station Jame Mosque	59.78	55.80	Silent	50	High
February 2020							
5.	**NL1**	Sadar Rasulpur Railway Station	52.91	63.51	Mixed	60	Low
6.	**NL2**	Sadar Rasulpur Railway Station Jame Mosque	52.61	52.25	Silent	50	High
7.	**NL3**	Gangasagar Railway Station	46.68	55.06	Mixed	60	Low
8.	**NL4**	Gangasagar Railway Station Jame Mosque	49.24	55.51	Silent	50	Low
March 2020							
9.	**NL1**	Cumilla Railway Station	61.56	72.68	Mixed	60	High
10.	**NL2**	Cumilla Railway Station Jame Mosque	54.72	66.10	Silent	50	High
11.	**NL3**	Kasba Railway Station	59.73	62.49	Mixed	60	Low
12.	**NL4**	Kasba Railway Station Jame Mosque	61.48	55.82	Silent	50	High
April 2020		**Not sampling due to COVID 19 situation (Lock down)**					

SL No.	Sample Code	Location	Noise Level Leg (dBA)	Base line Leg (dBA)	Zone (according to DoE)	Bangladesh Standard at day Time Leg(dBA)	Remarks
May 2020							
13.	**NL1**	Lalmai Railway Station	54.37	64.13	Mixed	60	Low
14.	**NL2**	Lalmai Railway Station Jame Mosque	49.21	59.12	Silent	50	Low
15.	**NL3**	Saldanodi Railway Station	57.44	62.49	Mixed	60	Low
16.	**NL4**	Ganganagar Jame Mosque	47.19	55.82	Silent	50	Low
17.	**NL5**	Kasba Railway Station	58.23	54.65	Mixed	60	Low
18.	**NL6**	Kasba Railway Station Jame Mosque	51.31	NR	Silent	50	High
June 2020							
19.	NL1	Alishahar Railway Station	55.38	62.95	Mixed	60	Low
20.	NL2	Alishahar Railway Station Jame Mosque	57.48	61.83	Silent	50	High
21.	NL3	Shashidal Railway Station	52.37	62.22	Mixed	60	Low
22.	NL4	Shashidal Samata Shishu Niketon	48.21	NR	Silent	50	Low

2.6 Remarks and Recommendation on Environmental Parameters

Surface water quality: Total dissolved solids was found 90 mg/l in Haora River Water in the month of January 2020. In respect to other rivers the value is higher. Possible cause may be that the eroded soil particles may contain soluble components that can dissolve in water. On the other hands as plants and animal decay, dissolved organic particles are released and contribute more TDS concentration in water. When construction debris and different types of wastes are thrown into water body, it causes surface water pollution. As it is less than DoE standard (300-600 mg/l), so no effect will be imposed on aquatic organisms. **Mitigation measure** may be taken as to prevent water from pollution by waste materials. Dissolved Oxygen was found 9 mg/l in the same river in the same month. This value is higher than other rivers. This may be aeration action of wind, during photosynthesis O_2 as byproduct and colder water hold more oxygen. This value is beneficial for aquatic organisms.

Ground water quality: The ground water quality parameters like P^H, Phosphate, and Manganese, arsenic, iron and fecal coliform found within the permissible limit.

Air quality: Air quality parameters like $PM_{2.5}$, PM_{10}, SPM, SO_2, NOx and CO value found within the limit. Sometimes air quality deteriorates due to dust pollution.

Noise level: Noise level at Akhaura Railway station measured was 67.82 Leg(dBA) in the month of January 2020. Akhaura station area is crowded area and there is a local market at the vicinity. Noise level was found 59.78 Leg(dBA) at Akhaura Railway Jame mosque area. The noise value is little bit increased due to sudden train pass. This exists for few minutes. As Exposure time for noise level 85 Leg(dBA) is 8 hours. For **mitigation measures** earplugs and earmuffs should be provided.

Mitigation Measure suggested: For noise control vehicle and equipment should be maintain properly. New equipment should be used. Ear muffle and Ear Plugs should be used. For dust control water should

be sprayed in construction site. For surface water pollution control construction debris and waste should not be thrown in water course and should be dumped in designated places. For temperature controlling 1, 65,000 trees should be planted as early as possible to keep the project area cool.

1) Fisheries Resource.

100. Bridges, culverts and existing railroad cross many waterways. Of them Gumoti River is the main river which is crossed this rail line. There is no doubt that fish populations, their habitat and water quality in general are all seriously threatened due to land use changes and chemical pollution. The major rail crossing rivers are Dakatia, Goniajoori, Gomoti River, Gomoti Spill, Saldanadi, Bajni River, Sidai Khal, and Howrah. During breeding season (June-July) of fishes, construction activities specially piling of bridge is being avoided.

2) Wildlife

101. Within the RoW and the areas where embankment is to be placed is all either paddy, pasture or water ditches specially ponds paralleling the tracks. Some of these ditches may be home to common amphibians, reptiles and aquatic birds. During the filed inspection no wild mammals have been observed to be affected. Contractor is trying to keep minimum disturbance of these wildlife.

3. Compliance with Environment Related Project Covenants

1) Compliance with National Environmental Laws

102. The environmental legislation of GOB emphasizes reducing the negative impacts of infrastructure development projects and enhancement of the positive impacts. This conforms to the National Environmental Policy 1992 that was enacted based on the Agenda 21 of Rio Conference and subsequent enactments of the Bangladesh Environmental Conservation Act (ECA) 1995 and Bangladesh Environmental Conservation Rules (ECR) 1997. The DOE documents though do not mention about the provisions for railway tracks and railway bridges specifically.

2) Compliance with ADB Guidelines

103. According to the environmental guidelines of ADB the project falls under Category B and hence an IEE was sufficient to meet the environmental requirements. An IEE report was prepared by the Consultant engaged by the ADB during appraisal in 2014. However during the detailed design stage in 2016 an updated Environmental Management Plan (EMP) was prepared. The project is also in conformity with the latest Guideline of ADB i.e. Safeguard Policy Statement 2009.

3) Contractor Compliance

a) Environmental Management Plan (EMP)

104. Overall compliance with key actions defined in the EMP, as indicated in the Compliance Monitoring Check List. At present only clearing, earth work for embankment and some station ground preparation are going on.

b) Compliance with Construction Contract Clauses

105. Detailed assessment of compliance by the Contractor with applicable construction contract clauses addressing environmental matters are shown in contract agreement. The Contractor has been complying with more of the contract clauses. Operating period mitigation measures (not the

responsibility of the Contract) after the Taking Over of the Works by BR should be implemented properly, e.g. waste management and maintenance of station facilities. For garbage this is partially due to the failure of the Contractor to provide garbage bins as specified in the station specifications. The Engineer will work with BR during the defect period to try and rectify this condition.

c) Environmental Monitoring Reports

106. 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 2020 to June 2020 of contractor this Semiannual Environmental Report has been prepared by CSC of ALDLP. The report contains tables of all monitoring results those are being reported in the respective monthly reports.

d) Landscaping and Site Restoration

107. 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 very well executed.
With the earthworks for embankment and bridges test piling, the majority of works remaining are located at the stations involving the station buildings, platforms and platform sheds, pedestrian foot over bridges and the signaling system. Cleaning up of surplus materials along the ongoing track and its tidy storage at the stations 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.

4. Adequacy of Mitigation Measures

1) Budget and Timeline

108. The original budget allocated for this work is for 4 years for international specialist and for national counterpart. This budget allowed for the completion of two monitoring reports every year, but did not provide enough time for the essential workshop and training at the start of the Contract and the requirement for the international environmental specialist to be on site when the Contractor mobilized. Finally the budget provided should be related to the length/size of the project since larger projects take longer to inspect and longer to report on.

2) Capacity Building

109. Bangladesh Railways has recognized the gap in their technical capacity to address safeguard issues and to implement EMP. BR has committed to establishing an Environmental and Social Safeguards Unit to manage safeguards across the agency. Consultants are doing awareness meeting with contractor's personnel on safeguards and plantation activities.

5. Adequacy of Institutional Arrangements for EMP Implementation

110. An annual workshop on EMP implementation and an annual performance review is require, in which ADB should participate. To operate effectively the Engineer should have the direct authority to stop work and fine the contractor for not complying fully with the environmental contract clauses and EMP. The contractor should not be asked to provide presentations on project progress to the lender or BR without the involvement of the Engineer. It only stands to reason the self-reporting will not be impartial and likely miss many important issues, as was the case during at least one ADB mission. This situation led to multiple future problems.

111. The Engineer needs to better enforce the specific deliverables as defined in the EMP, e.g. the construction period EMP completion report and adherence to the reporting table of contents, and field survey requirements.

6. Results of Environmental Monitoring and Compliance Measures

1) Key Issues Identified

112. The monitoring results revealed that there were some major significant environmental issues that are being raised during the reporting period. But there are a number of working sites where more mitigation action is need to be taken by the contractor to meet up full compliance with the EMP, as many more activities have been started on site already. In respect to location, work type and status of compliance contractor should mention the environmental issues and mention their mitigation measures taken.

7. Action Plan of Environmental Mitigation and Monitoring

113. Substantial construction activities will occur after the rainy season when many of the work sites will become accessible. The focus of environmental monitoring will be on the following aspects:

(a) Better implementation of environmental management plan and mitigation measures to minimize the negative environmental impact of the work under construction;

(b) Continue to improve water, air and noise quality sampling and analysis of the project by adhering to specific instructions provided by the Engineer. Pay close attention to the causes of non-compliance and remediation measures to secure safe water supply, air quality and acoustic environment;

(c) Ensure soil erosion protection of the embankment and the bridge sites; and

(d) Strengthen the implementation of the Health and Safety aspects of the EMP for the entire workforce.

114. The Engineer intends to strictly enforce these requirements and with the help of BR be able to demonstrate a substantial improvement by the Contractor over the remaining period 2020.
Of these the Health and Safety issues will need continued and on-going attention with all of the site activities including track laying and signaling works in progress where the safety of works adjacent to the operating line will be paramount, both for worker's safety and for the safe operations of the train services. The action plan is defined in **Table 8**, and will be expanded by the Contractor.

Table 8. ACTION PLAN AND STATUS OF ENVIRONMENTAL MITIGATION AND MONITORING

Environmental Parameter	Action Required	Timeline
Landscape and future visual intrusion	Cleaning up of various work areas along the site as embankment and bridge works proceed to enable channel and slope protection works and grassing, etc. to be installed and become stabilised and minimise visual intrusion	Immediate after completion of works at these sites
Tree Felling	Ensure trees felled are correctly recorded to enable compensation to be made if required. Initiate planting of trees along lower slope where completed to ensure sufficient time for their establishment.	Tree plantation has been started in the month of June and by August 80,000 saplings should be planted.
[1]Fisheries, Fish habitat and water courses	Make appropriate arrangements for restoration of borrow pits for use as fishponds wherever possible and where requested by local communities.	After completion of site works fill up the borrow pit or create fish ponds
Surface Water	Execute sampling in line with sampling program specified the EMP and BR instructed. CTM to undertake; then present results with analysis indicating impacts (if any) and mitigation measures if needed. Sampling should be carried out in the presence of ENGINEER staff with details of locations provided on plans and on the ground and at the times appropriate to ensure meaningful data can be obtained.	Once in every month
Ground Water		Once in every month
Air Pollution		Once in every month
Noise		Once in every month
Soil Contamination		Prevent contamination during construction
Level Crossing	Ensure that once crossing structures are completed all obstructions are removed, natural channel restored	After completion of works
Workforce Camp Conditions	Ensure adequate waste bins are provided at camps with regular disposal to suitable locations. Initiate regular collections and disposal of garbage from around campsites and ensure the areas remain hygienic. Provide potable water supply at all times (e.g. arsenic found in camp tube-well)	Continuously
Construction Waste Management	Ensure all solid wastes at works sites and yards are contained and then correctly disposed of; and that oils, grease, etc. from servicing activities is properly collected, contained and recycled.	Continuously
Personal Health and Safety	Maintain effective operation and cleaning of sleeping, cooking, washing and toilet facilities in camps. Ensure water supplied is potable and conduct tests for verification. Ensure First Aid Equipment and Medical Facilities are readily available at all times. Initiate further training and awareness sessions on the use of PPE for staff and take steps to ensure these are used correctly	Continuously
Vector Borne Diseases	Initiate treatment of abandoned borrow pits and clean up areas where water is ponding to reduce risks for breeding of mosquitos. Record of regular inspections provided.	Continuously
Landscape and future visual intrusion	Cleaning up of various work areas along the site as embankment and bridge works proceed to enable channel and slope protection works and grassing, etc. to be installed and become stabilised and minimise visual intrusion	As an when required and after completion of works

[1] There are Borrow pit fish pond photographs are attached as appendix:14.6: F

SECTION III: ENVIRONMENTAL MANAGEMENT

8. Implementation of EMP during Construction Period

The Consultant have managed and checked environmental management plan implementation by preparing an appropriate environmental progress schedule in accordance with plans of environmental management during construction.

Contractor has reviewed EIA (environmental impact assessment) and establish and implement mitigation measures suitable for site conditions according to the EMP.

Contractor is well aware of the environmental management plan for its thorough implementation with particular emphasis on critical areas of focused management so as to avoid any problems during inspection.

Contractor shall prepare and keep photos and location maps before and after construction and gain approval from Consultant.

Contractor shall conduct daily inspection and evaluation of environmental management.

Defects identified during the daily inspection shall be collected on a weekly basis, recorded in report of environmental impact assessment and gain approval from Consultant.

When construction of each activity is completed, Contractor shall write down results of consultation and implementation of EMP. Only after obtaining approval from Consultant, Contractor might proceed to perform the next phase of construction.

Contractor shall conduct inspection when the local government authority checks the status of environmental management.

8.1 Qualitative Environmental Monitoring results during January- June 2020

8.1.1 Noise and Attenuation Measures

Clause 3.5 of the EMP defines in detail the noise attenuation measures to be undertaken:

Measures to be undertaken	Measures Taken	Remarks
Use of modern plant and equipment.	Contractors are using modern plant and equipment.	Noise pollution by these equipment is very low.
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.	CTM did not install mufflers for combating noise generation from the machineries to comply the national regulation	Noise abating gear like mufflers for effective noise control should be installed.
Locate rock crushing, concrete mixing and material shipment yards away from residential areas, schools, colleges and hospitals.	Crushing and mixing activities are away from institutions.	No measures need to be taken.
Install temporary noise barriers near sensitive locations such as schools, religious places and hospitals	These institutions are far away from construction sites and noise level is low.	Noise barriers are less important.
Providing the construction workers with suitable hearing protection like ear cap, or earmuffs etc.	Contractor has not provided the ear cap or earmuffs to the workers who are working near to the noise generating instruments.	Noise level is within tolerable limit (bellow 85 dBA) so these instruments need not to be used.

Measures to be undertaken	Measures Taken	Remarks
Noise quality monitoring to be carried out as per the schedule in the environmental monitoring plan.	Noise level monitoring is being carried out according to the monitoring schedule.	Monitoring is being performed monthly basis.

8.1.2 Dust Control

Undertake dust suppression as defined in Clause 3.3 of the EMP:

Measures to be undertaken	Measures Taken	Remarks
Vehicles transporting construction material to be covered	Materials are being transported covered time to time.	As uncovered materials create dust pollution, contractors are instructed to perform the work by September 2020.
Construction equipment to be maintained to a good standard and idling of engines discouraged.	Equipment are being maintained in good standard.	During COVID-19 pandemic situation activities were totally closed. So all of the engines were idled.
Machinery emitting visible smoke to be banned from construction sites.	Most of the smoke emitting machinery are band.	One or two such machines are need to be banned.
Contractor to prepare 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.	Toma is spraying water properly in the dust generating area. Max also spraying water but insufficient.	Frequency should be increased in MAX part.
Dust masks to be provided to workers where dust hazards exist.	CTM has not been provided adequate PPE item to the labours.	Some of the workers are not using PPE properly. They need more awareness.
Air quality monitoring to be carried out as per the schedule in the environmental monitoring plan.	CTM is monitoring air quality properly as per monitoring schedule.	CTM JV is monitoring air quality once every month.
All roads that become dusty and all areas where construction related activities are carried out, shall be subject to necessary suppression measures by watering, sweeping or other measures approved or directed by the Engineer.	Contractors are spraying water for dust suppression, but not sufficient.	Dust suppression should be 3 to 4 times a day.
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, contact of such materials with soil or water course through discharge, run-off, and or seepage.	Waste oil, lubricant etc. are not allowed to suppress dust. Accidental spillage is prevented.	Contractors suppress dust through water spraying on dust daily two to three times
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 routes.	Contractor is spraying water on dust at road and embankment but not on stockpile.	Contractor should spray water on stockpile to control the air pollution.

8.1.3 Watercourse Impacts in Wetlands/Ponds/Rivers

Measures to be undertaken	Measures Taken	Remarks
Adequate mitigation measure shall be undertaken to limit the impact on all water bodies within the Project area	Mitigation measure like waste disposal at designated area has been taken to limit the impact on all water bodies within project area.	In worker's campus bins have been provided to collect different types of waste and sent to waste dumping places.
Earth moving in the vicinity of watercourses shall be kept to a minimum to avoid sedimentation and contamination from fuel and lubricants.	Earth moving in the vicinity of watercourse are handling with careful to avoid pollution.	Earth moving activity creates sedimentation in nearby watercourse. So carefulness should be continuous.
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.	CTM is ensuring the sufficient stream flow of the water bodies during the bridge and culvert construction.	This practice should be continuously and regular basis.
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.	Sediment laden run off does not enter the adjoining watercourses.	This practice should be continuous to prevent the water contamination.
Construction materials and waste shall not be discharged in watercourse during construction of bridges/culverts by implementing appropriate mitigation measure.	Construction materials and waste are collected and are being dumped in designated places.	These are continuous process.

8.1.4 Borrow and Dredging Site Impacts

Measures to be undertaken	Measures Taken	Remarks
Proper management of borrow pits and dredging sites so that water pollution and water logging may not be happened.	No such measures need to be taken as positive impacts are found.	Borrow pits and dredging sites have been converted into fish ponds,

8.1.5 Disposal of Construction Debris and other Waste Materials

Measures to be undertaken	Measures Taken	Remarks
Adequate mitigation measure shall be undertaken to limit the impact on pedestrians, local communities and water bodies within the Project area	Construction areas are barricaded by caution tap and safety sign boards have been set up to limit impact on pedestrians. Debris are not thrown into the water bodies.	Construction debris and other waste materials are dumped in designated areas.
No burning shall be allowed.	Contractor is not burning any dry waste.	Contractors are aware of the impact of burning waste.
No cleared debris shall be left lying on the surface of the ground or buried in any agricultural land	Debris are kept temporarily in site and then left on dumping place permanently.	Debris are not buried in any agricultural land.

Measures to be undertaken	Measures Taken	Remarks
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; and	The disposal areas are provided by Quasba and Cumilla City Corporation.	Debris are disposed of in designated areas.
All disposal areas shall be finally graded to a uniform and level condition and left such that they create a minimum impact on the surrounding area.	Contractor is ensuring the minimum impact on the surrounding area due to waste disposal for short time.	More improvement is required. Disposal should be avoiding impact on surrounding area.

8.1.6 Servicing and Operating Equipment

Measures to be undertaken	Measures Taken	Remarks
Servicing of machines or equipment near rivers, streams or other bodies of water shall be carried out in such a manner as to avoid pollution with gasoline, diesel fuel, oil, grease, or surplus or disposable materials	Machines and equipment are being serviced with care to avoid pollution by gasoline, diesel fuel, oil and grease.	Servicing are not performed near rivers or other water bodies.
Without limiting the generality of the foregoing, the Contractor shall ensure that all hydraulic systems, fuel systems and lubricating systems are in good condition to avoid leakage of petroleum products; and	Sometimes leakage happens. Contractor does not fully maintain these systems properly.	The leakage of lubricant contaminate soil. Contractor should avoid leakage of petroleum products.
Fuel spills will not be condoned and care shall be taken to avoid overfilling machines.	Sometimes overfilling machines.	Contractor need to be checked properly and avoid overfilling machines.
The Contractor shall have the proper equipment to transport fuel so that spillage will not occur. Automatic shut-off nozzles shall be installed on all fuel dispensing units.	They have proper equipment to transport fuel.	The spillages are not occurring during fuel transportation.
The Contractor shall have oil spill abatement equipment on the Site at all times.	Contractor has oil spill abatement equipment.	Need regular checking.
The type of equipment shall be subject to the approval of the Engineer, and the equipment shall be maintained in good working condition. Disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP or as directed by the Engineer.	Equipment are being maintained in good working condition.	Disposal of used oil, lubricants, tires, etc. as directed by the Engineer.

8.1.7 Control of Petroleum Products

Measures to be undertaken	Measures Taken	Remarks
All petroleum products shall be stored in a designated storage location where any spillage can be safely maintained without contamination of the surrounding area. Storage of petroleum products shall not be permitted in the vicinity of streams rivers or other bodies of water. Impermeable liner shall be placed on subsurface of the storage room to avoid groundwater contamination.	Max part fuel storage is in designated storage location and maintenance is properly done.	Toma should properly maintain and monitor the fuel spillage.

8.1.8 Occupational Health and Safety

Measures to be undertaken	Measures Taken	Remarks
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.	In MAX part appropriate personal protection equipment supplied. In TOMA part it is not satisfactory.	Ear protecting equipment is not provided among the workers of both the party.
Follow the specification on construction safety as defined in civil works	Workers sometimes use PPE	Workers should use PPE during work all time.
Construction workers will be required to train in general health and safety matters and on specific hazards of their work.	Workers are getting training on general health and safety matters.	Workers are changing time to time. They remain new most of the times.
Must not hire child labour, age below 14	In some sites sub-contractors are using child labour.	They are removed instantly during CSC's inspection.
Hire, use of benefit from child labour-Child labour (as defined by ILO Conventions 138 and 182) means that no workers under the age of 14 may be hired as general labours, and no workers under the age of 17 are to be hired for hazardous jobs	Workers are above the age of 14 and hazardous job workers are above the age of 17.	Sometimes sub-contractor use workers under the age of 17 for hazardous jobs. This is serious violation of labuor law. Contractor should avid this practice.
Equal treatment, equal opportunity. No discrimination based on race, caste, origin, religion, disability, gender, sexual orientation, union or political affiliation, or age; no sexual harassment. Minimum wage- according to minimum wage standards as defined in the Bangladesh Labour Act.	No discrimination among the workers have been observed. They are getting equal benefit.	Gender equity, wage equity and Labour act are being followed properly.

8.1.9 Protection of Topsoil and Soil Erosion

Measures to be undertaken	Measures Taken	Remarks
Topsoil storage areas must be protected during the dry season from wind erosion by covering.	Topsoil has been protected from erosion by covering in few cases.	Topsoil should be covered for protection from erosion.
Rapid re-vegetation and use of hydro-seeding and jute erosion protection mats will be applied in areas where erosion is noted during the regular monthly inspections.	Rapid re-vegetation has been performed by turfing but no erosion protection jute mats have been applied.	Sometimes soil erosion is happening from embankment due to heavy rain fall. After erosion contractor should repair the embankment.
Embankment site to be planted with trees to promote natural vegetation; as well as fast growing grasses.	Pit preparation activities for tree planation have been started in the month of June 2020.	Tree plantation has been started but grasses are also being planted to protect embankment.
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.	Natural drainage has not been hampered by stockpiling and or disposal of materials as these are away from natural drainage.	Care should be taken all the times.

9. Compensatory Tree Plantation Programme during January-June 2020

CTM JV had planned to plant trees to compensate the loss of cutting trees. It will help to keep ecological balance and absorb carbon-dioxide. CTM JV had submitted Compensatory tree plantation plan to CSC. ADB had reviewed and updated the plan. Gomoti Nursery has been selected for planting trees. Trees are being planted on both side of the rail line. Objective of tree plantation

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

- To protect the affected cultural/sensitive areas (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.
- To arrest soil erosion at the embankment slopes.

9.1 Scope of tree plantation

About 31,749 timber trees, 13,546 fruit trees, 188 medicinal trees, 4,166 banana trees, and 5,693 bamboo trees of different sizes will be cut due to the implementation of Project at pre-construction and construction periods. Approximately, 55,000 trees will be removed from the study area. The proposed Tree Plantation and Replacement Program (TPRP) will suggest to plant at least three times of the actual fallen trees. These trees are calculated on both side of the proposed new alignment, proposed station building areas, and new station access road areas (associated facilities). Therefore, a total of 165,000 trees will have been planted completion of this project.

The following areas have been identified for development of plantation sites in the Project areas:

- Both side slopes of the constructed new railway embankment;
- Back side of the constructed new stations; and
- Along the affected cultural/sensitive areas (within 50 m from the ROW boundary).

9.2 Selected Gomoti Nursery Visiting Report 11 March 2020

The Government of Bangladesh is emphasizing on improved connectivity between each part of the country. In addition, Bangladesh is an important land transport crossroad as it connected with south Asia road network. Railway transportation facility is the best land transportation option considering mode of transport, Bangladesh government is emphasizing improved communication between each part of the country. Also, Bangladesh is an important land transport intersection because of its link with South Asia's road network. Considering the mode of transportation, railway transport is the best land transportation option, Bangladesh Railway has taken some initiatives, including tree plantation, to maintain the ecological balance of the railway. Below is a discussion of the rules and activities of the Bangladesh Railway, ADB and CTM-Joint venture on the planting of trees.

The following are some of the principles of tree planting by CTM-Joint venture

- Timber: Shil koroi, Akashmoni, Kat Badam, Mehogani. Koromcha, Radhachura, Krisnochura.
- Fruit: Date tree, Date palm. Olive. Bel.
- Medicine: Neem, Bohera, Hortoki, Amloki, Arjun.
- Fuel: Epil-Epil, Rain Tree, Koroi.

These tree types will be planted on the basis of % according to differnt places. the place are:

- Track embankment.
- Curves signal.
- Railway Station &
- Sensitive area.

Nursery Information:

- **Nursery name:** GOMOTI Nursery
- **Location:** Adarsha Nagar (Near Gomoti Bridge), Cumilla
- **Owner name:** Md. Johirul Islam
- **Mob: +88**01711-444366.
- **Total Staff:** 7people.
- **Total present worker:** Male: 30 people. Female: 20 people.
- **Tree:** in stock/ out stock, below is the information about the trees.
- **Transport:** Three wheels' vehicles are two. & four wheels' vehicles (mini pickup) are one.
- **Water motor:** sufficient.
- **Soil excavation machine:** 4pcs wholesale machine.
- **Equipment:** there are various machinery for nursery work.
- **Housekeeping:** Good.

ESTIMATE OF TREES

In stock trees:

Sl No.	Trees Name	Number of trees
1	Akashmoni	9168
2	Kat- Badam	9168
3	Mehogani	9166
4	Arjun	9168
5	Epil-Epil	9168
6	Rain Tree	9166
7	Olive	12376
8	Palm Tree	12374
9	Neem	3300
10	Bohera	3300
11	Hortoki	3300
12	Amloki	3300
13	Bel	3300
14	Koroi	4124
15	Radhachandra	4124
16	Krisnachura	4125
	Total Tree	**108,627**

Out stock trees:

Sl no.	Trees name	Number of trees
1	Garjan	9166
2	Shal	9168
3	Shil koroi	9166
4	Date tree	12,375
5	Date palm	12,375
6	Koromcha	4,127
	Total Tree	**56,377**

In stock total tree: 108,627

Out stock total tree: +56,377

Total: 165,004pcs

Bangladesh Railway had planned to plant trees on both sides of the track to make the newly constructed Akhaura-Lakhsham double line project environment friendly, so that the railway line is accurate, strong and environment friendly. On March 11, 2020, ADB CTM and CMC jointly visited the nursery (Appendix-E). The visiting ADB's representatives were Mr. Rakibul Haque (Environment Specialist), CSC representative, Dr. Md. Kabil Hossain (Senior Environment Specialist), Redoan Rakib Mugdho (Jr. Environment Specialist). TCCL representatives Ashok Kumar Dey (HSE Manager), Md. Mujibul Haque (APO) and Md. Mirja Hasanul Habib (Environmental Engineer) including Max's representative Md. Abu Hanif (HSE manager) and some Engineers attended the visit, and expressed their important opinions.

ADB representative Mr. Rakibul Haque, wanted to know to Nursery Owner Mr. Zahirul Islam about work progress, rules and regulations for planting the project.

Nursery authorities told Rakibul Haque that he had read all the restrictions and said that he would carry out his activities as per the directions of ADB and BR. He also informed that he will start his work from June 2020, and that he would inform the CTM authorities about the planting of one lakh eight thousand saplings this year.

CSC representative Dr. Md. Kabil Hossain informed the nursery owner that he would like to know how to perform and progress in 72km work and also requested to work collaboratively with other nurseries.

Nursery authorities told Dr. Kabil that he had previous experience of such a great job and expressed great interest in the work. He also said that he spoke to another nursery owner but no one showed any interest in the work.

TCCL representative Ashok Kumar Dey said that, few workers could not work on the 72-kilometer route. He told to increase the manpower. And not just recruit, make training for them as heavy work should be performed by skilled workers.

He instructed the nursery owner to provid the required PPE to workers.

Nursery authorities told Ashoke Kumer Dey, that he would appoint staff and start training all staff before the work begin.

Max representative Mr Abu Hanif informed the nursery authorities about various issues and wanted to know how to monitor the caring after planting trees.

Nursery authorities told Abu Hanif, "We are very worried about this, but we will take our necessary measures to save the tree, as we will use the net's fence if necessary." And another initiative that we have taken to protect the goat from reaching the Arohar tree is that it is possible to save the tree from the cow/ goat by using this method.

Representatives of CTM and ADB expressed satisfaction with the nursery authorities. And urged the responsible person to report any issues. And instructed them to carry out the work with due diligence and honesty.

Then all delegates visited the entire nursery. After watching their activities, the delegates said they had already started knitting and preparing for the project work.

9.3 Present status of Compensatory tree plantation as on 30 June 2020

Under ALDLP, tree plantation had been started in the month of June 2020. Contractor has targeted to plant 1, 08,000 saplings during June-August 2020. Gomoti Nursery had been contacted by CTM JV for fulfill the target. The selected nursery were visited jointly by ADB, CSC and CTM JV in the March of 2020. Pit preparation for plantation has been started from zero point at Laksam (Chainage 130+700) end (see the photograph below). CTM JV is following the guidelines of Bangladesh Railway and Social forestry rules of Forest Department.

Following activities are now going on for tree plantation at ready track under Akhaura –Laksam double track project. The activities are being performed by Gomoti Nursery owner.

Activities performing are as follow:

1. Weeding of long weeds from the track sides
2. Digging of pits by hole driller (two drillers)
3. Pit preparation with compost fertilizer
4. Fencing with nylon net (height 3.5')
5. Fencing completed 10 km.
6. Chainage under working: 130+700 to 148+800
7. Pit prepared up to 30 June =25,200
8. Saplings transferring from nursery to Laksam planting areas
9. Trees planted as on 30 June =20,300
10. Location of tree plantation: Laksam Zero point to Lalmai

Field observation by CSC Environmental Team

a) Weeding is not being done properly
b) Sapling size is 2.5'-3.5' instead of 4'-5'
c) At least 10% saplings are dying (we suggested for replacement)
d) Plantation progress is very slow
e) Ready track for plantation of at least 80,000 saplings by August 2020 but only 20300 saplings have been planted up to June 2020.

Usually why trees die-

i. Improper plantation practices i.e. untrained and/or unskilled workmanship
ii. Lack of care i.e. no watering, no protection for cattle grazing, insufficient manpower
iii. Involvement of local communities was absent in the program

iv. Lack of protection i.e. surround fencing, supports to grow vertically
v. Eaten by cattle and goats
vi. Stakes from plant are stolen by poor people for fuel

Recommendations –

i. Deploy skilled manpower for the plantation job
ii. Procure suitable, healthy, strong and steady saplings
iii. Maintain the tree spacing (2m) and ratio of Timber : Fruit : Medicine : Fuel (5:3:1:1)
iv. Comply with proper plantation guidelines for saplings of different species
v. Prepare each point of the plantation area well
vi. Ensure proper care after plantation
vii. Water and manure timely
viii. Ensure protection by fencing
ix. Plant long tree at the bottom row of embankment and bush tree at upper row.

Photographs

9.4 Monitoring Plan for Tree Plantation & Replacement Program

Items listed below are required to be monitored according to the approved Tree Plantation and Replacement Plan. CSC`s environment specialists will monitor closely whether these items are in practice and implemented properly.

Monitoring before Plantation

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

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.

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

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

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

Monitoring during Plantation

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

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

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.

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:

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.

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

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.

Capacity Building training

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

Status of Planted trees

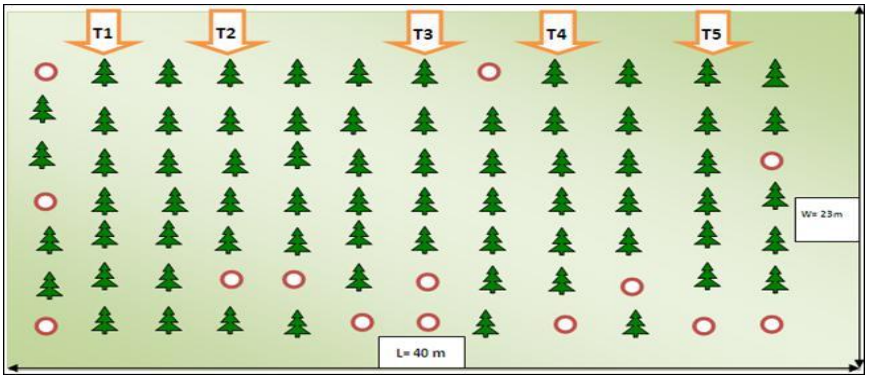
Condition of planted tress must be inspected. A rating system will be followed while counting. According to the condition of planted trees five scale rating will clearly describe the status of trees. The scale include –Very Good, Good, Fair, Weak and Dead.

Monitoring of Tree Replacement

Dead trees will be detected and ensure new sapling plantation for each dead tree as replacement.

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.



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

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 care taker 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. Plantation monitoring checklist has been attached as **appendix-14.5-E**

9.5 Varbal Contact between Nursery and Manpower working in tree plantation

Table 9. CTM JV's Compensatory Tree Plantation Plan during Rainy Season 2020

SL no	Work Description	Manpower/ Worker			Total Manpower	Working Hour		Payment Status
		Supervisor	Male	Female		Staring	Ending	
1	Nursery- where plants are growing at the desired age.	1	6	5	12	8.00 am	4.00 pm	Monthly
2	Trees shift and transportation with load unload proper way from nursery to the Sites	1	4		5	9.00 am	5.00 pm	Monthly
3	Jungle Cutting		1		1	9.00 am	5.00 pm	Daily
4	Dig the planting holes and distance measurement, utility check, Group - 1	1	3		4	9.00 am	5.00 pm	Monthly
5	Dig the planting holes and distance measurement, utility check, Group - 2	1	3		4	9.00 am	5.00 pm	Monthly
6	Remove existing roots from the hole.			1	1	9.00 am	5.00 pm	Monthly
7	Compost fertilizer put in pit, caring, processing, etc		3	2	5	9.00 am	5.00 pm	Monthly
8	Fencing - engage four groups	1	12		13	9.00 am	5.00 pm	Monthly
9	Place the tree in the center of the hole and planted, four groups	2	11	5	18	9.00 am	5.00 pm	Monthly
10	Tie the trees			2	2	9.00 am	5.00 pm	Monthly
11	Water the tree thoroughly or as per require		6	4	10	8.00 am	5.00 pm	Monthly
12	Dead saplings and replace the dead plants with new saplings.	1	2		3	9.00 am	5.00 pm	Monthly
13	Caretaker for inspection with maintenance @ one inspector per three KM		4		4	7.00 am	6.00 pm	Monthly
14	Tree and Plantation specialist and others				2	General Duty		Monthly
	Total	**8**	**55**	**19**	**84**			

10. Environmental safeguard activities are being monitored regularly

- Monitoring of Monthly Sample collection of Ground water, Surface Water, Air and Noise from construction site for testing is going on.
- Regular site monitoring by Environmental Specialists is going on. It's a continuous process.
- Currently no work is going on there in Black Cotton Zone (Hazardous Work site) and so there are no workers at site.
- Tree plantation and replacement program is going on and it was started on 16 June 2020.

10.1 Findings of Environmental Issues to be complied

- **Compensatory Tree Plantation program**
  55000 trees have been cut down for project work. As compensation 1, 65,000 trees should be planted by contractor. During June 2020 tree plantation has been started. By August they will plant 80,000 saplings.

- **Waste management plan regarding Dismantled existing station building**
  CTM was supposed to submit a plan to CSC for review since long but no proper respond was found.

- **PPE`s for work Safety**

  A lot of workers did not wear Personal Protective Equipment's properly, especially it is so hard to find the workers with safety helmets, shoes and gloves. Contractor's initiatives regarding this issue is not satisfactory at all. This issue is persisting since long but no action taken yet.

- **Site Boundaries**
  No barricading is found at most of the construction sites. Contractor is continuously failing to ensure safety barricading. Several reports have been sent to them with photographs.

- **Safety Sign Boards at Worksite**

  Very few Safety Sign boards are provided. Number of Sign boards should be increased. Size of Sign boards are small and should be increased for clear visibility. Language of sign boards should be in Bangla for the clear under standings of workers and local people.

- **Removal of Solid Construction Debris from bridge locations**
  Both Toma and Max have approved dumping zone. But still they make it delay to carry out solid debris to dumping zone. Several time CSC has reminded regarding this issue. No remarkable changes are visible.

- **Safety Sign at Temporary Level Crossing**
  As instructed earlier, Safety signboard with slogan and pictures should be made bigger to create visual impacts. And Signboards should be posted in appropriate places of the level crossings. But most of the board are without pictures. Language of the board also should be in Bangla for clear understanding of the local people.

11. Bentonite Slurry Management during construction work

11.1 Re-use of Bentonite Slurry

Bentonite slurry can be re-used repeatedly provided its properties are carefully monitored and kept under control. Whatever system of excavation is used, loss of slurry will occur. Some will be excavated with the soil, some will permeate into the strata, and some will become too contaminated for re-use and have to be taken off site. Also, some slurry may be left in the excavation if it is not filled with concrete to ground level. The slurry which is lost is replaced by fresh slurry which is blended with the used slurry to top up the system. Bentonite powder may have to be added to the slurry or admixtures may have to be introduced to adjust its properties. About 94-96% Bentonite is being reused. The quantity of bentonite powder to be added to the mixing water depends on the quality of the bentonite and the required viscosity of the slurry. For most applications, concentrations between 4% and 6% by weight are typical.

11.2 Final Disposal of Bentonite Slurry

Usually, the cheapest acceptable method of disposal of Bentonite slurry is to place it in an approved landfill tip. However the availability of approved tips is limited, and many tip operators will only accept limited daily quantities (generally related to how much dry solid waste they are handling). Additionally, in wet weather, some tips will not accept Bentonite slurry for disposal. The purpose of these forms of treatment is to allow the products to be disposed of as solid waste. Waste disposal regulations have been the subject of significant changes in recent years and users of this guide should always ensure that any transportation or disposal is in compliance with the latest regulations. A part of the dried slurry is being collected and deposited to a designated approved dumping place (Bibirbazar, Jagonnathpur, Cumilla City Corporation dumping yard and Quasba City Corporation dumping yard) which is 2 km far away from the locality. Rest of the slurry is taken by the people who will use the slurry for their landfill site.

11.3 Chemical and Environmental Impact Analysis of Bentonite Slurry

Bentonite Slurry sample was collect by CTM JV from construction site on 4 September 2019 and sent to BUET for testing. CSC had found the test result on 22 December 2019. This study with chemical analysis and phase identification has revealed that there is no harmful chemical component in the supplied Bentonite sample which can be released into the environment during exploitation and processing. According to chemical composition result the most abundant oxides in the Bentonite are SiO_2 and $Al2O_3$. The total SiO_2 present in the clay is around 61.5%. Fe_2O_3 is the third most significant

component of Bentonite sample. The result of the XRF test on Bentonite clay shows that the supplied Bentonite does not contain any harmful toxic metal oxides. Composition of ASH from XRF LAB Centre XRF-1800 are: SiO_2=61.74%, Al_2O_3=10.16%, Fe_2O_3=8.26%, K_2O=4.41%, and CaO =1.66. Heavy metals analysis done on the slurries were found to be very low in concentrations and thus bioaccumulation in aquatic organisms from Bentonite slurry is insignificant.

12. Occupational Health and Safety

12.1 Main Objective in Health and Safety

- 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 9such as the facilities for toilets, drinking water
- Provide appropriate First Aid facilities and trained personnel

12.2 H&S Management system principles

HSE main principle is “keep safe workplace, keep safe people”. So, if we want 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.

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.

12.3 Managing Risk in the workplace

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

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.

12.4 Providing of Safety Tools

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.

12.5 Training, awareness and supervision

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

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

12.6 Welfare facilities

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.

12.7 Sanitary conveniences

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.

12.8 Washing facilities

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.

12.9 Drinking water

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.

12.10 Precautions to prevent fires

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 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

12.11 Precaution in case of fire

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.

12.12 First aid

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.

12.13 Site Security

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.

12.14 Work in the Rail Corridor

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.

12.15 Safety measures during construction period

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.

12.16 Safety Notice Board

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

12.17 PPE requirements and Training

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

12.18 Safety promotional event

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.

12.19 Orientation session on HIV/AIDS and STI Awareness

Activities :

- Managing, monitoring of HIV/AIDS prevention programme.
- Presentation of awareness orientation session on HIV/AIDS prevention programme.
- Provision of medical and counseling services.
- Condom and IEC materials distribution.
- Posters provided for all railway stations and work sites.

Description

Many workers are working in the ALDLP and adjacent to project area lot of community people are working. The workers and the community people are not aware of the HIV/AIDS.

Orientation session on HIV/AIDS and STI Awareness/Prevention under ALDLP has been conducted in the construction sites and communities.

Table 10. Orientation session on HIV/AIDS and STI awareness January-June 2020

Date and time	Program Title	Place	Participants		
			Male	Female	Total
13/01/2020 at 12.00 Noon	Orientation Session on HIV/AIDS and STI for workers	Rajapur Railway Station	22	0	**22**
13/01/2020 at 4.00 pm	Orientation Session on HIV/AIDS and STI for the Community people	Near Cumilla Railway Station Yard	0	13	**13**
30/01/2020 at 1.00 pm	Orientation Session on HIV/AIDS and STI for workers and Hijra (third gender)	Akhaura Railway Station	09 Hijra- 09	0	**18**

Date and time	Program Title	Place	Participants		
			Male	Female	Total
30/01/2020 at 3.00 pm	Orientation Session on HIV/AIDS and STI for the community people	Near Akhaura Railway Station	02	22	**24**
25 /02/ 2020 at 12.00 Noon	Orientation Session on HIV/AIDS and STI for workers	Bridge No: 243	60	0	**60**
25 /02/ 2020 at 3.00 pm	Orientation Session on HIV/AIDS and STI for the Community people	Near Bridge No: 243	01	22	**23**
26 /02/ 2020 at 1.00 pm	Orientation Session on HIV/AIDS and STI for workers	Kosba Railway Station	16	0	**16**
26 /02/ 2020 at 3.00 pm	Orientation Session on HIV/AIDS and STI for the community people	Near Kosba Railway Station	01	20	**21**

Orientation Session on HIV/AIDS and STI awareness

12.20 Status of implementation of the safety execution plan

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. They are also trying to ensure use of personal protective equipment for workers' safety.

12.21 Comments on occupational health and safety

- CTM is not continuously inspecting the sites for identify hazard
- Every month they do not inspect their machinery and equipment
- Every month CSC and CTM have done the Health and Safety joint inspection.
- They inspect for railroad safety including level crossings.
- They are inspecting in all works, and much more for keeping safe workplace
- They are not providing high quality of PPE for their employees
- They are keeping up-to-date PPE checklist and stock properly
- They rarely exchange damage PPE
- They provide PPE for the visitors but not enough
- They are providing general safety awareness training
- Providing individual safety awareness training
- Delivering work basis training and toolbox meeting.
- Group safety induction

12.22 Recommendations for health and safety

- All workers should be provided with Personal Protection Equipment (PPE) and wear properly.
- Using of PPE by workers should be ensured.
- Safety guards should be nominated at every unman rail crossing and railway bridge sites
- The cautionary sign boards should be set up at very close to the bridge ends. So people can easily notice the sign board and will be careful of the accident.
- Working sites should be well demarcated to protect the public.
- Potable safe water should be ensured in every site.
- Barricading must be installed during excavation, work at height.
- All the vehicles and plant must be inspected and display the copy of permit.
- More pay attention for the electric cables and equipment in safe use and tagged after inspected.
- Implement fire safety

Table 11. HSE Statistical report on accident/incident (MAX part)-January-June 2020

Sl. No.	Description of report items	January 2020	February 2020	March 2020	May 2020	June 2020
1	Total Manpower (Engaged daily average)	1295	1485	1528	445	450
2	Total man-hours worked [(according to pay roll) for that month]	321160	344520	354496	110,360	110,350
3	Total man-hours worked without Loss Time Accident (LTA)	321160	344520	354496	354,496	354,445
4	Total Man-days loss due to Loss-Time Accident (LTA)	0	0	0	0	0
5	Number of Reportable LTA	0	0	0	0	0
6	Number of minor injury/first-aid cases	8	8	11	0	0
7	Number of near miss incidents	0	0	0	0	0
8	Number of major injuries	0	0	0	0	0
9	Number of fatal accidents	0	1	0	0	0
10	Number of dangerous occurrences	0	0	0	0	0
11	Frequency rate= (Number of reportable LTAx1000000)/Man-hours worked	0	0	0	0	0

12	Severity rate= (Man-days lost due to reportable LTAx100000)/Man-hours worked	0	0	0	0	0
13	Incident rate=Number of reportable LTAx1000)/Average number of persons employed	0	0	0	0	0
14	Cumulative AIR (Accident Incident Rate); AIR= (Number of Reportable Accident x 1000)/Average Daily Manpower.	0	0	1	0	0

Table 12. Compliance measures (MAX part) during January-June 2020

Sl. No.	Description	January 2020	February 2020	March 2020	May 2020	June 2020
1	% of First-Aid Kit Available complete with necessary medicines	90%	92%	93%	95%	96%
2	% of Camp Labour covered with periodic medical attention	95%	93%	94%	98%	98%
3	% of excavated area barricaded	85%	87%	86%	84%	90%
4	% of welders using necessary PPE	87%	86%	88%	89%	89%
5	% of Staff & Workmen using required safety gear	75%	80%	84%	84%	85%
6	% of Staff & Workmen getting portable drinking water	98%	98%	98%	99%	99%
7	% of area lighting for night work	90%	92%	93%	95%	95%

N.B: April month was out of work

Table 13. Training and awareness programs (MAX part) during January-June 2020

Sl No.	Description	January 2020	February 2020	March 2020	May 2020	June 2020
1	Total Manpower (engaged daily average)	1295	1485	1528	445	
2	No. of personnel exposed to tool box training	1340	1370	1035	580	
3	No. of tool box meeting held	167	185	142	65	
4	No. of safety induction training program conducted	2	3	2	6	
5	No. of safety training held	1	1	1	0	
6	No. of safety seminars held	-	-	-	0	
7	No. of Safety film screened	14	22	14	0	

N.B: April month was out of work

Table 14. HSE Statistical report on accident/incident (TOMA part) January-June. 2020

Sl. No.	Description of report items	January 2020	February 2020	March 2020	May 2020	June 2020
1	Total Manpower (Engaged daily average)	902	842	790	780	785
2	Total man-hours worked [(according to pay roll) for that month]	223,696	195,344	150,120	150,110	150,140
3	Total man-hours worked without Loss Time Accident (LTA)	223,696	195,344	150,120	150,110	150,140
4	Total Man-days loss due to Loss-Time Accident (LTA)	0	195,340	0.5	0.5	0.5
5	Number of Reportable LTA	0	0.088	0.086	0.087	0.088
6	Number of minor injury/first-aid cases	0	0	0	0	0
7	Number of near miss incidents	0	1	0	0	0
8	Number of major injuries	0	0	0	0	0
9	Number of fatal accidents	0	0	0	0	0
10	Number of dangerous occurrences	0	0	0	0	0
11	Frequency rate= (Number of reportable LTAx1000000)/Man-hours worked	0	0.157	0.0140	0.0130	0.0150
12	Severity rate= (Man-days lost due to reportable LTAx100000)/Man-hours worked	0	0.7098	0.0686	0.0684	0.0688
13	Incident rate=Number of reportable LTAx1000)/Average number of persons employed	0	0.144	001495	001490	001496
14	Cumulative AIR (Accident Incident Rate); AIR= (Number of Reportable Accident x 1000)/Average Daily Manpower.	0	1.187	1.2650	1.2640	1.2655

N.B: April month was out of work

Table 15. Compliance measures (TOMA part) during January-June 2020

Sl. No.	Description	January 2020	February 2020	March 2020	May 2020	June 2020
1	% of First-Aid Kit Available complete with necessary medicines	85%	87%	88%	86%	89%
2	% of Camp Labour covered with periodic medical attention	90%	88%	89%	87%	90%
3	% of excavated area barricaded	80%	82%	81%	80%	84%
4	% of welders using necessary PPE	82%	81%	83%	79%	83%
5	% of Staff & Workmen using required safety gear	70%	75%	79%	78%	80%
6	% of Staff & Workmen getting portable drinking water	90%	90%	90%	89%	90%
7	% of area lighting for night work	83%	84%	85%	83%	87%

N.B: April month was out of work

Table 16. Training and awareness programs (TOMA part) during January-June 2020

Sl No.	Description	January 2020	February 2020	March 2020	May 2020	June 2020
1	Total Manpower (engaged daily average)	902	840	790	780	795
2	No. of personnel exposed to tool box training	917	872	760	750	770
3	No. of tool box meeting held	55	50	44	42	46
4	No. of safety induction training program conducted	08	09	06	06	07
5	No. of safety seminars held	0	0	0	0	0
6	No. of Safety film screened	120	138	152	150	158

N.B: April month was out of work

Table 17. Key Action Taken in January to June 2020 (MAX and TOMA)

Sl No.	Status of Key Actions from previous Health& Safety	Status
1	Installation of reflective road signboard	Continue
2	Individual safety induction for all type of employee	Done
3	Installation of safety fence for protecting the public	Continue
4	Maintained of diversion signboard and supporting board	Continue
5	PPEs inspection and replacement	Continue
6	Provide company ID card for employee	Continue
7	Supervise HIV/AIDS subcontractor's prevention program.	Continue
8	Safety induction training to 3rd party	Continue
9	Specific HSE training programs to workers (e.g. Hoist, Lifting act)	Continue
10	Induction sticker & logo sticking in helmet	Continue
11	Organize safety management team meeting	Done
12	Installation of safety WARNING & CAUTION signboard	Done
13	Group training to employee e.g. First aid, Fire fight, etc.	Done

13. Overall Conclusion and Recommendations

a. Overall Progress with Implementation of Environmental Safeguard Measures

115. According to the monitoring and supervision by the Engineer of the environmental activities on the ALDLP it is found that the Contractor, CTM is now credibly undertaking most of the environmental mitigation measures specified in the EMP although there are areas where further action and improvement need to be made.

116. The Contractor's compliance with contract clauses and EMP tasks has increased since the mobilization of CTM's environmental engineer, which is a very positive sign.

117. The potential adverse impact of the ongoing works on the major watercourses and overall drainage of the area is being minimized by ensuring the design and construction of the new embankment and structures generally match the embankment and structures of the existing track

alignment. The potential adverse impact of dust from the transport of large quantities of embankment materials is being minimized by spraying water to the worksites.

118. The monitoring of water and air quality, and noise levels had generally been fully compliant since January 2020. The implementation of the occupational health and safety issues has been greatly improving with the Contractor and Engineer holding regular briefings related to the various campsites and work sites.

b. Recommendations for improving compliance through corrective action plan

119. Based on the site inspection and monitoring of the execution of the Environmental Safeguards program the accomplishments in response to the relevant corrective action plan which are given in the following **Table 18.**

Table 18. Recommendations for Improving Contractor Compliance

Sl. No.	Corrective Issues	Action	Timeframe	Responsible persons
1	The Contractor must ensure that the sampling of the critical parameters for water quality, noise and air quality is carried out fully in line with the Sampling Program so that meaningful results can be obtained enabling further mitigation measures to be determined and initiated if required.	Air quality and Noise level monitoring period will be 24 hours	Every month	Health & Safety and Environment Officer of CTM
2	The Contractor should be strengthened so that actions taken to improve health and safety issues are maintained and not lost over time. It will be necessary to arrange the training and awareness in the health and safety issues for the construction workers with regular and repeated sessions presented & delivered by specialised personnel.	Regular health and safety training for the construction workers	By 15 August	Health & Safety and Environment Officer of CTM
3	The overall management of camps and worksite must be further improved in line with the best practices on occupational health and safety so that these areas of the site can be made fully compliant.	Health, safety and hygienic condition in the worksites	By 30 August	Health & Safety and Environment Officer of CTM
4	The staffing provided to address the environmental safeguards program should be enhanced to ensure that all the requirements of the program can be correctly actioned and reports can be provided in a timely manner recognising the importance of these matters to all stakeholders.	Environmental safeguard activities, action taken and reporting	During project period	Health & Safety and Environment Officer of CTM

c. Overall Environmental Safeguards Compliance

1) Contractor

120. The environmental awareness creation, particularly regarding the direct construction impacts and especially for health, pollution and safety issues are important. The need to develop self-regulation of the contractors will have to be emphasized, with the consultant's supervisory role that to be in conformity the relevant Environmental Clauses (Section 6, Subsection H of contract technical specification) incorporated in the construction contracts and national legislation.

2) Bangladesh Railway

121. Bangladesh Railway has recognized the need to improve its safeguards technical capacity and to that end in planning to establish an Environmental and Social Safeguards Unit within the agency.

3) Construction Supervision Consultant (Engineer)

122. The engineer need addressing all safeguard issues and recognizing the lack of technical capacity of the contractor through preparing and delivering workshop on EMP implementation, field monitoring and reporting, including templates of all required tables and reports.

4) Asian Development Bank (ADB)

123. For loan implementation work the ADB's active participation is very important and periodic discussion with BR about the need for the Contractor to comply (based on the Engineer's input) is essential if the EMP actions need to be effective. This action reinforces the seriousness of safeguard implementation with both the Contractor and BR, while underscoring the value of the Engineer's oversight. With the absence of suitable staff engaged from the commencement of the Project by the Contractor this did not happen at the start of the works, but the situation will be resolved after the first year.

Lessons Learned and Gaps.

The following are major lessons learned during January to June 2020 implementation period

1) Prequalification of the Contractor

124. Contractor's pre-qualification in environmental and social safeguards needed to specify in the bid documents and then follow through commitments by the contractor to provide safeguard expertise from the start of the construction period need to be constantly enforced.

2) Preparation of Environmental Clauses Section of Contracts

125. Contracts should have environmental sections where all measures are defined, including cross referencing the EMP, prepared as part of the environmental assessment, and with financial effects provided for non-compliance.

3) Prepare Environmental BOQ section

126. In order to effectively hold back payment for safeguard work not completed or inadequately addressed, costs should be linked to each major mitigation task or task group. To address this an environmental safeguards section of the construction contract's Bill of Quantities was prepared, thereby attaching costs to each task. In this way the Engineer can easily link payment hold-backs with incomplete work.

4) Engineer's Environmental Specialist on the Job while the Contractor was mobilizing.

127. Having the Engineer's (CSC) designated environmental specialist on the job when the Contractor mobilized was essential to set the tone and significance of environmental safeguards. Most EMPs have, as an important pre-construction activity, information on EMP implementation and reporting to the Contractor, and assisting with the preparation of the contractor's Environmental Mitigation or Management Work Schedule (EMWS). These contracts should therefore have a provision for the early involvement of the project environmental specialist.

5) Presentation on safeguard by contractor for all of the ADB missions and involvement of CSC

128. Contractor should make presentations on the work being undertaken without the knowledge or oversight of the Engineer is essentially the same as taking away all responsibility and authority of the

Engineer to direct the Contractor and to decide on performance. This occurred twice during the constructions stage and resulted in a very significant loss of authority for the Engineer. The Contractor took this to mean that the Engineer and environmental safeguards were items to ignored, with few if any consequences.

129. ADB needs to insist that the Engineer be involved in all matters that require regular the Engineer oversight. This is especially true for safeguard matters, which tend to slip "under the radar". It is important to have both EIB and ADB HQ involved on large and long duration projects and to make sure that the Engineer is kept in the information loop as much as possible.

130. Present environmental progress status during January-June 2020 is given in **Table 19.**

Table 19. Present environmental progress status during January-June 2020

Sl No.	Environmental Issues	Degree of satisfaction in respect to mitigation measures taken						Remarks
		Very good	Good	Fair	Not bad	Bad	Worst	
1	Noise and attenuation measures							Sometime exceeds standard level but remain within tolerable limit
2	Dust control		√					
3	Water course impacts in wetlands/ponds/rivers		√					
4	Disposal of construction debris		√					
5	Other waste management			√				Care should be taken not to mix into water.
6	Servicing and operating equipment		√					
7	Control of petroleum products		√					
8	Waste oil and lubricants		√					Soil should not be contaminated.
9	Occupational health and safety			√				More disinfectants should be provided
10	Toilet facility			√				Old toilet should be replaced.
11	House keeping			√				More hygienic condition should be maintained.
12	Drinking water facility		√					
13	Use of personal protective equipment (PPE)			√				PPE supply and use should be ensured
14	Protection of top soil and soil erosion			√				Embankment should be protected
15	Borrow and dredging site impacts			√				This will be recovered after rainy season
16	Disposal of Bentonite slurry			√				Slurry is non-toxic
17	Compensatory Tree plantation		√					One training performed

14. Appendices

14.1 Appendix-A. Quantitative Environmental Monitoring Schedule, 2020

Factor of Monitoring	Stage	Point of Monitoring	Test Parameters	Method for Monitoring	Frequency of Monitoring	Test Month in year 2020
Air Quality	Construction	All construction locations along the line - 2 locations	PM 10, PM 2.5, SOx, NOx	High Volume Sampler	Once per Month	January- done February- done March- done April -COVID-19 May- done June -done July August September October November December
Ambient noise level	Construction	All construction locations along the line - 2 locations	Measurement of noise dB(A)	Filed Level Noise Meter	Once per Month	
Surface Water quality	Construction	All construction locations along the line - 2 locations	Temperature, pH, TDS, EC, TSS, DO, COD, BOD5	In situ and Laboratory analysis	Once per Month	
Ground Water quality	Construction	All construction locations along the line - 2 locations	Temperature, pH, Phosphate, Mn, Fe, As, Fecal Coliform	In situ and Laboratory analysis	Once per Month	

14.2 Appendix-B. Environmental Sampling Photographs: January-June 2020

Sampling photo in the month of January – June 2020

Air Quality Monitoring at Rajapur Railway Station

Air Quality Monitoring at Sadar Rasulpur Railway Station

Noise Level Monitoring at Shankuchail Jame Mosque Railway Station

Noise Level Monitoring at Cumilla Railway Station Jame Mosque

Noise Level Monitoring at Akhaura Railway Station Jame Mosque

Noise Level Monitoring at Gangasagar Railway Station Jame Mosque

Surface Water Collection at Gomti River (Upstream)

Surface Water Collection at Haora River (Downstream)

Groundwater Collection at Akhaura Railway Station

Figure 3. Sampling photo in the month of January – June 2020

14.3 Appendix-C. Environmental site monitoring photographs: January-June 2020

A picture is worth a thousand words
Barnard

Figure 4. Environmental site monitoring photographs

14.4 Appendix-D. Nursery visited by ADB, CSC and CTM during January-June 2020

A picture is worth a thousand words
Barnard

Figure 5.Nursery visit photographs

Figure 6.Nursery seed and sapling photograph

Figure 7. Nursery seed bed visit photographs

14.5 Appendix-E Checklist for Monitoring the Compensatory Tree Plantation Program

Checklist for Monitoring the Compensatory Tree Plantation Program

Date of Inspection	**00/00/2020**
Area of Inspection	
Location (Chainage)	
Inspected By	
Contractor	
Average height of Saplings	
Types of Saplings	
Species	

Monitoring before plantation and during plantation

S/N	Monitoring Issues	YES	NO	N/A	Remarks
01	Is size of excavated pits is adequate (1ft x 1ft x1ft) for plantation?				
02	Is soil prepared with compost or decomposed cow dung and mixed properly? (according to plantation techniques mentioned in TPRP)				
03	Are weed and debris removed during soil preparation?				
04	Is gap between two pits accurate, according to TPRP?				
05	Are the roots properly covered by the soil?				
06	Are support stacks provided?				
07	Are saplings watered daily until they strongly rooted?				
08	Are saplings properly fenced to survive as well as to protect?				
09	Is Watch Guard deployed to protect planted trees?				
10	Do they Weeding and clear bottom of planted saplings?				
11	Are saplings planted both side slopes of the newly constructed embankment?				
12	Are saplings planted back side of the constructed new stations?				
13	Are trees planted according to the types and species mentioned in the Tree Plantation Plan?				
14	At least 03 saplings planted instead of each cut?				
15	Are trees planted in the range of RoW?				
16	Is effective to arrest the soil erosion?				
17	Affected people as mentioned in RP are properly compensated?				
18	Is capacity building training arranged?				

Monitoring before plantation and during plantation						
S/N	**Monitoring Issues**			**YES**	**NO**	**N/A**	**Remarks**
19	Is tree replaced according to the requirement						
20	Are support stacks removed after the firm establishment of trees and safe from molestation?						
21	Can care takers be recruited to carry out the Inventory work?						
22	Will caretakers have the ability to conduct the inventory and produce credible data?						
23	Whether the caretaker training will be required?						
	Monitoring After Plantation						
24	Status of Planted Trees (within inspected area)	No. of Very Good Trees	No. of Good Trees	No. of Moderately Good Trees	No. of Weak Trees	No. of Dead Trees
25	Instructions, if any?					

_____ _____

Contractor's Representative **CSC's Environment Specialist**

Instructions:

This checklist is to be completed jointly by CSC`s ENV specialist & CTM-JV`s representative at the time of making the site inspection. A tick should be placed in the applicable Yes/No box as appropriate. Where an item is not applicable, the notation N/A should be placed in the box

Where a non-conformance is identified, a brief explanation is to be provided in the corresponding Remarks box

If a non-conformance cannot be rectified immediately, write a Site Instruction in instruction box to the Contractor listing the required action to be taken.

14.6 Appendix-F. Photographs of borrow pit ponds beside railway track

Photographs of Borrow pit ponds excavated during earth work of ALDLP

14.7 Appendix-G. Environmental Monitoring Checklist January- June 2020

CONSTRUCTION CAMPS

Checklist Question	Yes	No	Remarks
1. Is the camp/yard located in a protected area, next to a community water source or any other ecologically or otherwise sensitive area?		✓	There are no such areas
If yes, comment on the adverse impacts on the environment:			
2. Is the camp/yard being properly maintained?	✓		
If no, list what is not being done properly			
3. Is the wastewater being disposed of properly?	✓		
If no, comment on how it is being disposed and what are the impacts			
4. Have septic tanks been installed?	✓		
5. Are the septic tanks working correctly, that is not overflowing, or emitting smell?	✓		
6. Is the solid waste being disposed of properly?	✓		
If no, comment on how it is being disposed and the impacts of such disposal:			
7. Is attention being paid to “Good housekeeping”?	✓		
If no, comment on what is not being done:			
8. Are contractor’s vehicles being maintained at the campsite/yard?	✓		
9. Is the waste from vehicle maintenance being disposed of property?	✓		
If no, comment on how it is being disposed:			
10. Is the fuel storage area properly surfaced?	✓		
If no, comment on how the surrounding area is being affected:			
11. Are occupational health and hygiene precautions being taken?	✓		
If no, comment on where they are being negiected:			
12. Does the community have any issues with the camp?		✓	
If yes, what are the issues?			
13. Is the detail First Aid is available?	✓		
14. All necessary firefighting equipment is on site and in good working order.	✓		
15. Telephone numbers of emergency services are available on site	✓		

EROSION OF SLOPES

Checklist Question	Yes	No	Remarks
1. Is there any erosion/Landslides/Instability beside the road? If yes than what is the reason		✓	
(a) A combination of some of the reasons above			
(b) Improper drainage			
(c) Improper leveling after earth removal			
(d) Inadequate water channel diversion			
2. Is remedial action required?		✓	
If yes, comment:			
3. Did the erosion/landslide/instability cause any damage?		✓	
If yes, what was the nature of the damage?			
4. Was the erosion brought to the notice of appropriate authorities by the communities?	✓		
If no, was there any action taken?			

AIR POLLUTION

Checklist Question	Yes	No	Remarks
1. What is the nature of air pollution?			
(a) Dust from road/ rail	✓		
(b) Generator emissions	✓		
(c) Vehicular emissions	✓		
2. Is the problem significant enough to warrant attention?		✓	
If yes, did the contractor take appropriate measure to mitigate the problem?			
3. What is/are the measures taken?			
(a) Periodic water sprays on road surface /borrow pits	✓		
(b) Vehicles regularly maintained	✓		
(c) Equipment regularly maintained	✓		
4. Is air pollution creating problems for the surrounding communities?		✓	
If yes, what type of problems?			

WATER POLLUTION

Checklist Question	Yes	No	Remarks
1. What is the nature of water contamination?			
1.1 Surface water (stream, pond etc.)			
(a) Disposal of out spoil into water body or on slope leading to water body		✓	
(b) Discharge of wastewater from camp into fresh water body		✓	
1.2. Groundwater			
(a) Oil spillage		✓	
(b) Any other disposal over soil surface		✓	
2. Is the impact significant enough to warrant mitigation measures?		✓	
If yes, provide necessary details:			
3. Is the impact long term?		✓	
If yes, comment:			
4. Can it be ratified by mitigation measures?	✓		
If yes, what type of mitigation measures should be taken?			Oil spillage protection
Any additional comments:			

CULTURAL HERITAGE

Checklist Question	Yes	No	Remarks
1. Does the project area have any cultural heritage, archaeological, historical or religious sites?		✓	N/A
2. If yes, are they affected in any way by the project activities?			N/A
If yes, how?			N/A
3. Did the concerned authorities and the contractor take any appropriate measures to protect the site?		✓	N/A
If yes, what are the measures taken?			N/A
4. Are the communities satisfied with the measures taken?			N/A
5. Is the community satisfied with the measures taken by the contractor to protect land?			N/A
If no, how and with what measures can it be improved?			N/A
6. Is the local administration satisfied with the measures taken by the contractor to protect land?	✓		N/A
If no, what is being suggested by the local administration?			N/A

LAND CONTAMINATION (CAMP SITE)

Checklist Question	Yes	No	Remarks
1. What are the impacts of project activities on land?			
(a) Road/ rail run-off oil, grease and fuel contaminating land		✓	
(b) fuel oil/used oil/grease spill on land in equipment yards/camps sites		✓	
(c) indiscriminate discharge of waste on land		✓	
(d) indiscriminate disposal of solid waste		✓	
any other project activities resulting in land contamination			
2. Is the impact significant enough to warrant mitigation measures?		✓	
If yes, provide necessary details:			
3. Is the impact permanent?		✓	
4. If permanent, could it have been avoided by taking appropriate mitigation measures?		✓	
If yes, what type of mitigation measures should have been taken?			
5. Is the impact temporary?	✓		
If yes, how could it be corrected?			Fuel, used oil, grease should be kept in protected drums.
6. Is the community satisfied with the measures taken by the contractor to protect agricultural activities?	✓		
If no, how and with what measures can it be improved?			
7. Is the local administration satisfied with the measures taken by the contractor to protect agricultural activities?	✓		
If no, what is being suggested by the local administration?			
8. Did the community allow the use of their land for borrow pit or any other purpose?		✓	
If yes, what was the motivation behind it?			
If no, did the contractor take permission from the land owner and local administration for the specific use?			

NOISE POLLUTION

Checklist Question	Yes	No	Remarks
1. What is the nature of noise pollution?			
(a) Vehicles on road/ railway	✓		
(b) Generators, construction plant	✓		
(c) Construction vehicles	✓		
2. Is the problem significant enough to warrant attention?		✓	
If yes, did the contractor/consultant take appropriate measure to mitigate the problem?			
3. What is / are the measures taken?			
(a) Vehicles regularly maintained and silencers checked	✓		
(b) Speed limit enforced on project vehicles	✓		
(c) Construction equipment maintained and silenced	✓		
(d) Awareness raising of staff over causing nuisance to local communities	✓		
4. Is noise pollution creating problems (health, aesthetic and nuisance) for the surrounding communities?		✓	
If yes, what type of problems?			

DRAINAGE AND FLOODING

Checklist Question	Yes	No	Remarks
1. Is the flooding extensive or not?		✓	
If yes, give details:			
2. Have contractors activities caused flooding or blocked drains?		✓	
If yes, give details:			
3. Have cross drainage structures been built in correct location as shown in contract?	✓		On going
If no, give details:			
4. Are cross drainage structures “as built” same as in “detailed design”?	✓		
If no, give details:			

CONSTRUCTION CAMPS CLOSURE

Checklist Question	Yes	No	Remarks
1. Is the camp/yard located in a protected area, next to a community water source or any other ecologically or otherwise sensitive area?		✓	
If yes, comment on the adverse impacts on the environment:			
2. Has the camp/yard been properly cleared of all debris and re-vegetated?	✓		
If no, list what was not done properly:			
3. Was the wastewater disposed of properly?	✓		
If no, comment on how it was being disposed and what were the impacts:			
4. Are septic tanks installed? Have they been removed?	✓		
If no, why not?			
5. Was solid waste disposed of properly?	✓		
If no, comment on how it was being disposed and the impacts of such disposal:			
6. Was attention being paid to housekeeping?	✓		
If no, comment on what was not being done:			
7. Have all the contractor equipment being removed from the campsite / yard?		✓	
8. Has the scrap metal from vehicle maintenance being disposed of properly?	✓		
If no, comment on how it is to be disposed:			
9. Has all fuel storage been removed from the site?	✓		
If no, comment on how the surrounding area is being affected:			
10. Have all general offices and staff dwellings been removed?	✓		
If no, comment on if they are to be handed over to new owner or other plans:			
11. Does the community have any issues with the camp closure?		✓	

FLORA AND FAUNA

Checklist Question	Yes	No	Remarks
1. Is any flora or fauna will be disturbed?		✓	
If yes, give details:			
2. Have contractor's activities caused any damage to fish habitat?		✓	
If yes, give details:			
3. Does any Plant species need to be cut down for construction?	√		Already cut down
If yes, give details:			
4. Is re-vegetation going on	✓		
If not, why			

14.8 Appendix-H: Corrective Action Plan (Res. persons: Safety & Environ. Officer of CTM)

SL. No.	Impacts/Issues	Status	Corrective Actions	Timeline
1	Work sites are noisy due to pile driving, power generator, batch plants, movement of construction ve hicles and sudden train pass train pass along the existing line.	1. While monitoring noise level, 24 hours' time frame (covering both Day and night) has not been followed. 2. CTM did not install mufflers for combating noise generation from the machineries to comply the national regulation	1. Strictly ensure that noise quality monitoring to be carried out on 24 hours' basis and it must cover both day and night. 2. Providing the construction workers with suitable hearing protection earplug or earmuffs etc.	1. Every month during monitoring 2. Providing Supporting Equipment-Within 20-August-2020
2	Air Quality and Dust increase at busy stations and construction areas leading temporary and localized air pollution	1. Water spraying frequency and location is not appropriate and not up to the mark. 2. Bare stock pile of sand is creating dust pollution.	1. Daily 3-4-time water spraying is mandatory. 2. Bare stock pile of sand should be covered.	1. During dry Season 2. Within 30-August-2020
3	Construction Materials and Wastes	Despite having approved dumping zone, construction materials and wastes are being thrown to surface water in some cases.	Carry out all kind of wastes and non-usable construction debris to nearest dumping location.	With immediate effect. It is a continuous process
4	Servicing of defective vehicle, Equipment or Plant at work Site which contaminate Earth	In some sites mechanics are servicing defective vehicle, equipment on bare soil without any oil spill protection which results contamination of soil.	Provide adequate oil spill abatement equipment on the site and at workshops at all times and make sure about proper use of these.	30 August 2020
5	Poor safety oversight and management of the work sites by the contractor leads to accidents and unsafe working conditions Contractor does not provide adequate PPE or properly enforces its use, leading to accidents Lack of safety training by contractor	1. Number of safety signboards and size is inadequate. Also language is English which is difficult for understandings by workers. Practice of barricading while work at height is absence and use of safety tape fence is not in practice. 2. In MAX part appropriate personal protection equipment supplied. In TOMA part it is very rare and contractor does not enforce its use. 3. Safety training is inadequate	1. Increase the number of safety sign boards with proper size for clear visibility and use Bangla language for local people and workers Ensure mandatory use of safety fences separating the construction sites. 2. Supply appropriate PPE, such as safety boots, helmets, gloves, protective clothing, goggles and ear muffs among the workers and enforce its use. 3. Take urgent initiatives to arrange several types of training programs.	30September 2020
6	Near about 55000 trees had been cut down for project work. As part of environmental compensation 1, 65,000 trees (1:3) should be planted. It will help to keep ecological balance and absorb carbon-dioxide. Tree plantation report to be included in the monthly report.	The plantation has been started but the progress is very slow. Target is 1,08,000 sapling by this rainy season. 20300 saplings have been planted by June 2020. CTM is not providing tree plantation status report in their monthly monitoring report.	Near about 80,000 saplings should be planted in this rainy season. Monthly plantation report should be provided.	30 August 2020 Every month

14.9 Appendix-I. Progress of Time Bound Action Plan agreed the Aide Memoire 2020

Ref. No.: JV-ALDLP-BR-20-059 Date: 11 March 2020

Mr. Md.Arifuzzaman
Project Director
Bangladesh Railway Rail Bhaban,
16 Abdul Gani Road, Dhaka-1000, Bangladesh

Project: Contract No.: PD/ALDLP/CSC/02/2016: Consulting Services for Construction Supervision of Akhaura-Laksam Double Track Project

Subject: Submission of progress of Time Bound Action Plan agreed the Aide Memoire.

Ref:
1. Contractor letter CTM JV/TL/ALDLP/BR/20/3599, Dated 04 March 2019
2. GCC Sub-Clause 2.1 [Right of Access to the Site]

Dear Sir,

We are submitting herewith the progress of Time Bound Action Plan agreed in the Aide Memoire on 27-01-2020 from ADB for the mission held on 22-30 December 2019 for your further necessary action please.

Sincerely yours.

Raymond George Sawyer
Team Leader
Construction Supervision of Akhaura-Laksam Double Track Project
E-mail: raysey9@gmail.com

Encl: 1. Progress of Time Bound Action Plan agreed the Aide Memoire.

Progress of Time Bound Action Plan agreed the Aide Memoire.

Action/Issue	Responsibilities	Agreed Time Frame	Action Taken
Submit variation proposal to ADB covering the following issues (para 31): a. Increase in earthwork volume over the BOQ quantity. b. Treatment of 4.8km of BCZ c. SCP in Culverts and Bridge Approach and Low Embankment	BR/CSC	15 March 2020	❖ Variation proposal already submitted to BR vide letter no. JV-ALDLP-BR-20-044. Dated:10-03-2020. ❖ Design of BCZ will be finalize after appointment of Geotechnical/Earthwork Design Engineer of CSC. ❖ Variation proposal already submitted to BR vide letter no. JV-ALDLP-BR-20-044. Dated:10-03-2020.
2. Section 1 upline opening for traffic(para11)	BR	31 March 2020	❖ Chainage 130+760 to 140+960=10.2km opened on 16-6-2019. ❖ chainage 142+242 to 149+350=7.108km opened on 22-11-2019. ❖ chainage 154+541 to 155+200=0.659 opened on 19-01-2020 ❖ Chainage 140+603 to 142+683= 1.880 opened on 08-03-2020. ❖ Total route 19.847km opened. ❖ Rest 4.678 route km will be opened for traffic on or before 15 May,2020 subjected to solve land acquisition problem.
3. Submission of Training Proposal on Contract Management (para 17)	CSC/BR	31 Jan 2020	❖ As per CSC's contact agreement survey & overseas study tour proposal for employer has submitted

			through mail on 07-01-2020. (Annexure-1)
4. Finalization of Design for 5 Pilot Unauthorized Level Crossing (para 29)	BR/CSC	15 Feb 2020	❖ Will be finalized within 31March,2020.
5. Update on Resettlement at Akhura Station (para32)	BR	31 Jan 2020	
6. Finalization of the Replacement Of "Senior Resettlement and Gender Specialist" (para 43)	CSC/BR	31 Jan 2020	❖ May be finalized before 31 March,2020.
7. Recruit Environment Officer and 3 safety staff for the Contractor	CTM-JV/Toma	15 Feb 2020	❖ Done, Environment officer is working from 1st February 2020. ❖ One safety inspector two safety supervisor and ten safety helper is now working at site. (Annexure-2)
Provide review comments on Tree Plantation Guidelines prepared by CTMs	ADB	15 Feb 2020	
Post big safety signboards (8x6) ft at each populated area and two (3x2) ft at both sides of all unauthorized level crossings.	CTM-JV/Max	15 Feb 2020	❖ 7 project signboards (15x8) ft hoisted at 7 different locations (Laksam, Cumilla station, Labiba Tower-Engineer's Accommodation& Office, Gumti Bridge Site Office, Quasba, Akhaura, Bridge No.272). ❖ Besides, about 200 safety signboards (2.5x3) ft hoisted at level crossings (60% unauthorized & 40% authorized) where works are going on.
Organize 2 awareness campaigns monthly on the safety at the unauthorized level crossing sites and report to ADB and PMU	CSC/CTM	At least two in Jan 2020	❖ No awareness session was held at the ULC gates where the Contractor worked temporarily but such awareness program for the workers of CTM-JV was held regularly during daily toolbox

			meetings (29 held in January & 13 in Feb 2020).
Finalization of SOP	BR	30 March 2020	
Protect the Gomti riverbank after completion of bridge construction (para 45-54)	CTM	ASAP	❖ May be completed before 31st December,2020.
8. Incorporation of SDES comments in supplementary RP with list of all changes from the original RP including Akhaura station, BR colony, compensation through GRC, new JVC and clear indication of land acquisition requirements so far identified to ADB	CSC Resettlement Specialist	15 Feb 2020	❖ Draft supplemental resettlement plan (10th reversion) covering the additional resettlement impacts that were not included in the 2014 & 2015 project resettlement plan. Incorporating the SDES comments on supplementary RP and conforming to the recent comments of BR resettlement unit have already been submitted to PD of ALDLP, BR vide memo no. JV-ALDLP-BR-20-034, Dated: 13-02-2020. (Annexure-3)
Share CMIS password with consultant and ADB	BR	Immediately	
Obstacles report to be submitted to ADB	BR	15 Feb 2020	❖ Updated validation list of obstruction after joint verification by BR-CSC-CTM team has submitted to PD of ALDLP, BR vide memo no. JV-ALDLP-BR-20-037, Dated 17-02-2020 (Annexure-4)
ADB and BR will schedule a joint field visit to review impacts of Critical intersections loop lines and associated facilities.	BR and ADB	Jan 2020	
Methodology for PVAC rates for the new LA cases to be confirmed	BR	15 Feb 2020	

Scope of INGO contract variation for SRP implementation	BR	9 Feb 2020	
Submission of semiannual social monitoring report till December 2020 to ADB (para 55-57)	BR	15 Feb 2020	
9. Provide broad sheet reply for pending audit observation (para 60)	BR	15 Feb 2020	