

Bharat Heavy Electricals Limited.



**1st Monitoring Report
April, 2018**

**Draft Monthly Environmental Compliance Monitoring of 2x660
MW Maitree Super Thermal Power Project**

Submitted:

**May, 2018
Dhaka**

Center for Environmental and Geographic Information Services



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Acknowledgements

The Center for Environmental and Geographic Information Services (CEGIS), a Public Trust under the Ministry of Water Resources, is grateful to Bharat Heavy Electricals Limited (BHEL) for awarding the contract of consultancy for “Monthly Environment Compliance Monitoring during Construction Period for 2x660 MW Maitree Super Thermal Power Project at Rampal in Bagerhat District, Khulna Division” for a period of one year.

CEGIS greatly acknowledges the extensive support of Mr. Surojit Mandal, General and Construction Manager, BHEL (Power Sector – Eastern Region: Maitree 2x660 MW STPP) to entrust CEGIS as an independent agency for monthly environmental compliance monitoring. CEGIS is thankful to Mr. Sartaz Hussain, Dy. Engineer, BHEL, (BIFPCL 2 x 660 MW MSTPP) for his cooperative and collaborative insistence for accelerating this Project. Additionally, CEGIS is also grateful to Mr. Ratnadeep Kumar, Asst. Engineer (Safety), BHEL (BIFPCL 2 x 660 MW MSTPP) for mobilizing the field activities.

Abbreviation and Acronyms

BHEL	Bharat Heavy Electricals Limited
BIFPCL	Bangladesh-India Friendship Power Company Limited
BOD	Biochemical Oxygen Demand
BPDB	Bangladesh Power Development Board
CEGIS	Center for Environmental and Geographic Information Services
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
COD	Chemical Oxygen Demand
DO	Dissolved Oxygen
DoE	Department of Environment
EC	Electric Conductivity
EIA	Environmental Impact Assessment
EHS	Environmental Health Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPC	Engineering, Procurement and Construction
HSE	Health Safety and Environment
MW	Mega Watt
NO _x	Oxides of Nitrogen
NTPC	National Thermal Power Corporation
PM	Particulate Matter
PP	Power Plant
PPE	Personal Protective Equipment
SO ₂	Sulfur Dioxide
SPM	Suspended Particulate Matter
TDS	Total Dissolved Solid
ToR	Terms of Reference
USEPA	United States Environmental Protection Agency

Glossary

Term	Definition
Compliance	When construction activities are being conducted in accordance with the Environmental Requirements of the Project.
Environmental Requirements	Environmental Specifications set out in the Environmental Management Plan (EMP) and relevant Environmental Protection Plan (EPP). Conditions included in the Environmental Assessment Approval for the Project
Non-conformance	A construction activity conducted in a manner that deviates from a best management practice, compliance with which is required in the EPP for that construction activity.
Non-compliance	A construction activity conducted in a manner that deviates from a legal condition under a permit, an enactment, or a regulation, compliance with which is required in the EPP for that construction activity.
Reportable Environmental Incident	An incident of non-conformance or non-compliance which has caused or has the potential for causing an impact on the quality of air, land or water, wildlife, aquatic species, species at risk or heritage resources, and is reportable under a permit, an enactment, or a regulation.

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Chapter 1 : Introduction

1.1 Background

The Maitree Super Thermal Power Plant is a joint venture project of Bangladesh Power Development Board (BPDB), and National Thermal Power Corporation (NTPC) Ltd., India and is run by Bangladesh-India Friendship Power Company Pvt. Ltd. (BIFPCL). Bharat Heavy Electricals Limited (BHEL) has been awarded the contract of all Engineering, Procurement and Construction works of the Power Plant within the specified schedule. BHEL has already initiated the construction works. In order to fulfil the environmental due diligence, BHEL has decided to engage third party for monthly monitoring of the environmental compliance within the project area as per the requirement of Department of Environment (DoE) EIA approval Condition No-44 which is : *“Environmental Monitoring Reports according to specific format specified in the EIA Report shall be made available simultaneously to DoE Bagerhat District Office, Khulna Divisional Office and Headquarters on a monthly basis during the construction period of the Project.”* Accordingly, this monthly monitoring activities need to be continued for the entire construction period and the reports need to be submitted to DoE. In this regard, monitoring of environmental parameters as well as the status of Environmental Health and Safety (EHS) should be conducted in accordance with the EMP as stated in EIA Study Report.

1.2 Brief of the Project

The construction of BIFPCL 2x660 MW Maitree STPP has been progressing well as the project is now in the infrastructure development stage. The Project area includes 905 acres of land (Block-A) which is just beside the BPDB Project area (Block-B). The MSTPP Project area is connected with a 6 km length two lane access road from the Khulna-Mongla Highway to the MSTPP area. Expansion works are going on to convert this access road into a six lane road. A number of construction companies are now working at the Project site to complete the civil works within the stipulated time schedule. The Project activities conducted at various stages, include:

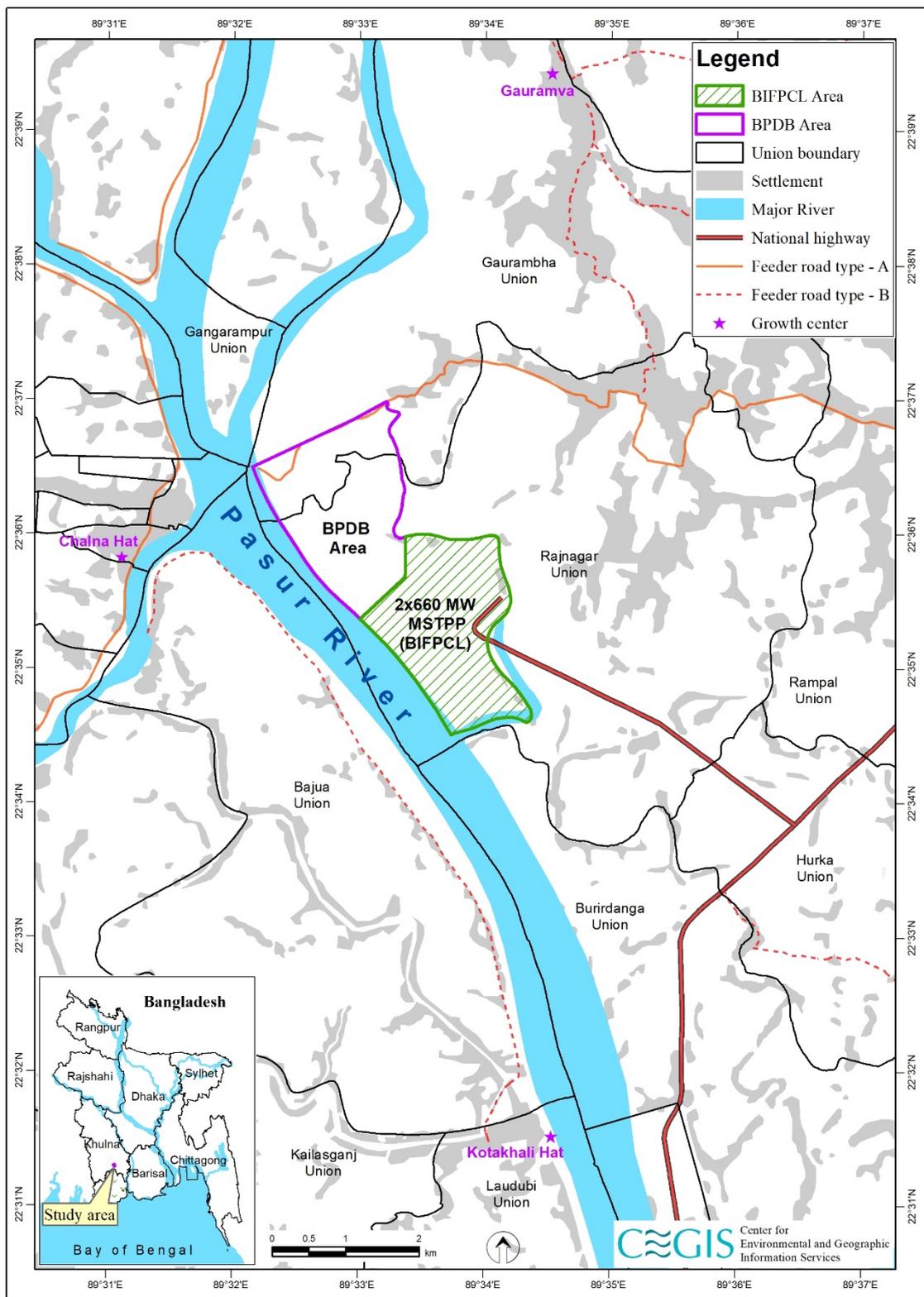
- Land Development activities at Block- A and B;
- Land preparations for infrastructure development;
- Extension work for increasing the width of the access road;
- Earthworks and land development including protective works near the bank of Passur river;
- Passage of road for traffic movement for construction purposes;
- Pile driving, base and sub-base construction activities;
- Land filling and construction works in the Jetty area:
- Labor shed construction;
- Service works;
- Power supply from the national grid and also from generator at working site;
- Concrete batching Plant and concrete pouring operations.

1.1 Selection of Sample collection site and discussion with the Proponent

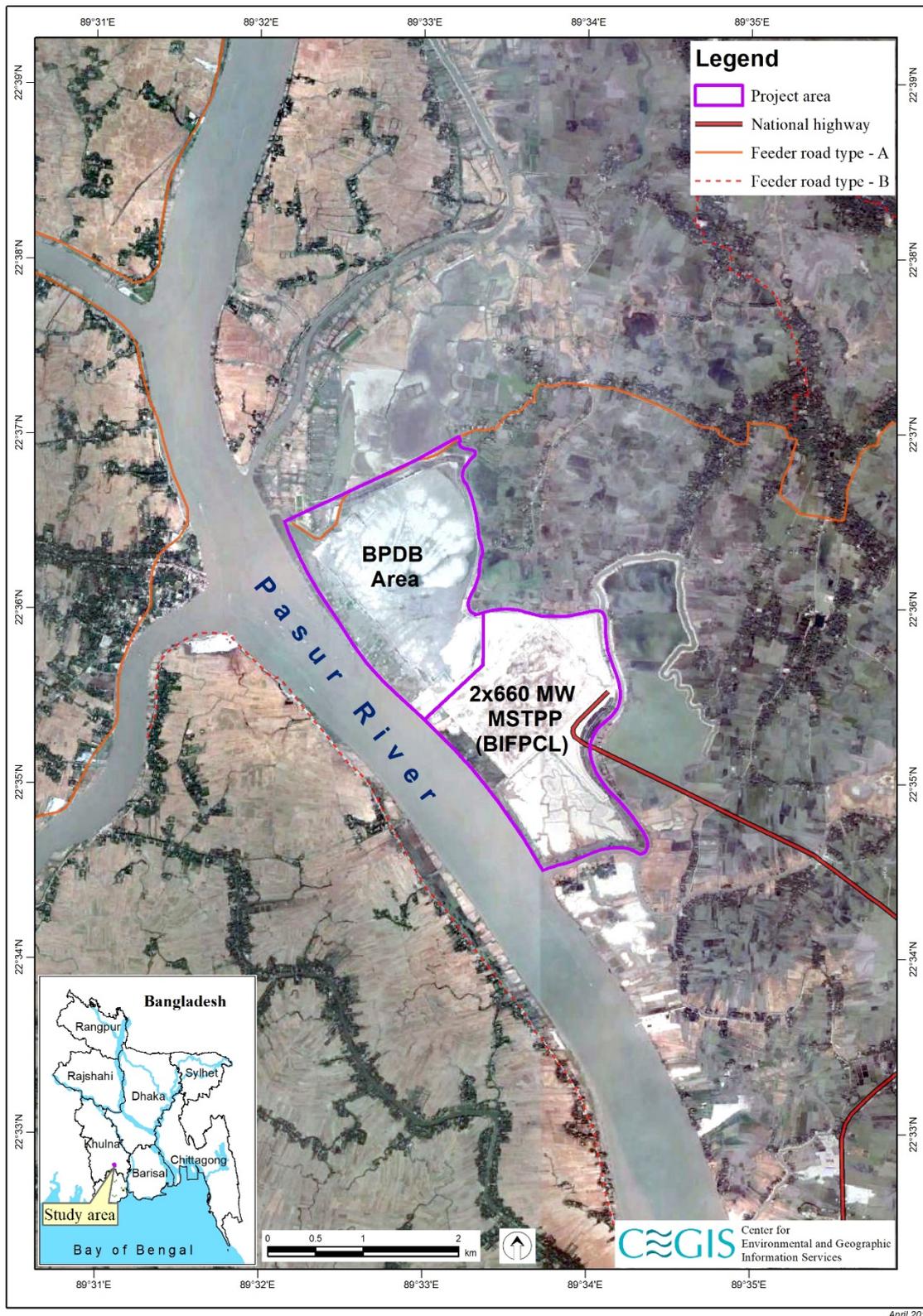
At the initial stage of first monthly monitoring, on 20th April, 2018 morning the Team met with Mr. Surojit Mandal, General Manager and Construction Manager, BHEL and discussed with him regarding selection of sampling location for conducting the Monthly Environmental Compliance Monitoring at 2X660MW MSTP Project. The Proponent gave necessary guidance and appointed one professionals to accompany with the CEGIS monitoring Team for facilitating the field monitoring activities. However, the location of sampling point has been selected in such a way that it reflects the worst case of ambient air quality, water quality and noise level status in and around the Project area. During this field trip the monitoring Team has successfully conducted the field activities and generated the monitoring results after lab analysis which has been presented in this first monthly monitoring Report.

1.2 Location of the Project

The MST Power Plant is located in between latitude 22° 37' 0"N to 22°34'30"N and longitude 89°32'0"E to 89°34'5"E and at about 23 km south of the Khulna City and 14 km north-westward from the Sundarbans. Location of the MSTP Project area is presented in **Map1.1a and 1.1b**



Map 1.1a: Location of 2x660 MW Maitree Super Thermal Power Plant



Map 1.1b: Location of 2x660 MW Maitree Super Thermal Power Plant

1.3 Study Objectives:

The overall objective of this study is to monitor the environmental compliance of certain parameters during the construction phase of this Power Plant Project.

- Monitoring of the certain environmental parameters of air quality, water quality and noise level at the sensitive receptor (point) in the Project site;
- Comparing the monitoring results with national (ECR 1997) and international standard (IFC 2007) and;
- Identifying the causes behind non-compliance and suggesting mitigation measures accordingly.

1.4 Scope of the Services

The scope of the study are as follows which are specified in Table 1.1

1. Conducting monthly air quality monitoring continuously (24 hrs.) at the sensitive receptors within the project boundary. Air quality monitoring stations are to be set at least one in every location near the labour shed, one in major construction works area, and one at the Jetty area. Air quality monitoring parameters to be monitored include SO₂, NO_x, CO, PM_{2.5}, PM₁₀, SPM and O₃.
2. Conducting monthly water quality monitoring in the project area, especially at the discharge points. At least three samples are to be collected from the Project area which include discharge outlet point and drinking water, etc. The monitoring parameters are pH, DO, Temperature, BOD₅, COD, Hardness, EC, TDS, NO₃, PO₄, SO₄, Cl⁻ after grab sampling.
3. Conducting monthly monitoring of noise level as Leq (dBA) values both for day and night time. Noise level will be monitored at ten locations through USEPA approved standard procedure. Monitoring locations will be determined on the basis of site specific work and location sensitivity.

Table 1.1: Environmental parameters measured during monthly monitoring visit

Parameters		Number of Location	Frequency of Sampling	Quantity of Samples	Guidance and Acceptance of the tests.
Air Quality	SO _x , NO _x , SPM, PM ₁₀ and PM _{2.5} , CO, O ₃	1-North west corner of the Power Plant./ Jetty Location 2-Labor Shed area. 3-Major Construction area	1	3	As per the guidelines provided in approved EIA reports for 2X660 MW, Coal based Thermal Power Construction. Project at Rampal Upazila, under Bagerhat
	Water Quality	BOD ₅	1. Outlet point-1 2. Outlet point-2 3. Outlet point-3	1	
COD		1		3	
Total Hardness		1		3	
Chlorine		1		3	

Parameters		Number of Location	Frequency of Sampling	Quantity of Samples	Guidance and Acceptance of the tests.
	pH		1	3	district of Bangladesh. And in line with the relevant Environmental Acts and Rules of Govt. of Bangladesh.
	DO		1	3	
	Temperature		1	3	
	EC		1	3	
	Nitrate		1	3	
	Sulphate		1	3	
	Phosphate		1	3	
	TDS		1	3	
Noise Level	Noise level	10 sites (considering the major sensitive area/construction activities)	1	10	

1.5 Purpose of the study

Environmental Compliance Monitoring is immensely necessary for a Project to assess the environmental status, non-compliance and non-conformance issues as per national environmental standards and good international practices. Additionally, with the aim of complying the EIA approval condition (Condition no.: 44) of Department of Environment, Bharat Heavy Electricals Limited (BHEL) has engaged Center for Environmental and Geographic Information Services (CEGIS) for carrying out the Monthly Environmental Compliance Monitoring study of the Maitree Super Thermal Power Plant. The Environmental Monitoring report will present the results of physical environment, particularly ambient air quality, ambient noise level and water quality, during the construction phase of the proposed Power Project. This monitoring activities will be conducted monthly, which has already started from the month of April, 2018. Moreover, a quarterly monitoring of environmental parameters is already being conducted by BIFPCL since February, 2014. The results of the monitoring will be presented monthly to BHEL reflecting the compliance status of the environmental parameters along with the follow-up action.

Chapter 2 : Approach and Methodology

2.1 Overall Approach

Study approach is prepared based on the scope of services. According to the ToR, this monitoring report is being prepared for the month of April, 2018. The environmental parameters for air quality, water quality and noise level have been selected based on the monitoring framework of the EIA study of 2x660 MW Coal based Thermal Power Plant Project at Rampal, Bagerhat which is also recommended in the scope of the services.

The location of air, water and noise monitoring sites (stations) are selected depending on the recommendation of the EIA study, location sensitivity and impact potentiality of that particular area in a specific time period. The **Figure 2.1** below provides an understanding of the different activity which has been carried out during the monitoring of Environmental Compliance of Maitree Super Thermal Power Plant.

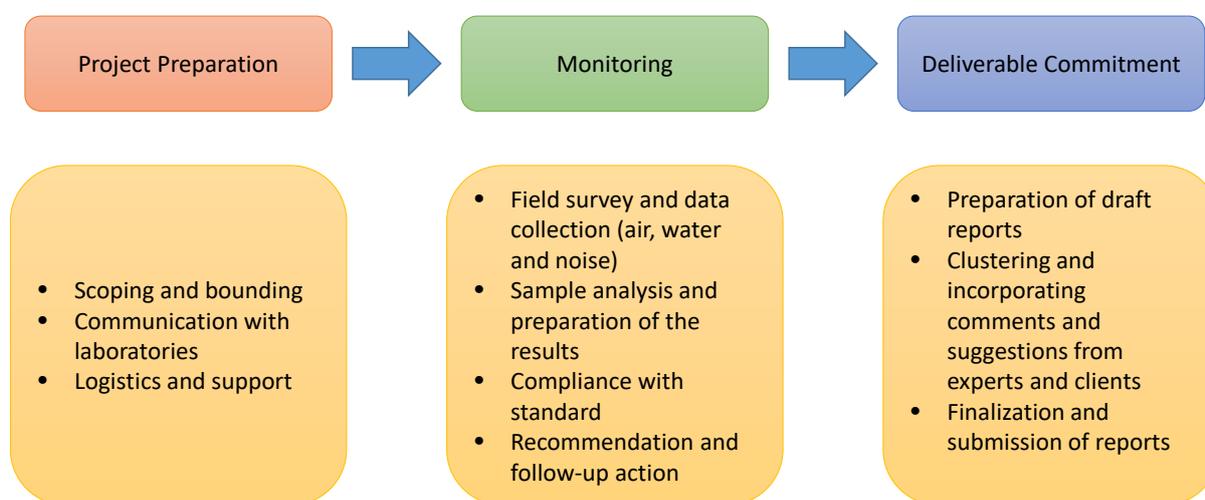


Figure 2.1: Monitoring Framework

Monitoring of environmental parameters like air quality, water quality and noise level are investigated through different monitoring equipment and tools. For air quality monitoring *volumetric sampler* has been used, water quality parameters has been tested *in-situ in the field and grab sample* has been collected for laboratory analysis and finally the *sound pressure level meter* has been used to estimate the present noise level equivalent in the surrounding areas. However, the monitoring activities have been conducted continuously at specified locations with skilled technicians and professionals.

2.2 Team Mobilization

An Environmental Compliance monitoring Team consisting of one Environmental Expert, one Junior Environmental Engineer and two technicians have conducted the monitoring study in the field (**Table 2.1**). The monitoring Team has worked at the BIFPCL 2x660 MW MSTPP site for 4 days i.e., from 20th April-23rd April, 2018. The monitoring activities have been performed independently as per standard practices.

Table 2.1: Composition of Environmental Compliance Monitoring Team

Position Assigned	Number	Responsibilities
Environmental Expert	1	Preparation of the Monitoring Plan, maintaining effective communication with BHEL and preparation of the Report.
Junior Environmental Engineer	1	Implementation of the compliance monitoring and preparation of the Report
Technician	2	Operation of the machineries and equipment, sampling etc.,

Collected sample from the field has been submitted to laboratory for analysis and testing. The results were checked precisely. The root cause has been assessed after analysis of the results and field observation. Additionally, a compliance monitoring Report has been prepared, which is reviewed by the internal and external experts. A number of internal professional manpower inputs have been used within the Consultant's Team for the efficient functioning and completion of the services.

2.3 Methodology of Environmental Compliance Monitoring

The monitoring activities have been performed through a methodological frame work. QA/QC procedure have been maintained during the field investigation and sampling of all the environmental parameters. The locations of air quality, water quality and noise level monitoring are shown in **Map 2.1a and 2.1b**. The locations are subjected to change in future depending on the potentiality of the impacts and its magnitude, sensitivity of the receptors and capturing the worst case scenarios. The procedure associated with the monitoring of each of the environmental parameters are described in the following sub-articles.

2.3.1 Ambient Air Quality

The location of ambient air quality has been monitored in three locations as specified in **Map 2.1a and 2.1b**. Air quality monitoring is performed at locations adjacent to the labour shed, jetty areas and construction site where the ambient air quality might be affected by construction and installation works as well as transportation of materials for working. The air samples were collected at the construction areas to test the environmental parameters to ensure that BHEL complies with the terms of environmental protection.

Emission of particulate matters and gaseous pollutants from construction site are monitored for 24 hours continuously. All of the criteria pollutants (SPM, CO, O₃, PM_{2.5}, PM₁₀, SO_x, and NO_x) have been monitored at specified places. *Respirable Dust Sampler* (Model-Envirotech India APM-460BL) and *Fine Particulate Sampler* (Model-Envirotech India APM-550) have been used to collect the air samples. The PM_{2.5}, PM₁₀, and SPM have been tested by *gravimetric method*. The SO₂ has been absorbed in a specified chemicals and tested by *West-Gaeke method*. The NO₂ has also been absorbed in a specified chemicals and tested by *Jacob and Hochheiser method*. Finally CO and O₃ has been measured using a *CO and Ozone meter respectively*.

2.3.2 Water Quality

Surface water quality monitoring includes the discharge water from the site and drinking water used by the labors and officials. The location of water quality monitoring have been shown in **Map 2.1a and 2.1b**. Water discharge from the project site to Passur River is observed and sample has been collected to determine the current status of discharge water quality.

Water quality field investigation has been conducted during mid-April, 2018 which is marked as pre-monsoon dry season. Therefore, no outlet discharge has been observed and recorded from the project boundary except one from Reverse Osmosis Plant rejected water outlet. BHEL use it to reserve the storm water inside the project boundary and use this water for dust suppression and curing by spraying. Considering the present scenario, checking the quality of drinking water used by the labors as well as by the project officials has become very much important. Therefore, two samples have been collected to monitor the drinking water quality of the project area. Standard practices have been followed for monitoring water quality. In-situ testing has been done at field and collected samples are brought into laboratory for various analyses. The parameters that are being analyzed include pH, DO, Temperature, BOD₅, COD, EC, TDS, NO₃, PO₄, SO₄, and Chloride as recommended in the EIA study done for this Project. Detail methodology for testing the water quality parameters are shown in **Table 2.2**.

Table 2.2: Methods followed in analyzing water samples

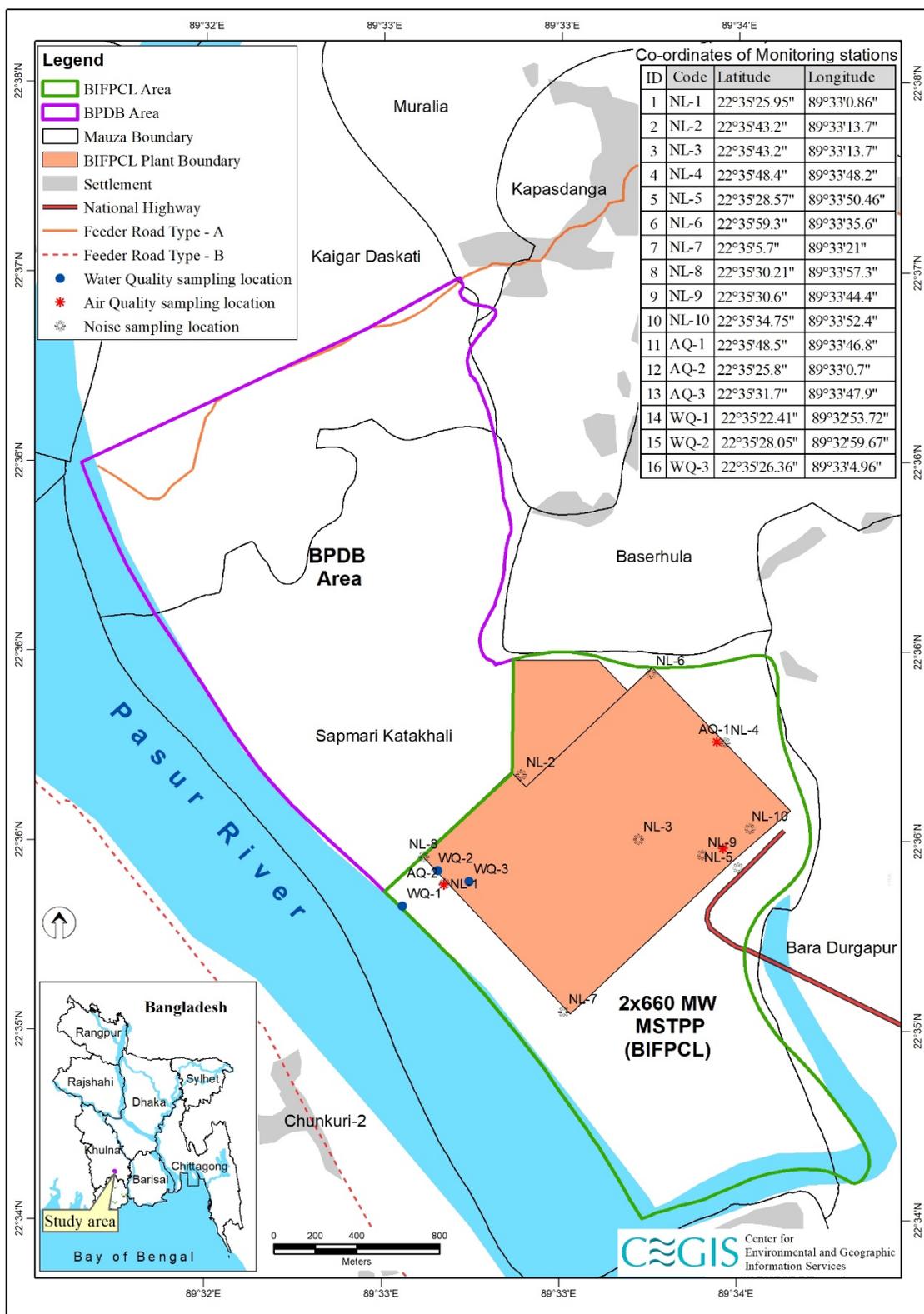
<i>Sl. No</i>	<i>Parameters</i>	<i>Methods</i>	<i>Reference</i>
01	Temp	Electrode	HORIBA, U-50 Multi-parameter Water Quality Meter
02	pH	Electrode	HORIBA, U-50 Multi-parameter Water Quality Meter
03	EC	Electrode	Multi-parameter meter (Instrument Catalog)
04	TDS	Electrode	Multi-parameter meter (Instrument Catalog)
05	Dissolved Oxygen (DO)	DO Meter	Lutron DO 5519 (Instrument Catalog)
06	Biological Oxygen Demand (BOD ₅)	DO Meter	Lutron DO 5519 (Instrument Catalog)
07	Chemical Oxygen Demand (COD)	Colorimetric Method (COD Reactor: Et 125 SC and Spectrophotometer: UNICO 4802)	APHA, (1992)
08	Total Hardness (TH)	Titrimetric Method	APHA, (1992)
09	Chloride (Cl ⁻)	Moh's Titration	APHA, (1992)
10	Sulfate (SO ₄ ²⁻)	Turbiditymetric Method	APHA, (1992)
11	Phosphate (PO ₄ ³⁻)	Ascorbic Acid Method	APHA, (1992)
12	Nitrate (NO ₃ ⁻)	Ultraviolet Spectrophotometric Screening Method	APHA, (1992)
13	Salinity	Electrode	HORIBA, U-50 Multi-parameter Water Quality Meter
14	Turbidity	Electrode	HORIBA, U-50 Multi-parameter Water Quality Meter

2.3.3 Ambient Noise Level

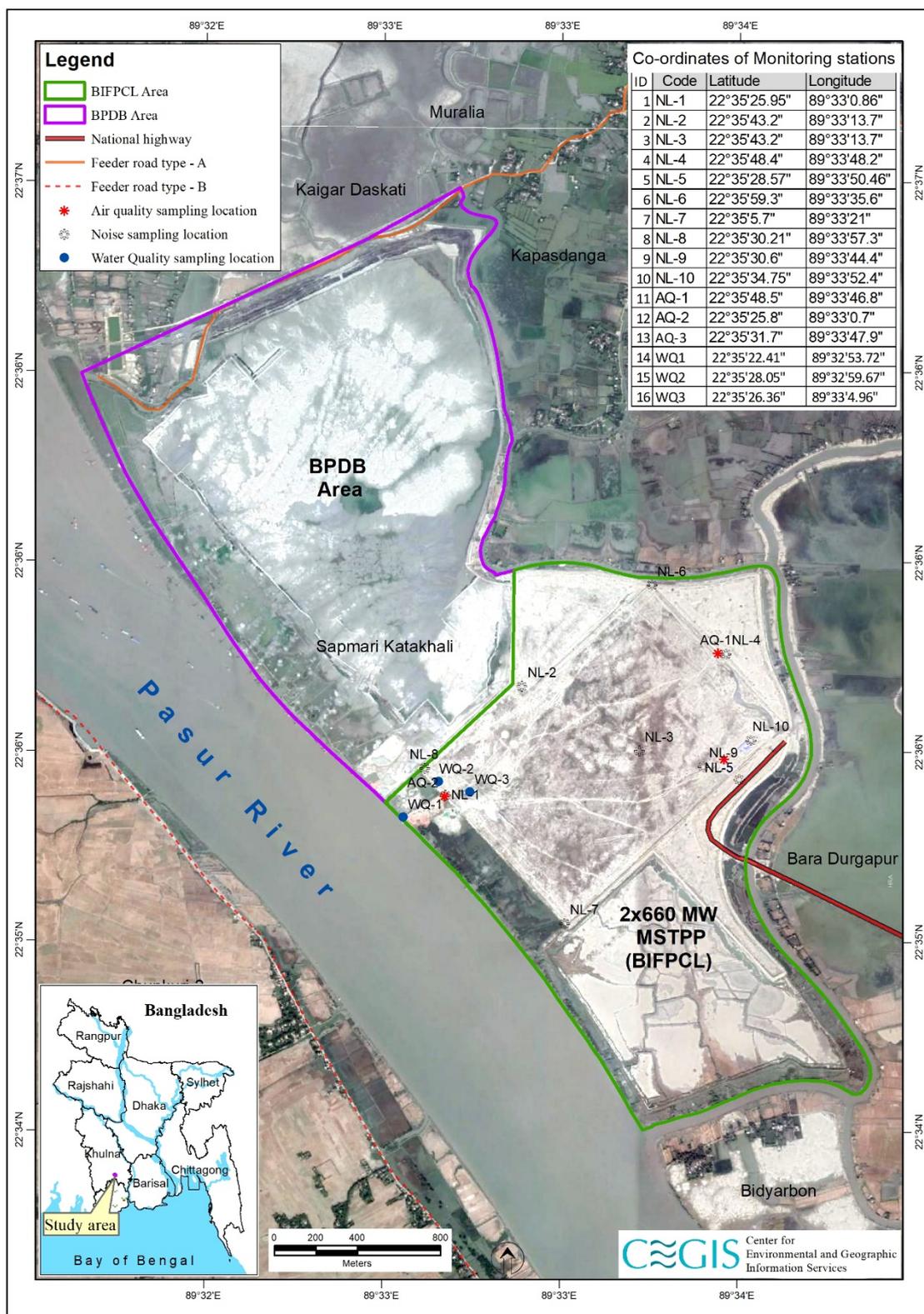
During construction stage major source of noise is expected to stem from construction site, movement of vehicles, electricity producing generator etc. Ambient noise levels has been monitored at ten locations. Noise levels has been measured during day and night time at each of the 10 locations based on the location sensitivity, importance and impact potentiality. Each time noise level was recorded for fifteen minutes continually by using portable noise level

meter. The sites are subject to change in future monitoring schedule based on the changing of working areas, types of work and importance of the location.

Noise is described by a weighted sound intensity (or level) and is measured in units called decibels (dBA). However, in this circumstance the noise level has been measured in terms of A- weighted equivalent continuous sound pressure level (Leq) and recorded by *Sound Level (Sound Pressure Level) Meter (kanomax-4431)*. Depending on the site condition and acoustic environment, the noise meter was set up and calibrated each time following the manufacturer's instruction manual.



Map 2.1a: Sampling locations



April 2018

Map 2.1b: Sampling locations

Chapter 3 : Monitoring Results and Discussion

Environmental compliance monitoring is being implemented by an independent organization, CEGIS. In line with the directives of the ToR of the contract the environmental compliance monitoring is performed. This Monthly Environmental Monitoring results have been generated through in-situ testing and lab analysis. This report also compares data collected with targets, checked with the standard limits and provides commentary environmental issues during the month of April, 2018. Future monthly reports from May, 2018 and onward will incorporate results of the previous investigations so as to compare the overall trend of the concerned environmental compliances.

3.1 Ambient Air Quality Monitoring Results and Discussion

Air quality has been sampled through volumetric sampling procedure. Sample has been collected for 24 Hours continually at three places especially at the site of labour colony, Jetty area and major construction areas. All of the criteria pollutants have been checked randomly in the Project site in order to assess the baseline situation as well as for the compliance standard. **Table 3.1** shows the monitoring results of the criteria pollutants.

Table 3.1: Ambient air quality monitoring results

Location of Air Quality Monitoring	Sampling Period	Criteria Pollutants ($\mu\text{g}/\text{m}^3$)						
		SO ₂	NO _x	SPM	PM ₁₀	PM _{2.5}	CO	O ₃
Standard Limit ECR, 2005		365 (24hr)	100 (Annual)	200 (8hr)	150 (24hr)	65 (24hr)	10000 (8hr)	157 (8hr)
Standard Limit IFC, 2007		125 (IT-1), 20 (24hr)	200 (1-Hr)		150 (IT-1), 50 (24 hr)	75 (IT-1), 25 (24 hr)		160 (IT-1), 100 (8-hr)
Labor shed AQ-1	24 Hr	13.3	15.4	174.1	149.1	32.2	35	04
Jetty Location AQ-2	24 Hr	15.3	16.7	187.1	134.3	35.7	41	02
Major Construction Area AQ-3	24 Hr	10.7	12.9	164.6	91.9	23.0	29	06

Source: CEGIS, 2018

Ambient air quality of the gasses pollutants has been recorded minimum in this months. In fact all of the criteria pollutants recorded were relatively lower with respect to standard limit. Presence of particulate matter is near to saturation stage especially for SPM and PM₁₀. The potential sources of air pollutants at the time of sampling for 24 hrs is presented below.

1. Exposed/uncovered soil of the project site.
2. Land development sites of BPDB.
3. Construction works like piling, testing, building construction and other civil works etc.
4. Vehicular movement over the paved and unpaved roads inside the project area.
5. Operation of generators and different types of machineries.
6. Stockpile of sand, stone, debris etc.
7. Dredged spoil dumping and excavation works.

Since maximum project works are limited to day time, the pollutants increases during day time and reduces during night. Therefore, the collective pollution concentration for each of the criteria pollutants represent the average values for 24 hrs. Moreover, frequent rainfall is also responsible for washout of air pollutants of the project air shed. However, the ambient air pollutants were found within the standard limit as set by the DoE. The project authority should take necessary action to reduce the PM₁₀ and SPM especially at Labour shed and Jetty construction areas.



Photo 3.1: Setting up air quality monitoring station inside the MSTPP



Photo 3.2: Generation of dust during to vehicle movement in MSTPP

3.2 Water Quality Monitoring Results and Discussion

AS per EMP and EIA approval condition, the Project Authority will not use ground water during construction as well as operation purposes of the power Plant. Therefore, BHEL has planned to use desalinated Passur river water during construction as well as operation stages. A large scale desalinization Plant based on Reverse Osmosis (RO) technology has been operating for supplying the construction water at site. RO Plant is also used for supplying drinking water for the labours as well as officials working at site. Therefore, a small quantity of rejected water from RO Plant which is highly concentrated brine has been disposed off to the Passur River. At present, discharge from the worker's colony are being dried up before discharging it into the adjacent river. Moreover, storm water are kept into the temporary trench for re-using the same water as sprinkling or curing. However, during this monitoring program three samples were collected, one from RO discharge outlet and two from drinking water outlets for analysis. The analysis results has been presented in **Table 3.2** and **Table 3.3**.

Table 3.2: Discharge water quality monitoring result

Parameters	Sample WQ- 1	ECR , 2006 for Inland SW	IFC 2007, Effluent Guidelines
Temp (°C)	30.8	40 (Summer)	3 at the age of the mixing zone
pH	7.7	6-9	6-9
EC (µS/cm)	28,000.00	1200	-
TDS (mg.L-1)	14,000.00	2100	-
DO (ml.L-1)	4.50	4.8-8	-

Parameters	Sample WQ- 1	ECR , 2006 for Inland SW	IFC 2007, Effluent Guidelines
BOD ₅ (ml.L-l)	2.30	50	30*
COD (ml.L ⁻¹)	417.25	200	125*
TH (mg.L ⁻¹)	4,900.00	-	-
Cl ⁻ (mg.L ⁻¹)	514.00	600	-
SO ₄ ²⁻ (mg.L ⁻¹)	1209.00	-	-
PO ₄ ³⁻ (mg.L ⁻¹)	0.299	-	2*
NO ₃ ⁻ (mg.L ⁻¹)	5.07	10	10*
Salinity (ppt)	15.8	-	-
Turbidity (NTU)	13.0	-	-

Source: CEGIS 2018

Note: WQ – Water Quality; SW – Surface Water

*Sanitary Sewage Discharges of IFC, 2007

Table 3.3: Drinking water quality monitoring result

Parameters	Sample WQ-2	Sample WQ-3	ECR , 2006 for Drinking Water
Temp (°C)	31.8	32.0	20-30
pH	8.7	8.3	6.5-8.5
EC (µS/cm)	70.50	47.40	-
TDS (mg.L-1)	34.80	23.80	1000
DO (ml.L ⁻¹)	4.10	4.00	6
BOD ₅ (ml.L ⁻¹)	2.10	2.20	0.2
COD (ml.L ⁻¹)	bdl	bdl	4
TH (mg.L ⁻¹)	bdl	bdl	4
Cl ⁻ (mg.L ⁻¹)	102.80	70.90	150-600
SO ₄ ²⁻ (mg.L ⁻¹)	11.65	8.34	400
PO ₄ ³⁻ (mg.L ⁻¹)	0.0795	0.0476	6
NO ₃ ⁻ (mg.L ⁻¹)	1.83	2.99	10
Salinity (ppt)	1	0	-
Turbidity (JTU)	5.08	6.18	10

Source: CEGIS, 2018

Discharge from RO Plant contains high percentage of TDS and EC. It is observed that COD value of the brine is higher than the national standard. The level of salinity is also increased after RO of the river water. In fact, the intake water of Passur river contains high amount of EC and TDS which is further accelerated after treatment through RO Plant. The quantity of discharge from RO Plant is very much insignificant with respect to the flow quantity of Passur which is a tidal river. It is expected that this discharged water will have little effect on the Passur flow. The proponent may re-use or recycle the brine, if possible. The drinking water quality is good as the parameters results are well within the standard limit except Temperature and pH value. The proponent should construct a shed over the drinking water storage tank in order to

reduce the water temperature. They should take necessary steps to reduce the pH level during water treatment at the RO Plant.

3.3 Ambient Noise Level Monitoring Results and Discussion

Ambient noise level has been monitored at 10 locations around the Project area which is shown in **Map 2.1a and 2.1b**. The locations were selected based on the sensitivity of the areas and potentiality of the impact magnitude. Noise level monitoring results of the ambient noise levels are shown in **Table 3.4**. Results were obtained from ten locations and both during day and night time of the equivalent noise level (Leq) in dBA scale.

Table 3.4: Ambient noise level from in and around the Project site

Location Name	Types of Area	Time	Noise Level dB(A) Leq	ECR 2006 dB(A) Leq	IFC 2007 dB(A) Leq	Remark
Jetty Site NL-1	Industrial	D	59.3	75	70	Transportation of Vehicles, Engine running Construction works Noise from water treatment Plant etc.,
		N	55.0	70	70	Noise from water treatment Plant etc Generators
Township Construction Area NL -2	Industrial	D	59.5	75	70	Pump Station running Vehicle movement Hammering on piles Generator running
		N	55.3	70	70	Vehicle movement Construction works Excavator working
Construction Area NL-3	Industrial	D	58.7	75	70	Vehicle movement Construction work
		N	63.2	70	70	Crane working Generator running
Labor Shed (Area) NL-4	Residential	D	58.2	55	55	Vehicle movement Construction works of labor shed Batching works Pile driving
		N	44.4	45	45	Generator noise Wind blow Construction noise
Near Entrance Gate in front of Health Care Center NL-5	Commercial Area	D	59.6	70	70	Batching planet Vehicle Transportation Wind blow Running of construction machine
		N	49.2	60	70	Vehicle Transportation Wind blow Running of construction machine
North-East corner of the PB NL-6	Industrial	D	53.8	75	70	Construction noise Natural sound in corporation Machinery noise from batching plant
		N	45.9	70	70	Construction noise

Location Name	Types of Area	Time	Noise Level dB(A) Leq	ECR 2006 dB(A) Leq	IFC 2007 dB(A) Leq	Remark
						Natural sound in corporation Machinery noise from batching plant
South –West Corner NL-7	Industrial	D	60.6	75	70	Dredging Machine noise Excavators noise Wind blow
		N	53.5	70	70	Wind blow Noise of the vessel movement Generator noise
North west corner of the Project boundary NL-8	Industrial	D	49.8	75	70	Wind Blow
		N	63.4	70	70	Generator Machineries Vehicular Transportation
Major construction Area NL-9	Industrial	D	58.5	75	70	Machine running Construction works Plie driving
		N	55.1	70	70	Construction works Generator Vehicular Transportation Plie driving
Near BIFPCL Area NL-9	Commercial	D	62.8	70	70	Vehicular movement Nearby construction Wind blow
		N	49.4	60	70	Vehicular movement Nearby construction Generator noise

Source: CEGIS, 2018

Massive civil construction activities have been carried out by BHEL as per design and stipulated time schedule. The sources of noise has been identified and presented in **Table 3.4**. The construction activities, vehicular movement, running of generator and wind blowing are major sources of noise generation. As seen from the above Table that the overall noise level during the construction period (both day and night time) are well within ECR, 2006 and IFC, 2007 standards except at day time in labor shed areas. The labor shed area is also now under construction stage. Therefore, it has crossed the standard limit as set for day period. In fact, the labors are working at different site at that time. However, it can be assumed that the noise level will be lowered/subsided when construction works of the labor camp will be completed fully.



Photo 3.3: Ambient noise level monitoring during day time



Photo 3.4: Ambient noise level monitoring during night

Chapter 4 : Follow-up Action Required

The monitoring activities have been performed independently in order to capture the worst case scenarios of the vital environmental parameters. The result of the environmental parameters shows that the values are within the compliance standard limit as per ECR 2006 and IFC 2007. However, the proponent e.g. BHEL should adopt following activities immediately to minimise the pollution level in the coming months.

1. Ensuring spraying of water to the roads and exposed soil especially in the evening time to minimize suspended dust particles in the ambient air;
2. Ensuring the use of dust mask by the labours during work;
3. Ensuring the use ear plugs for long time exposure at the construction sites;
4. Ensuring the management and reuse of the RO rejected water e.g. brine water; and
5. Ensuring the continuation of the best working and safety practises at construction sites.