Bangladesh–India Friendship Power Company Limited
(A Joint Venture of BPDB, Bangladesh and NTPC Ltd., India)

Environmental Impact Assessment of Coal Transportation for the Proposed 2X660 MW Coal Based Maitree Super Thermal Power Project at Rampal, Bagerhat, Bangladesh

Volume I: Summary Report

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Acknowledgements

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CEGIS is also grateful for the contribution of the field officials of different Government and Non-Government organizations for sharing their ideas and views on the attitudes of the local people towards the Project and existing problems of the study area as well as their suggestions in solving the problems.

Last but not the least, the study team appreciates and acknowledges the concerns and perceptions of local people regarding the Project and their active participations during field visit.

Responses of Comments of Department of Environment (DoE), Dhaka on EIA of Coal Transportation (Comments in Bengali[1] Translated into English)

Vide Memo No. PA/Chharpatra/5532/2016/473
Meeting held on 14th September, 2017 at DoE, Dhaka

[Hosted by DoE and participated by BPDB, BIFPCL, CEGIS & other Relevant Agencies]
And further meeting on 06.12.2017 and 24.01.2018 at DoE

Sl. No.		Comments	Responses	Action Taken
1	2. Ka	Since the proposed project site is adjacent to the Sundarbans Ecologically Critical Area (ECA) and UNESCO declared the Sundarbans as a World Heritage site, its impact on the above mentioned sites, assessed property value and measures to be taken for mitigations may be discussed at length and added to the main report as a separate Chapter. Moreover, a proposal to form an independent monitoring team to monitor the environmental aspects of the Project in line with an international monitoring system should be included in the EIA report.	• Legal aspect and applicability of Environmental Conservation Act (ECA) and Ecologically Critical Area (ECA) have been flagged and mentioned in Table 2-1 and para-36-46 (Chapter 2; page: 2-7 to 2-9). Ecologically Critical Area Management Rules-2016 is mentioned in para-59 (Chapter- 2) of Volume- II: Main Report. • Legal bindings for protection of Ecologically Critical Areas and the Sundarbans World Heritage sites are mentioned in Section 2.5.2 (Chapter- 2) of Volume- II: Main Report. • UNESCO World Heritage Convention-1972 is mentioned in para- 123 (Chapter- 2; page: 2-21) of Volume-II: Main Report. • Baseline condition of the major and ecologically significant elements of the Sundarbans Reserve Forest is elaborately described in **Section 7.8.2** (Chapter 7; page: 7-63) of Volume- II: Main Report. • Baseline condition of significant eco-elements of the Property is	In regards with value assessment of the Property, Strategic Environmental Assessment (SEA) considering the Outstanding Universal Value (OUV) of the Property is being taken up by the MoEF, Government of Bangladesh. It is understood that the Govt of Bangladesh will take appropriate actions in line with the findings of SEA study on OUV of WHS (Refer para-75, page no. 2-13. During EIA of Coal Transportation the following impacts were identified and considered for impact assessment on the WHS and the Sundarbans as a whole. **(Refer Table 9-1 in page 9-43 to 9-79** of Volume- II: Main Report**).** [*Note: Alphabetic symbol 'A' denotes impacts during Feasibility and Design Phase; 'B' denotes impacts during Implementation Phase; and 'C' denotes impacts during Operation and Maintenance Phaes*] C5- Coal dust may affect the vegetation and wildlife of the

[1] Scanned copy of Comments of DoE is appended just below this table.

Sl. No.		Comments	Responses	Action Taken
			described under the heading of World Heritage Site in para 566 (Chapter 7; page: 7-71) of Volume- II: Main Report. • Baseline condition of ECA is described in para 569 (Chapter 7; page: 7-72) of Volume- II: Main Report. • Possible impacts of Coal Transportation on the Sundarbans adjacent to coal transportation route have been elaborately described in Para 732 in section 9.8.4 (Chapter 9; page: 9-94) of Volume- II: Main Report. • Refer Chapter 9, under "Mitigation and Enhancement measures" of Volume- II: Main Report. • Strict maintenance of National and International standard has been suggested in relevant sections of the EIA report of Volume- II: Main Report. • Formation of an Independent monitoring agency has been suggested in Section 11.5.4 (Chapter 11; page: 11-5) and in Chapter 12 (page:12-1) of Volume- II: Main Report. • Moreover, an Independent Monitoring Committee comprising representatives from relevant stakeholders may be formed by the Ministry of Environment and Forest (MoEF) to review and scrutinize the quarterly monitoring reports prepared by Independent Monitoring Agency has been suggested (Refer Chapter 12, page 12-2 of Volume II: main Report).	Sundarbans and World Heritage Site; C6- Water quality deterioration due to increase in shipping may impact fish and shrimp growth, on which livelihood of local communities depend on. C7- Increase in shipping, coal transhipment, and coal transport can increase collision induced risk and subsequent spillage C9- Generation of noise from vessels and tran-shipper may affect surrounding environment and wildlife including resident and migratory birds. C10- Increased lighting from ships/barges can create disturbances to the surrounding wildlife C11- Contamination risk from effluents (residue of ballast water, bilge water, oil, lubricant, garbage, domestic waste, food and kitchen waste, coal leachate, sewage, etc.) from ships. C12- Pollution from ships may affect aquatic habitats and reduce fish and crustacean production and recruitment. C13- Enhanced maritime traffic may have impact on dolphins, fish, and crustaceans. C15- Movement of bulk carriers and class lighterage carrying coal and limestone may generate wave on sea and inland water that might cause erosion along seashore and riverbank.

Sl. No.	Comments	Responses	Action Taken
			C16- Erosion caused by vessel wakes results in excessive sedimentation in the deep pools where larger fishes and dolphins congregate for feeding and as refuge areas. C17- Movement of foreign vessels can risk of invasion of alien species. Alien species might come through ballast water, hull-fouling, and by contract of vessel body, these species may compete with native species and therefore threaten biodiversity of the Sundarbans and their abundances. C18- Movement of coal and limestone vessels and transhipment process may have impacts on the surrounding the Sundarbans Ecosystem (including, terrestrial wildlife, aquatic fauna and nearby World Heritage Site). C19- Impact of gaseous emissions from vessels and tran-shipper on ambient air quality C20. Accumulation of fugitive coal dust and coal spills on riverbed during loading and unloading by tran-shipper at the mooring area. C22. Impact of coal dust emissions from unloading and loading and lighterage transport on biodiversity of the Sundarbans. Fugitive coal dust can coat mangrove leaves and reduce photosynthesis in the Sundarbans. C25. Discharge of contaminants through spills; discharge of coal to water

Sl. No.	Comments	Responses	Action Taken
			bodies will release Polycyclic Aromatic Hydrocarbons (PAHs) into aquatic environment. C28. Risk of oil spill due to the collision between coal vessel and oil tanker. C29. Risk of coal vessel sinking due to structural or mechanical failure and spilling oil and fuel into river. C30. Risk of Collision, grounding impact during low visibility and fog conditions. C31. Risk of collision and grounding due to tidal conditions. It is pertinent to mention that the nearest tip of World Heritage Site from the Coal Transportation Route is about 3.5 km. SoundPlan software were used to simulate the scenario where noise from transhipment of coal from Capesize vessels along with other sources including mother vessel, lighterage vessel and other vessels has been captured. The predicted noise level at the selected receivers are presented in the Table 9-5 and Figure 9-3 (day time) and Figure 9-4 (night time) of Volume- II: Main Report. The resultant noise level is found to be lower than the standard limit of Noise Control Rules, 2006 of Government of Bangladesh. It is also been seen from the graph that the resultant noise level dies down to 20-40 dBA at a distance 1 km from the route and practically the impact of noise level at the tip of WHS is almost nil. [*See*

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			additional comments-response on noise after this table] The air quality modelling study have been conducted by using CALPUFF model which is one of the state- of –art technologies suitable for long distance complex prediction of ground level concentration with the changing scenarios. [See additional comments-response on CALPUFF software after this table] The cumulative impact of all major emission sources in the air-shed is assessed. To assess the foreseeable future condition and account for an increase in pollution from brick fields, and increase in road and marine vessel traffic, projected data for 2030 is used for modelling. The emissions and input parameters for brick fields, road and vessel traffic is given respectively in Table 10-1, Table 10-2 and Table 10-3. Volume- II: Main Report. Table 10-4 shows the predicted maximum ground level 1-hr and annual averaging values of Nox for the cumulative case. The predicted values are within the National Bangladesh standards and WBG guidelines. Volume- II: Main Report. For SO_2 the predicted maximum ground level 24-hr and annual concentrations are given in Table 10-10. The table shows that the maximum predicted SO_2 concentrations for the

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			cumulative case are well within the Bangladesh Ambient Air Quality Standards and the predicted 24-hr averaging value is within WB/IFC interim target-1 **(Page 10-11)** of Volume- II: Main Report. Table 10-8 shows the predicted maximum ground level 24-hr and annual concentrations for PM10. As can be seen from the table, there is a marginal increase in maximum predicted levels for 24-hr and annual averaging from the project case to the cumulative case. The predicted concentrations are within the Bangladesh National standards and the predicted 24-hr average concentration meets WBG interim target-1 for 24-hr averaging and interim target-1 for annual averaging **(Page 10-11)** of Volume- II: Main Report. Table 10-6 of Volume- II: Main Report shows the predicted maximum ground level 24-hr and annual concentrations for $PM_{2.5.}$ As can be seen from the table, there is an increase in maximum predicted levels for 24-hr and annual averaging from the project case to the cumulative case. The maximum predicted concentrations are within the Bangladesh National standards and the predicted 24-hr average concentration meets WBG interim target-1. Increased inland water transport through the Passur River is not going to increase significantly (only three vessels in two days),

Sl. No.		Comments	Responses	Action Taken
				moreover ash produced by the Maitree Power Plant shall be sold to nearby cement industries, the requirement of importing the ash from India will be largely reduced as such the net increment of vessels in the designated route will be almost nil, hence impact on Bio-diversity on the Sundarbans is expected to be negligible.
2	2. Kha.	Since the proposed project shall pass through the Sundarbans Reserve Forest and the Sundarbans reserve forest is Ramsar site, it is necessary to mention Ramsar site regulations in this EIA report.	Ramsar site regulations are mentioned in the EIA Report. Refer Chapter 2, Page 2-20 of Volume- II: Main Report.	In 2015 the Contracting Parties identified the effective conservation and management of the Ramsar Site. The Plan calls for efforts to enable the participation of stakeholders, including indigenous peoples and local communities. The ecological character of a Site is fundamental. The Convention focuses on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) to stem the progressive encroachment on and loss of Wetlands now and in the future, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific and recreational value. Many Ramsar Sites are also protected under national schemes or regional systems. Some are also inscribed on the World Heritage List under the UNESCO World Heritage Convention. The study has identified the aquatic flora and fauna of the wetland ecosystem of the study area, which covers the whole coal transportation route through the Sundarbans as well as the WHS area. Local and global status of the fauna has been checked based on IUCN Red

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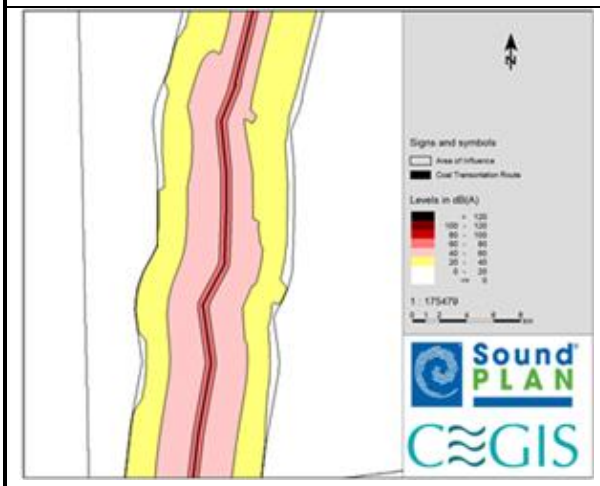
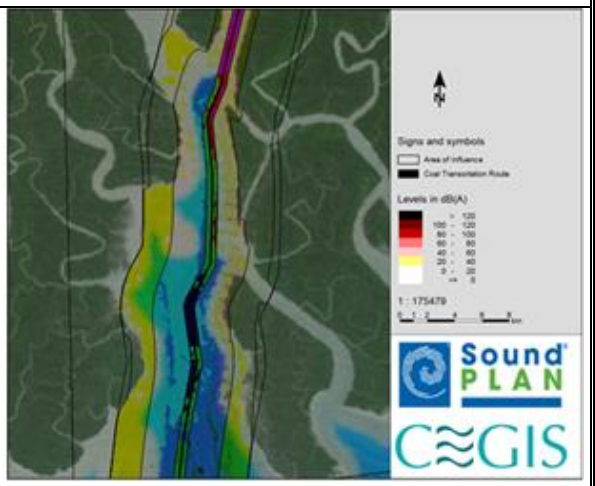
				List. Accordingly critical habitat assessment as per IFC Performance Standard Guidelines has been done for the fauna which are Critically Endangered and/or Endangered Species (**Page no. 9-139**) of Volume- II: Main Report. Impact assessment was done considering the ecological character of the study area and subsequent Environmental Management Plan was delineated.
3	2. Ga	Baseline information provided in the EIA study report of 1320 MW Rampal coal based Power plant should be similar to that provided in the EIA report of coal transportation for the Maitree Super Thermal Power Plant (MSTTP).	Baseline information of main plant EIA report and that of the coal transportation EIA report are almost similar or identical. These two EIAs were done at a gap of about 5 to 6 years using two different modelling software. In case if some data of the two EIAs differ with one another then this may be due to time gap, use of different modelling software, contemporary atmospheric condition, etc. The air quality modelling study in the EIA of Coal Transportation have been conducted by using CALPUFF model which is one of the state- of –art technologies suitable for long distance complex prediction of ground level concentration with the changing scenarios. CALPUFF is more sophisticated and a refined regulatory model recommended and approved by USEPA.	Continuous monitoring of the study area are being undertaken and still going on. Thirteen (13) such quarterly monitoring reports have been prepared and submitted to various relevant agencies including DoE where baseline are continuously updated. The monitored ambient air quality is summarized in Table 7-3 by broad head by season and one time data for January, 2016 is shown by the sampling location in Table 7-4 of Volume- II: Main Report and results are annexed in Annex 7-1 of Volume- III: Annexure.
4	2.Gha	If for some reason the present air quality mentioned in the report increases then what are the actions that will be taken should have been mentioned in the EIA Report.	The present values of criteria pollutants are mostly well below the Bangladesh Standard and World Bank's Interim Target (IT-1) as well as Guidelines of IFC Standard. Air quality impact for Project implementation case as well as cumulative case through a	-

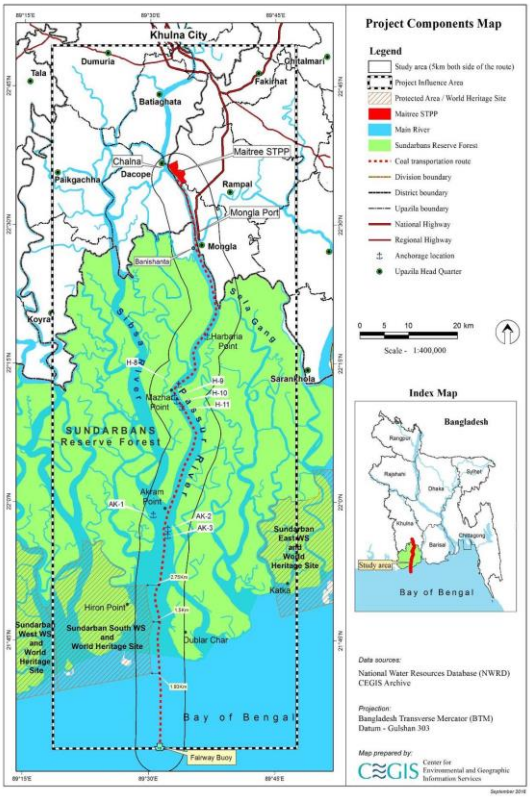
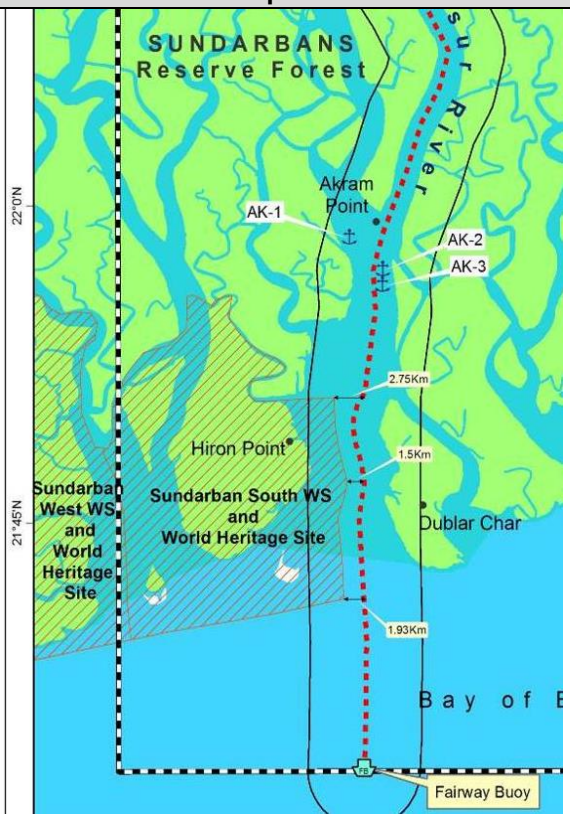
Sl. No.		Comments	Responses	Action Taken
			sophisticated model (CALPUFF) study, which shows negligible impact for both Project case and cumulative case, described in detail in Chapters 9, 10 and 11 has been studied under this assignment. However, in any case if there is any evidence of increasing trend of air pollution from the analysis of continuous air monitoring report being submitted to DoE, it may suggest additional suitable mitigation measures required to be adopted for coal transportation for Ramplal Power Plant but also for lot of many other vessels and transhipment activities in the route.	
5	2. Uma	Alternative route for coal transportation can be included in case if the main route cannot be used due to some problems.	Refer to Alternative Analysis Chapter 5 of EIA Report (Volume- II: Main Report) where elaborate alternative route study has been delineated.	A detailed alternative analysis of three alternative routes was delineated in weighted score method (**refer Table 5-1, Page 5-7**) of Volume- II: Main Report. Scores were given based on the Physical, Biological and socio-economical consequences due to vessel movement through the studied routes.
6	2. Cha	An emergency Response plan mentioning Response Group with Responsible person should be included to handle emergency that if occurs during coal transportation.	This issue has been considered in the study and presented in the report. Refer Section 11.9.4: Emergency Response Plans in Volume II- Main Report and a detailed "Emergency Preparedness and Response Plan" presented in Annex 11-4 in Volume III- Annexure. **(Page 139)** A MOA has been signed between BIFPCL & MPA on 16.08.2017, where MPA to form an Emergency Preparedness and Response Group (EPRG), headed by Member (H&M), MPA, may take note of it. **(Refer Annexure 11-5, Page 155 of Volume –III, Annexure).**	A detailed possible Emergency event due to coal transportation has been identified and its probability, response/action and principal response agencies have been delineated in **Annexure 11-4 in page 139 of Volume III**. However, a National Oil Spill Contingency Plan (NOSCOP) has been formulated as the country has seen multiple cases of spillage situation which prompts the country and the region to setup a detailed framework and guidelines for all agencies, organization and stakeholders concerned that must be active in responding to spillage events and combatting marine pollution,

Sl. No.		Comments	Responses	Action Taken
				leading in remedial action and prevention in the long-term under the guidance of MPA. The preparation of a National Oil Spill Contingency Plan is, therefore, necessary to identify the national capabilities and resources in order to establish an organizational structure to combat marine pollution so that focal points and lead agencies are identified and guided effectively (Refer para- 931, page no. 11-27).
7	2. Chha	The mitigation approaches of the negative impacts on the habitat of animals, biodiversity, fish, environment and ecology causing from the movement of vessels should be mentioned.	The mitigation approaches of the negative impacts are mentioned in Table 11-3: Mitigation Plan. Issues are mentioned specifically in C7, C9, C10 and C11 of Volume- II: Main Report.	The Passur River, designated route of MPA, has been operating for last 60 years and sailing of ships and barges are coming and going from MPA. The river mainly functions as a longitudinal migratory route of good number of brackish water fish species. They usually breed in the tributaries and distributaries commonly known as creeks of the Sundarbans. The creeks also function as nursery grounds of the resident and non-resident fish species, and also having high recruitment potential (**Section 7.9.6** in page no. 7-87). The management of fisheries resources in SRF from a technical point of view was started in 1989 with the restriction of fishing in 18 canals in all four ranges to accelerate fish breeding (FAO, 1994) (**Section 7.9.9** in **page no. 7-91**). Canals are shown in **Figure 7-49** in **page 7-92** of Volume- II: Main Report. The Passur river also functions as an important corridor of cetaceans like dolphins. These are all habituated with activities currently occurring through the river. No disturbances to aquatic fauna along the river are reported so far from the local people and officials. Only three (03) additional modern and IMO approved

Sl. No.		Comments	Responses	Action Taken
				vessels will be added to the existing vessel load of the river in two (02) days. Therefore, impact on aquatic fauna from coal transportation is found negligible.
8	2. Ja	Vessels used for coal transportation should be IMO certified. Coal transportation should be less during night time, thus focus should be given on this.	• All vessels including both mother and lighterage vessels will follow the IMO & MARPOL convention as applicable and all vessels are self-contained. Ref. Chapter 9, page 9-49 of Volume- II: Main Report. • Night time vessel movement will be avoided wherever practical Ref: Chapter-9, Page 9-49 of Volume- II: Main Report.	-

Additional Comments on Noise and justification of CALPUFF software:

Comments	Response
How far distance of WHS from the coal transportation route? Is it same as designated route of MPA? Justify the distance of WHS is safer from the coal transportation with respect of Noise propagation? Identify it in the model generated image?	Coal will be transported through the same route following by the MPA for last sixty years. The selected route in coherence with the MPA designated route is about 3.5 km distance from the nearest point of the WHS (Refer Figure 3-1 of Volume II: Main Report)). It is located safer distance from the coal transportation route. The sound of marine vessels will nearly be decayed within 500-700m when sail through during transportation period. The distance of terrestrial area of WHS from the MPA designated route are shown in following figure. From the SoundPlan output figure (Refer Figure 9-5 and Figure 9-6 of Volume II: Main Report) it is observed that intensity of sound level is about 40-20 dB(A) at a distance about two (02) km from the transportation route towards the WHS.
	

Comments	Response
	
Why CALPUFF is used as a dispersion modeling in compare to AERMOD air dispersion modeling?	CALPUF is also a state-of –art air dispersion modeling system, USEPA recommended and wide use modeling software. The advantages of CALPUFF is that it can adopt the fumigation effects, over water effects in the modeling process over AERMOD. Therefore, it is recommend to use CALPUFF at the projects falling under coastal zone. For air dispersion modeling, a grid of 50x150Km has been considered in order to capture all the sensitive locations (including WHS) and sources. However, CALPUFF is suited better for this project. A study has been conducted by Gulia S., et. al. 2015 entitled “Performance evaluation of CALPUFF and AERMOD dispersion models for air quality assessment of an industrial complex” of the Journal of Scientific & Industrial Research, Vol. 74 PP 302-307.

Comments Sheet of DoE on EIA Report of Coal Transportation

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
পরিবেশ অধিদপ্তর
পরিবেশ ভবন, ই/১৬ আগারগাঁও
শেরে বাংলানগর, ঢাকা-১২০৭
www.doe.gov.bd

নং- পঅ/ছাড়পত্র/৫৫৩২/২০১৬/৪৭৩

তারিখ: ১৭/০৬/১৪২৪ বঙ্গাব্দ
০২/১০/২০১৭ খ্রিস্টাব্দ

বিষয়ঃ বাংলাদেশ ইন্ডিয়া ফ্রেন্ডশীপ পাওয়ার কোম্পানী লিঃ কর্তৃক বাস্তবায়িতব্য Coal Transportation for the proposed Maitree Super Thermal Power Plant প্রকল্পের জন্য দাখিলকৃত পরিবেশগত প্রভাব সমীক্ষা প্রতিবেদনের উপর গত ১৪/০৯/২০১৭ তারিখে অনুষ্ঠিত জনমত পর্যালোচনা সভার কার্যবিবরনী।

সভাপতি	ঃ	মোঃ রইছউল আলম মন্ডল, মহাপরিচালক, পরিবেশ অধিদপ্তর।
স্থান	ঃ	চামেলী সভা কক্ষ।
তারিখ	ঃ	১৪ সেপ্টেম্বর ২০১৭ খ্রিঃ।
সময়	ঃ	সকাল ১০:৩০ টা।
উপস্থিতি	ঃ	পরিশিষ্ট-ক।

সভার শুরুতে উপস্থিত সকলকে স্বাগত জানিয়ে সভাপতি সভার কার্যক্রম শুরু করেন। তিনি প্রথমেই সভার উদ্দেশ্য ও প্রেক্ষাপট সংক্ষিপ্তভাবে তুলে ধরেন এবং আলোচ্য প্রকল্পের ইআইএ প্রতিবেদনের সাথে সংশ্লিষ্ট স্টেকহোল্ডারদের সভায় উপস্থিত হওয়ার জন্য ধন্যবাদ জানান।

২। এ পর্যায়ে উক্ত প্রকল্পের ইআইএ প্রতিবেদন প্রণয়নকারী প্রতিষ্ঠান সিইজিআইএস কর্তৃক ইআইএ প্রতিবেদনের উপর Powerpoint Presentation উপস্থাপন করা হয়। উক্ত উপস্থাপনায় রামপাল বিদ্যুৎ কেন্দ্রের জন্য Coal Transportation এর ফলে পরিবেশ ও প্রতিবেশের উপর সম্ভাব্য প্রভাবসহ আনুষঙ্গিক বিষয়াদি বিস্তারিতভাবে তুলে ধরা হয়। সেইসাথে সম্ভাব্য সকল প্রকার প্রভাব মোকাবেলায় প্রশমনমূলক ব্যবস্থাদিসহ পরিবেশবান্ধব প্রতিকারমূলক ব্যবস্থাসমূহেরও বিস্তারিত বর্ণনা দেওয়া হয়। উপস্থাপনা শেষে সভায় উপস্থিত সকলকে মতামত প্রদানের জন্য উন্মুক্ত আলোচনায় অংশগ্রহণের আহবান জানানো হয়। সভায় উপস্থিত সংশ্লিষ্ট স্টেকহোল্ডারগণ ইআইএ প্রতিবেদনের উপর নিম্নোক্ত বক্তব্য, মতামত ও পরামর্শ তুলে ধরেন।

ক) আলোচ্য প্রকল্পের অবস্থান যেহেতু সুন্দরবন ইসিএ এলাকা এবং ইউনেসকো ঘোষিত সুন্দরবন ওয়ার্ল্ড হেরিটেজ সাইটের পাশে সেক্ষেত্রে উক্ত প্রকল্পের জন্য সুন্দরবনের উপর কি প্রভাব পড়তে পারে, Properties এর Value Assessment করা এবং তা প্রশমনের জন্য কি কি ব্যবস্থা গ্রহন করা যেতে পারে তার জন্য বিস্তারিত বর্ণনা দিয়ে আলাদা একটা অধ্যায় যোগ করা যেতে পারে। উক্ত প্রকল্পের পরিবেশগত দিক মনিটরিং করার জন্য ইন্টারন্যাশনাল স্ট্যান্ডার্ড এর মনিটরিং সিস্টেম ফলো করা এবং সেজন্য একটি টিম গঠনের বিষয়টি ইআইএ প্রতিবেদনে অন্তর্ভুক্ত করা যেতে পারে।

খ) যেহেতু উক্ত প্রকল্প সুন্দরবন রিজার্ভ ফরেস্ট এ এবং রিজার্ভ ফরেস্ট যেহেতু রামসার সাইট, সেক্ষেত্রে রামসার সাইটের যেসব রেগুলেশন আছে তা উক্ত প্রতিবেদনে উল্লেখ করা যেতে পারে।

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গ) ১৩২০ মেগাওয়াট রামপাল কয়লা ভিত্তিক বিদ্যুৎ কেন্দ্রের ইআইএ প্রতিবেদনে প্রদত্ত Baseline Information এর তথ্যের সাথে Coal Transportation for the proposed Maitree Super Thermal Power Plant প্রকল্পের Baseline Information এর তথ্য সামঞ্জস্যপূর্ণ হওয়া উচিৎ বলে মতামত প্রদান করা হয়।

ঘ) প্রতিবেদনে Ambient Air Quality বর্তমানে যা দেখানো হয়েছে যদি কোন কারনে তা বেড়ে যায় সেক্ষেত্রে তা রোধ করার জন্য কি কি ব্যবস্থা নেয়া হবে তা প্রতিবেদনে উল্লেখ করা যেতে পারে।

ঙ) Coal Transportation এর জন্য বিকল্প পথের ব্যবস্থা রাখা যেতে পারে যাতে প্রধান যে পথে কয়লা আনা হবে সে পথে যদি কোন কারনে কোন সমস্যা দেখা যায় তাহলে বিকল্প পথে যাতে Coal Transport করা যায় সে বিষয়টি অন্তর্ভুক্ত করা যেতে পারে।

চ) Coal Transportation এর সময় যদি কোন দুর্ঘটনা ঘটে সেক্ষেত্রে তার জন্য Emergency Response Plan থাকতে হবে এবং সেজন্য Response Group তৈরি করতে হবে যেখানে Responsible Person কারা হবে তা উল্লেখ করা যেতে পারে।

ছ) Vessel এর চলাচলের জন্য সেখানে জলজ প্রানীর আবাসস্থল, জীববৈচিত্র্য, মৎসকূল, পরিবেশ ও প্রতিবেশের উপর যে প্রভাব পড়বে তা প্রশমনের ব্যবস্থা বিস্তারিতভাবে উল্লেখ করা যেতে পারে।

জ) Coal Transportation এ যেসব Vessel ব্যবহার করা হবে তা যাতে IMO Certified হয় সে বিষয়ে সভায় মতামত প্রদান করা হয়। রাতে Coal Transportation এর কার্যক্রম যতটা সম্ভব কম করা যায়, সেদিকে লক্ষ্য রাখা যেতে পারে।

৩। সভাপতি এ পর্যায়ে আলোচ্য প্রকল্পের ইআইএ প্রতিবেদনের উপর সভায় উপস্থিত বিভিন্ন সংস্থা থেকে আগত প্রতিনিধিদের লিখিত মতামত আগামী ০৭ (সাত) কর্মদিবসের মধ্যে পরিবেশ অধিদপ্তরে প্রেরণের জন্য অনুরোধ জানান।

৪। সভায় বিস্তারিত আলোচনার পর নিম্নরূপ সিদ্ধান্তসমূহ গৃহীত হয়ঃ

ক) সভায় উপস্থিত বিভিন্ন স্টেকহোল্ডারগণ উক্ত ইআইএ প্রতিবেদনের উপর তাদের লিখিত মতামত আগামী ৭ (সাত) কর্মদিবসের মধ্যে পরিবেশ অধিদপ্তরে প্রেরণ করবে।

খ) আলোচ্য প্রকল্পের অবস্থান যেহেতু সুন্দরবন ইসিএ এলাকা এবং ইউনেসকো ঘোষিত সুন্দরবন ওয়ার্ল্ড হেরিটেজ সাইটের পাশে সেক্ষেত্রে উক্ত প্রকল্পের জন্য সুন্দরবনের উপর কি প্রভাব পড়তে পারে, Properties এর Value Assessment করা এবং তা প্রশমনের জন্য কি কি ব্যবস্থা গ্রহন করা যেতে পারে তার জন্য বিস্তারিত বর্ণনা দিয়ে ইআইএ প্রতিবেদনে আলাদা একটা অধ্যায় যোগ করতে হবে। এছাড়া, উক্ত প্রকল্পের পরিবেশগত দিক মনিটরিং করার জন্য ইন্টারন্যাশনাল স্ট্যান্ডার্ড এর মনিটরিং সিস্টেম ফলো করা এবং সেজন্য একটি টিম গঠনের বিষয়টি ইআইএ প্রতিবেদনে অন্তর্ভুক্ত করতে হবে।

গ) আলোচ্য প্রকল্পটি সুন্দরবন রিজার্ভ ফরেস্ট এর ভিতর দিয়ে যাবে এবং সুন্দরবন রিজার্ভ ফরেস্ট যেহেতু রামসার সাইট, সেক্ষেত্রে রামসার সাইটের যেসব রেগুলেশন আছে তা উক্ত ইআইএ প্রতিবেদনে উল্লেখ করতে হবে।

ঘ) ১৩২০ মেগাওয়াট রামপাল কয়লা ভিত্তিক বিদ্যুৎ কেন্দ্রের ইআইএ প্রতিবেদনে প্রদত্ত Baseline Information এর তথ্যের সাথে Coal Transportation for the proposed Maitree Super Thermal Power Plant প্রকল্পের ইআইএ প্রতিবেদনে উল্লেখিত Baseline Information এর তথ্য সামঞ্জস্যপূর্ণ হতে হবে।

ঙ) ইআইএ প্রতিবেদনে Ambient Air Quality বর্তমানে যা দেখানো হয়েছে যদি কোন কারনে তা বেড়ে যায় সেক্ষেত্রে তা রোধ করার জন্য কি কি ব্যবস্থা নেয়া হবে তা প্রতিবেদনে উল্লেখ করতে হবে।

চ) Coal Transportation এর জন্য বিকল্প পথের ব্যবস্থা রাখা যেতে পারে যাতে প্রধান যে পথে কয়লা আনা হবে সে পথে যদি কোন কারনে কোন সমস্যা দেখা যায় তাহলে বিকল্প পথে যাতে Coal Transport করা যায় সে বিষয়টি ইআইএ প্রতিবেদনে অন্তর্ভুক্ত করতে হবে।

ছ) Coal Transportation এর সময় যদি কোন দুর্ঘটনা ঘটে সেক্ষেত্রে তার জন্য Emergency Response Plan থাকতে হবে এবং সেজন্য Response Group তৈরি করতে হবে যেখানে Responsible Person কারা হবে তা উল্লেখ করতে হবে।

জ) Vessel এর চলাচলের জন্য সেখানে জলজ প্রানীর আবাসস্থল, জীববৈচিত্র্য, মৎসকূল, পরিবেশ ও প্রতিবেশের উপর যে প্রভাব পড়বে তা প্রশমনের ব্যবস্থা ইআইএ প্রতিবেদনে বিস্তারিতভাবে উল্লেখ করতে হবে।

ঝ) Coal Transportation এ যেসব Vessel ব্যবহার করা হবে তা যাতে IMO Certified হয় সে বিষয়ে ইআইএ প্রতিবেদনে উল্লেখ করতে হবে। এছাড়া, রাতে Coal Transportation এর কার্যক্রম যতটা সম্ভব কম করা যায়, সেদিকে লক্ষ্য রাখার বিষয়টি ইআইএ প্রতিবেদনে অন্তর্ভুক্ত করতে হবে।

পরিশেষে আর কোন আলোচ্যসূচি না থাকায় উপস্থিত সম্মানিত সদস্যগণকে ধন্যবাদ জানিয়ে সভাপতি সভার সমাপ্তি ঘোষণা করেন।

(মোঃ রইছউল আলম মন্ডল)
মহাপরিচালক
পরিবেশ অধিদপ্তর
ফোনঃ ৮১৮১৮০০

বিতরণ (জ্যেষ্ঠতার ভিত্তিতে নয়)ঃ

১। উপাচার্য, বাংলাদেশ প্রকৌশল বিশ্ববিদ্যালয় (বুয়েট), ঢাকা
২। অতিরিক্ত সচিব (পরিবেশ), পরিবেশ ও বন মন্ত্রণালয়, বাংলাদেশ সচিবালয়, ঢাকা
৩। মহাপরিচালক, বাংলাদেশ পানি উন্নয়ন বোর্ড, ওয়াপদা ভবন, মতিঝিল বা/এ, ঢাকা
৪। চেয়ারম্যান, বাংলাদেশ অভ্যন্তরীণ নৌ-পরিবহন কর্তৃপক্ষ, বিআইডব্লিউটিএ ভবন, ১৪১-১৪৩, মতিঝিল বা/এ, ঢাকা
৫। মহাপরিচালক, সমুদ্র পরিবহন অধিদপ্তর, বিআইডব্লিউটিএ ভবন, ১৪১-১৪৩, মতিঝিল বা/এ, ঢাকা
৬। প্রধান বন সংরক্ষক, বন অধিদপ্তর, বন ভবন, আগারগাঁও, ঢাকা
৭। মহাপরিচালক, মৎস্য অধিদপ্তর, সেগুন বাগিচা, রমনা, ঢাকা
৮। চেয়ারম্যান, মংলা বন্দর কর্তৃপক্ষ, মংলা
৯। পরিচালক, পানি ও বন্যা ব্যবস্থাপনা ইন্সটিটিউট, বুয়েট, ঢাকা
১০। কান্ট্রি রিপ্রেজেন্টেটিভ, আইইউসিএন বাংলাদেশ কান্ট্রি অফিস, বাড়ী ১৬, রোড ২/৩, বনানী, ঢাকা-১২১৩
১১। পরিচালক (প্রাঃ সঃ ব্যঃ) ও আহবায়ক, পরিবেশগত ছাড়পত্র কিষয়ক কমিটি, পরিবেশ অধিদপ্তর, সদর দপ্তর, ঢাকা
১২। পরিচালক, পরিবেশ অধিদপ্তর, খুলনা বিভাগীয় কার্যালয়, খুলনা
১৩। পরিচালক (বায়ুমান ব্যবস্থাপনা/পরিবেশগত ছাড়পত্র), পরিবেশ অধিদপ্তর, সদর দপ্তর, ঢাকা
১৪। উপ-পরিচালক (প্রাকৃতিক সম্পদ ব্যবস্থাপনা),পরিবেশ অধিদপ্তর
১৫। উপ-পরিচালক/অফিস প্রধান, পরিবেশ অধিদপ্তর, বাগেরহাট জেলা অফিস, বাগেরহাট
১৬। জনাব মোঃ শাহজাহান, প্রাক্তন অতিরিক্ত মহাপরিচালক, পরিবেশ অধিদপ্তর, ঢাকা
১৭। ব্যবস্থাপনা পরিচালক, বাংলাদেশ-ইন্ডিয়া ফ্রেন্ডশীপ পাওয়ার কোম্পানী লিঃ, ইউনিক হাইটস (১৭ তলা), ১১৭ কাজী নজরুল ইসলাম এভিনিউ, ইস্কাটন, ঢাকা-১২১৭।

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Responses of Comments of Mongla Port Authority (MPA) on EIA Report for Coal Transportation of Rampal Power Plant

Vide Memo No. 18.14.0158.427.14.04.2017-105 dated 18 September, 2017
Meeting held on 14th September, 2017 at DoE, Dhaka

[Hosted by DoE and Participation from BPDB, BIFPCL, CEGIS & other Relevant Agencies]
And further meeting on 06.12.2017 and 24.01.2018 at DoE

Sl. No.	Described in EIA Report (Volume II: Main Report)	Comments of MPA	Action Taken
01.	**Page: 4-34, Para-368** 90% of the Capital Dredging will be required for yearly maintenance dredging.	According to study report, maintenance dredging will be required about 40% to 60% of Capital Dredging. But practically, the required maintenance dredging is about 20% to 30% of Capital Dredging (MPA, 2017).	Revised accordingly. Refer para- 364 in Chapter 4, page no. 4-35.
02.	**Page: 4-35, Para-370** ……Outer bar is approximately 60 kilometer of which about 38 kilometer has a draft restriction of 7 meter for smooth operation of vessels. Mongla Port Authority plans to dredge the section to increase its navigational draft to 8.5 meter. A channel of width 200 meter has been considered for safe entrance and manoeuvring of vessels. The dredging requirement has been assessed on the basis on the recent hydrographic chart/maps of Mongla Port Authority (surveyed in 2013) taking the design draft of the ongoing dredging program under consideration. Figure 4-10 present alignment and location of the dredging. It is estimated that the required dredging volume is around 4.35 million m^3 for a required draft of 8.5 m at initial stage. An EIA study was conducted by the MPA for the stretch along the Outer Bar, which is approved by the DoE on 25 August, 2013. The study suggested the Swatch of No Ground as dredged spoil disposal site using hopper dredger.	The length of Outer Bar area is about 16.5 km in which only about 11 km has draft restriction of more than 8.5 m draft vessel. Mongla Port Authority is planning to dredge this area, i.e., about 11 km at a width of 600-900 m. All dredged materials will be disposed at deep sea which is outside of Swatch of No Ground.	Revised accordingly. Refer para- 366 in Chapter 4, page no. 4-37.
03.	**Page: 4-36, Para-371** ……the maintenance dredging would be 90% of Capital Dredging……	According to study report, maintenance dredging will be required about 40% to 60% of Capital Dredging. But practically, the required maintenance	Revised accordingly. Refer para- 364 in Chapter 4, page no. 4-35.

Sl. No.	Described in EIA Report (Volume II: Main Report)	Comments of MPA	Action Taken
		dredging is about 20% to 30% of Capital Dredging (MPA, 2017).	
04.	**Page: 5-12, Para- 386** Mongla Port fairway buoy falls outside the jurisdiction of Mongla Port, hence does not require vessel charges for mother vessel.	Mongla Port limit has started from Fairway Buoy. Mother vessels which anchor a Fairway Buoy will be imposed charges as per tariff of Mongla Port.	Revised accordingly. Refer para- 382 in Chapter 5, page no. 5-11.
05.	**Page: 5-14, Para- 390** Harbaria/Mazhar point anchorage is the outer anchorage of Mongla Port located at a distance of around 16 NM from Power plant jetty. It has draft of around 8 meter.	Harbaria anchorage allows to anchor the vessels of 7.5-11 m draft. But Mazhar Point anchorage allows more than 11 m draft vessels. Due to draft restriction of Outer Bar, presently maximum 8.5 m draft vessel can berth.	Revised accordingly. Refer para- 386 in Chapter 5, page no. 5-13.
06.	**Page: 7-30, Para- 475** (ii) inland water way (Mongla Port to Chalna) which is maintained by the BIWTA.	The channel (Inland Waterway) between Mongla Port to Chalna also falls within the jurisdiction of Mongla Port, which is maintained by the MPA.	Revised accordingly. Refer para- 471 in Chapter 7, page no. 7-30.
07.	**Page: 7-42, Para- 499** Available draft in the fairway buoy ranges from 6.00 meter to 8.50 meter.	Available draft in the Fairway Buoy ranges from above 20 m to 25 m.	Revised accordingly. Refer para- 497 in Chapter 7, page no. 7-42.
08.	**Page: 7-42, Para- 502** The shoals along the outer bar in the southern section of 20 kilometre restrict entrance of larger vessels of above 20,000 dwt.	The shoals along the Outer Bar in the southern section of about 11 km restrict entrance of larger vessels of above 8.5 m draft.	Revised accordingly. Refer para- 497 in Chapter 7, page no. 7-42.
09.	**Page: 7-42, Para- 504** Available water depth at Herbaria Anchorage is 8 meter. As the channel proceeds, the depth further decreases from Harbaria to Port Jetty ranging between 4.00 meter to 5.50 meter.	Available water depth at Harbaria Anchorage is ranging between 7.5 m to 12.0 m. As the channel proceeds, the depth further decreases from Harbaria to Port Jetty ranging between 4.0 m to 5.5 m.	Revised accordingly. Refer para- 499 in Chapter 7, page no. 7-42.
10.	**Page: 7-51, Para- 533** In this respect the following three development projects to Mongla Port were considered: • On-going Project for dredging at the habor area in the Passur channel to facilitate berthing of 7.5 m draft ships at port jetty and mooring buoy (volume 35.11 lac cum). • On-going Project for dredging at the outer bar in the Passur channel aiming at increasing navigability at outer bar to facilitate easy access and	• Completed Project for dredging at the harbor area in the Passur channel to facilitate berthing of 7.5 m draft ships at Port jetty and mooring buoy (volume 35.11 lac cum). • Planned Project for dredging at the Outer Bar in the Passur channel aiming at increasing	Revised accordingly. Refer para- 528 in Chapter 7, page no. 7-50.

Sl. No.	Described in EIA Report (Volume II: Main Report)	Comments of MPA	Action Taken
	manoeuvring of more than 9 meter draft sips at anchorage area (volume 43.53 lac cum). • Planned Project for Capital Dredging from jetty no. 9 to 13 km upstream of the Passur channel with the objective of development of navigability up to 13 km upstream in the river route to ensure smooth and safe movement of vessels bound for coal power plant at Rampal, Bagerhat.	navigability at Outer Bar to facilitate easy access and manoeuvring of more than 10.5/11 m draft ships at anchorage area (volume 103.95 lac cum). • Ongoing Project for Capital Dredging from Jetty no. 9 to 13 km upstream of the Passur channel with the objective of development of navigability up to 13 km upstream in the river route to ensure smooth and safe movement of vessels bound for coal power plant at Rampal, Bagerhat.	

Responses of Comments of Bangladesh Water Development Board (BWDB), Dhaka on EIA of Coal Transportation

Vide Memo No. Chief Planning/1028 dated 1 November, 2017
Meeting held on 14th September, 2017 at DoE, Dhaka

[Hosted by DoE and Participation from BPDB, BIFPCL, CEGIS & other Relevant Agencies]
And further meeting on 06.12.2017 and 24.01.2018 at DoE

Sl. No.	Comments	Responses	Action Taken
1	River bank erosion is a very common phenomenon in our country. Movement of bulk carries and class lighter-age carrying coal and limestone along the Passur route may generate wave on sea and inland water which may exaggerate erosion along seashore and riverbank. Provision for monitoring river bank erosion and responsibility of the implementing authority for mitigation measures may be included in the report.	• Issue of erosion and accretion is addressed/described in different places of the EIA report where applicable. Refer Section 7.5.4, in Para- 460 to 463 and in Table 5-1 and in Figure 7-16 of Volume- II: Main Report. a. [As far as the erosion rate are concerned, erosion of the Passur River is approximately equal to the rate of accretion on the other bank. The downstream portion of the river from Hiron point became narrower in 2010 than 1984 and 1997 due to accretion. The extent of right bank-line reduces approximately 700 m to 1.4 km compared to the bank-lines of 1984 while the change is about 800 m to 1.5 km at the left bank.] • Impact of erosion during operation of coal transport vessel and others is mentioned in Table 9-1 at C-15 & C-16 in Chapter 9 of Volume- II: Main Report. • Mitigation measures are prescribed in in Table 9-1 at C-15 & C-16 in Chapter 9 of Volume- II: Main Report.	Erosion and accretion are being monitored continuously through quarterly monitoring mission at strategic locations (i.e., Hiron Point, Akram Point, Mongla Port, Harbaria and Project Jetty Site area) of the entire coal transportation route.
2	Location of dredged spoil disposal sites are proposed by consultation the local people around the project area and these locations are primarily government acquired land or private land interested to fill the property. Undertaking may be asked from local land owners regarding their interest to fill the property to avoid future disputes. A detail plan of dredged material management may be included in the report.	• The coal transportation route along the Passur River from Fairway Buoy to Rampal Power Plant is under the jurisdiction of the Mongla Port Authority (MPA). They are managing the route for decades and taking necessary action as required. • Dredged material management is being managed by MPA. • This EIA report only presented the findings of the studies	-

Sl. No.	Comments	Responses	Action Taken
		conducted by MPA under the caption of "Feasibility Study for Dredging of Passur River from Mongla Port to Rampal Power Plant" in 2015 and "EIA study of dredging of Outer Bar" in 2013. Subsequently a further study is being undertaken on revised ToR given by DoE. • Dredging related issues were not in the purview of the current study, only relevant issues were collected from the mentioned reports and appended accordingly in Para-364 to 367 of Volume- II: Main Report.	
3	Impact of dredging on tributaries and distributaries of Passur River and its mitigation measures may be provided in the report.	• As dredged material management are being managed by respective authorities, dredging related issues were not in the purview of the current study.	-
4	Everyday a lot of vessels and carrier will be moved for coal transportation through the Passur River. Due to accidental occurrence, the river water can be contaminated. In that case, emergency mitigation plan may be created for mitigation measures or emergency unit may be created to minimize the problem.	This issue has been considered in the study and presented in the report. Refer Section 11.9.4: Emergency Response Plans in Volume II- Main Report and "Emergency Preparedness and Response Plan" presented in Annex 11-4 in Volume III-Annexure. It is pertinent to mention here that inland water transport through the Passur River for Maitree STPP is not going to increase significantly (only three vessels in two days), moreover ash produced by the Maitree Power Plant shall be sold to nearby cement industries, the requirement of importing the ash from India will be largely reduced as such the net increment of vessels in the designated route will be almost nil.	

Responses of Comments of Ministry of Fisheries and Livestock on EIA Report for Coal Transportation of Rampal Power Plant

Vide Memo No. 33.00.0000.136.14.030.14-(Second Part) 253
Meeting held on 14th September, 2017 at DoE, Dhaka

[Hosted by DoE and participated by BPDB, BIFPCL, CEGIS & other Relevant Agencies]
And further meeting on 06.12.2017 and 24.01.2018 at DoE

Sl. No.	Location	Existing	Correction/Addition	Action Taken
01	Volume-I: Summary Report Chapter-10, Page-27 Para-07 Cumulative Impact on Biodiversity	Increased inland water transport through the Passur River may increase the potential of collision and injury of dolphins.	The statement might be rephrased as follows: Increased inland water transport through the Passur River may increase the potential of collision and injury of dolphins and will negatively impact the aquatic biodiversity, including finish and crustaceans.	Amended the statement as "Increased inland water transport through the Passur River is not going to increase significantly (only three vessels in two days), hence the potential of collision and injury of dolphins may not be significant and adversely affect the aquatic biodiversity, including finfish and crustaceans. Even collision with dolphins has not been reported (discussions were held with concerned authorities, fishermen association, vessel owner association, etc.) yet with the present movement of vessels." Refer Page- 27 of the Volume I: Summary Report.
02	Volume-I: Summary Report Chapter-11, Table: Mitigation/Enhancement Measures: Page-33 Issues-A4	"Due to frequent movement of vessel illegal fishing and catching of post larvae (PL) will be discouraged as such, fish	Department of Fisheries does not agree with this statement. Frequent movement of vessel will indeed disrupt the shrimp post larvae (PL) production. Statement	Only two vessels in three days shall sail due to coal transportation i.e., about 500 vessels (mother and lighterage

Sl. No.	Location	Existing	Correction/Addition	Action Taken
		production will be increased in the wild."	may be replaced as follows: "Due to Frequent movement of coal transportation vessel ecosystem of the river will be disrupted and water temperature may be increased. As a result natural breeding and nursery ground will be degraded, fish and shrimp will cause decline in production."	vessel) in a year. However, as ash produced by the Maitree Power Plant shall be sold to nearby cement industries, the requirement of importing the ash from India will be largely reduced as such the net increment of vessels in the designated route will be almost nil. Accordingly, the referred para is amended as "Due to frequent movement of vessel illegal fishing and catching of post larvae (PL) will be discouraged as such, fish production will be increased in the wild. If regular monitoring demonstrates disruption of habitat due to coal transportation vessel and corresponding decline of shrimp and fish production, necessary measures need to be undertaken to address the issue." Refer Table 9-1 and Table 11-3 in Impact A4 of Volume II: Main Report and in Page 33 of Volume I: Summary Report.
03	Volume-I: Summary Report Chapter-11,	Since catching of fish and post larvae will be discouraged	Seemingly it's not a scientifically acceptable statement. This	Amended the statement as "Since catching of fish and post

Sl. No.	Location	Existing	Correction/Addition	Action Taken
	Table: Mitigation/Enhancement Measures: Page-47 Issues-C3	during operation of the project, as such the production of shrimp and fish will increase in the area.	statement may be replaced as follows: Necessary measures need to be undertaken to address the alternative livelihood opportunities of the affected fisher's community.	larvae will be discouraged during operation of the project, as such, the production of shrimp and fish will increase in the area. If regular monitoring demonstrates decline of shrimp and fish production, necessary measures need to be undertaken to address the issue." Refer Table 9-1 in Impact C3 of Volume II: Main Report and in Page 47 of Volume I: Summary Report.

Responses of Comments of Bangladesh Inland Water Transport Authority (BIWTA), Dhaka on EIA of Coal Transportation

Vide Memo No. 18.11.0000.185.14.3708.15 533 dated 1 November, 2017
Meeting held on 14th September, 2017 at DoE, Dhaka

[Hosted by DoE and Participation from BPDB, BIFPCL, CEGIS& other Relevant Agencies]
And further meeting on 06.12.2017 and 24.01.2018 at DoE

Sl. No.	Comments	Responses	Action Taken
1	In order to transport legal commodities using Indo-Bangla inland riverine route, there exist an agreement since 1972 under the title "Protocol on Inland Water Transit and Trade between Bangladesh and India". Under this protocol using water vessels coal, cement producing raw materials like fly ash, machineries and other commodities are being transported from Kolkata of India to Bangladesh through the river route of Angtihara-Sheikbaria-Chalna-Mongla-Ghashiakhali channel. On an average, about 20/25 number of water vessels sail daily through this Channel. Considering its impacts on ecological and environmental balance, BIWTA gives its consent to the voyages of these water vessels through the channel under certain conditions. In this context the followings are to be noted.		
1.1	During the movement of water vessels the conservation of the Sundarbans ecological environment is to be ensured.	• Environmental Impact assessment and mitigation plan were delineated in Chapter 9. Existing information from the technical documents coal sourcing study air quality assessment; noise level assessment; inland water transport assessment; baseline biodiversity assessment; government databases; and field study also contribute to this section. • In addition, the Consultant has also consulted with multiple stakeholders, expert/institute, local residents and community focused groups, general public, environmental groups, and the client to seek feedback on various issues of environmental and social concern. • Such environmental issues of concern include: • Air quality; • Bed material and marine environment; • Water rresources; • Fish, fish habitat and species with status; and • Vegetation and wildlife, and species with special status	

Sl. No.	Comments	Responses	Action Taken
		in the Sundarbans Reserve Forest. • The Socio-economic Effects Assessment describes the following socio-economic and socio-community topics and effects: • Noise and vibration effects; • Light effects; • Increased vessel traffic; • Disaster risk and emergency response; and • Effects on livelihood dependent on the Sundarbans. • The Health Effects Assessment, including Human Health and Ecosystem Health Assessment present the following issues in detail: • Health effects of coal dust • Health effects of fugitive dust/particulate matter • Impact Assessment Methodology • Potential environmental and social impacts were identified on the basis of the review of feasibility reports, field visits, environmental quality baseline monitoring, ecological and fisheries surveys, stakeholder consultations, air quality dispersion modelling using USEPA approved CALPUFF, and noise modelling using SoundPlan. • The study has identified the aquatic flora and fauna of the wetland ecosystem of the study area, which covers the whole coal transportation route through the Sundarbans as well as the WHS area. Local and global status of the fauna has been checked based on IUCN Red List. Accordingly critical habitat assessment as per IFC Performance Standard Guidelines has been done for the fauna which are Critically Endangered and/or Endangered Species (Page no. 9-139) of Volume- II:	

Sl. No.	Comments	Responses	Action Taken
		Main Report. Impact assessment (Chapter 9 of Volume- II: Main Report) was done considering the ecological character of the study area and subsequent Environmental Management Plan (Chapter 11 of Volume II: Main Report) was delineated.	
1.2	It is to be ensured that goods carrying vessels of Power Plant project in no way causing any hindrance to PIWT&T Vessels.	Vessels of Maitree Power Plant project will follow the MPA guidelines and protocol thus ensuring the causing no hindrance to Protocol on Inland Water Transit & Trade (PIWT&T) Vessels (Refer para 517, page 7-48).	
1.3	Proper provision is to be kept to take appropriate measures to protect any damage or siltation of the channel due to any unwanted liquid or solid discharge from these vessels.	• All Vessels will follow applicable MARPOL Convention, Annex V on the Prevention of Pollution by Garbage from Ships, the IMO introduced new classification criteria to enable identification of substances harmful to the marine environment (HME) (Refer Chapter 11, page 11-60 of Volume II: Main Report). • Coal transportation shall be carried out using existing navigational route of the MPA. • A facility is to be developed in the MPA designated area for receiving the bilge for lighterage that will be calling at the plant jetty (Refer Chapter 11, page 11-62 of Volume II: Main Report). • MPA will ensure adequate port waste (solid and liquid) reception facilities and Ensure dry residues and/or the wash water that contains residues from an HME discharged at adequate port reception facilities. (An MOA in this regard has been signed between BIFPCL & MPA on 16.08.2017) **(Refer Annexure 11-5, Page 155 of Volume –III, Annexure).**	
1.4	Emergency Response Plan developed to prevent any	As per the MOA signed between BIFPCL & MPA on	

Sl. No.	Comments	Responses	Action Taken
	possible incident that may happen during Coal transportation should have a BIWTA representative in the response group.	16.08.2017, MPA to form Emergency Preparedness and Response Group (EPRG), headed by Member (H&M), MPA, may take note of it. **(Refer Annexure 11-5, Page 155 of Volume –III, Annexure).**	

Responses of Comments of Forest Department (FD), Dhaka on EIA of Coal Transportation

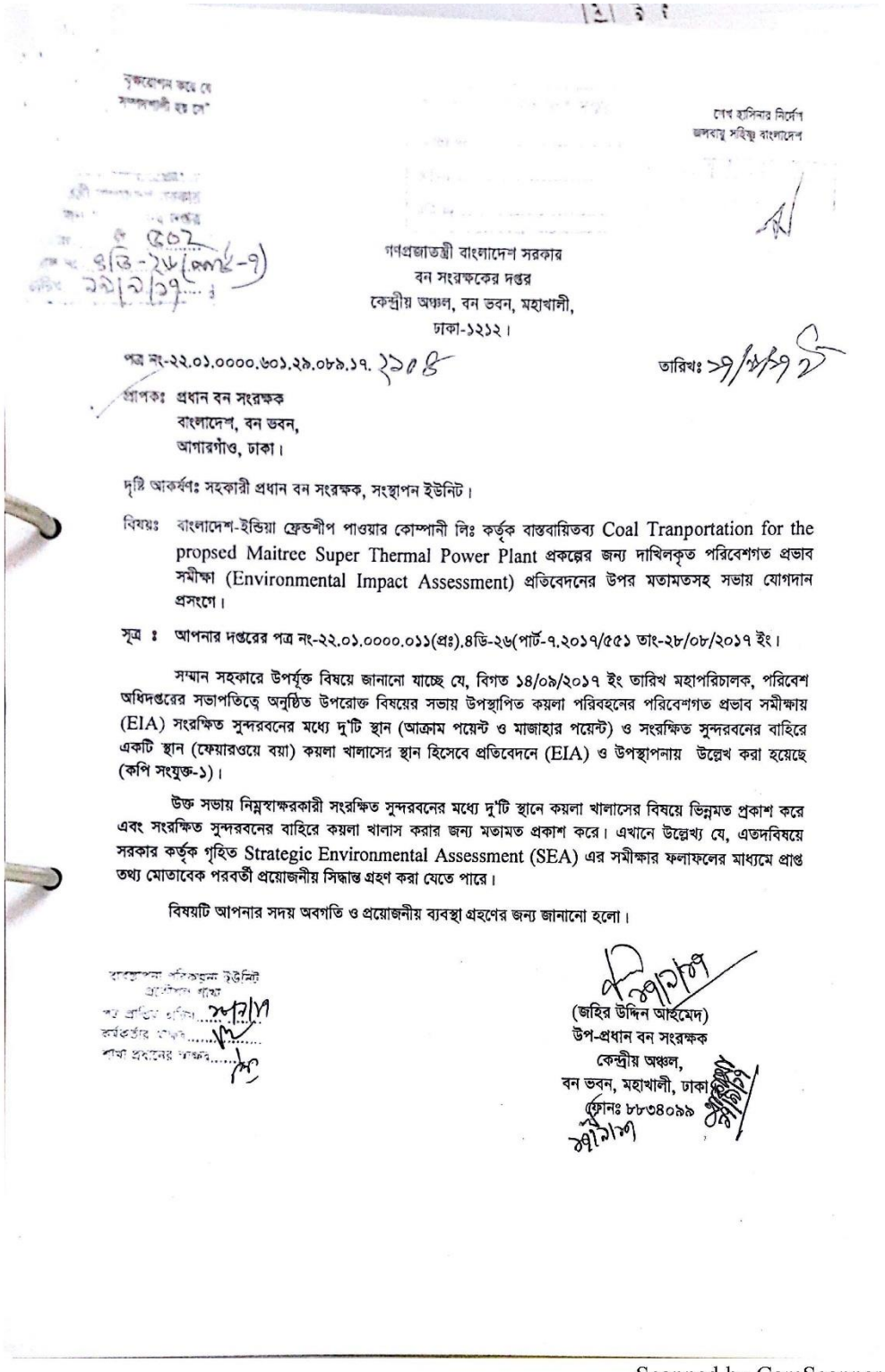
Vide letter No. 22.01.0000.011(Pra:),4D-26(Part-7.2017/551, Dated 28/08/2017
Meeting held on 14th September, 2017 at DoE, Dhaka

[Hosted by DoE and Participation from BPDB, BIFPCL, CEGIS& other Relevant Agencies]
And further meeting on 06.12.2017 and 24.01.2018 at DoE

Sl. No.	Comments	Response	Action Taken
1.	Forest Department expresses different opinions on transhipment of coal at two locations inside the Sundarbans Reserve Forest (SRF) and also expresses the opinion on transhipment of coal outside the SRF.	The EIA study of coal transportation for MSTPP has investigated at least three routes for transporting coal from the Fairway Buoy to MSTPP and three anchorage points for transhipping coal from mother vessel to lighterage vessel. The investigated routes are: **Option- 1: Passur Channel:** Fairway Buoy to Maitree STPP Jetty via Hiron Point-Akram Point-Harbaria-Mongla Port; **Option- 2: Sibsa Channel:** Fairway Buoy to Maitree STPP Jetty via Hiron Point-Akram Point-Chalna and through Sibsa-Dhaki-Chunkuri; and **Option 3: Mongla-Ghasiakhali Channel:** Fairway Buoy to Maitree STPP Jetty through Baleswar -Ghasiakhali- Mongla Nulla-Passur via Mongla Port. (Map is shown in Figure 5-1 in Volume- II: Main Report) Based on multi-criteria analysis considering 13 pertinent parameters of physical, biological and socio-economical aspects, it is found that Option- 1, i.e., the Passur Channel has scored highest (Refer Table 5-1 in Chapter 5 of Volume- II: Main Report), which have been used for last 60 years as maritime route and second largest port of Bangladesh (Mongla Port) operates. With the concurrence of Mongla Port Authority, there were three anchorage points identified for transhipping coal. These were: (i) Fairway Buoy at the Bay; (ii) Akram Point at the Passur Channel; and (iii) Mazhar Point (Harbaria) at the Passur Channel. All of the anchorage points possess merits and demerits in terms of data availability, natural calamity, tonnage, proximity to WHS, etc. Considering all pros and cons of mentioned factors (not inclusive) the study has suggested two transhipment points, i.e., Fairway Buoy and Mazhar Point for transhipment of coal for MSTPP. The points were selected considering less disturbances to the Sundarbans Reserve Forest. Harbaria is a regular anchorage of MPA. The anchorage at Mazhar Point, which is allowed by MPA for transhipment of coal of MSTPP is close to Harbaria and study	-

Sl. No.	Comments	Response	Action Taken
		suggested that there may be negligible impact on the Sundarbans ecosystem. The Akram Point was found less preferred as anchorage point for transhipment of coal since it is nearer to the World Heritage Site compared to the Mazhar Point and it becomes wavy and turbulent in the wet season. On the other hand, it is estimated that about 500 lighterage vessels need to be travelled all through the Sundarbans if Fairway Buoy is alone considered as an Anchorage Point. In that case, more emission is expected as smaller vessel emits more than that of larger vessel; more travel more susceptibility to accidental event; more release of bilge water and other contaminants. Mother vessel coming at Mazhar Point may erase all such problems at larger extent because only about (Mother Vessel: 117 + Lighterage Vessel: 292 = 409 vessels) vessels need to be sailed from Fairway Buoy to the MSTPP (Refer para- 403, page no. 5-17 of Volume II: main Report). Moreover, the protocol vessel coming from India (about 400 vessels) carrying ash sail through a part of the Passur Channel. Ash generated from the MSTPP may outweigh the ash demand of the cement factories at Mongla area mostly. In such case, vessel sailing through the Passur Channel will be reduced and in all practical purposes the reduction of protocol vessel with ash from India will compensate the additional voyage required for coal transportation. Thus net increase of vessels in the Passur Channel will be nil. This will be beneficial for the Outstanding Universal Value of the Sundarbans and its adjoining area (Refer para- 404, page no. 5-18 of Volume II: main Report).	

Comments Sheet of Forest Department on EIA Report of Coal Transportation



বৃক্ষরোপণ করে যে
সমৃদ্ধশালী হয় দেশ

শেখ হাসিনার নির্দেশ
জলবায়ু সহিষ্ণু বাংলাদেশ

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
বন সংরক্ষকের দপ্তর
কেন্দ্রীয় অঞ্চল, বন ভবন, মহাখালী,
ঢাকা-১২১২।

পত্র নং-২২.০১.০০০০.৬০১.২৯.০৮৯.১৭. ১২০৪ তারিখঃ ২৭/১২/১৭

প্রাপকঃ প্রধান বন সংরক্ষক
বাংলাদেশ, বন ভবন,
আগারগাঁও, ঢাকা।

দৃষ্টি আকর্ষণঃ সহকারী প্রধান বন সংরক্ষক, সংস্থাপন ইউনিট।

বিষয়ঃ বাংলাদেশ-ইন্ডিয়া ফ্রেন্ডশীপ পাওয়ার কোম্পানী লিঃ কর্তৃক বাস্তবায়িতব্য Coal Tranportation for the propsed Maitree Super Thermal Power Plant প্রকল্পের জন্য দাখিলকৃত পরিবেশগত প্রভাব সমীক্ষা (Environmental Impact Assessment) প্রতিবেদনের উপর মতামতসহ সভায় যোগদান প্রসংগে।

সূত্র ঃ আপনার দপ্তরের পত্র নং-২২.০১.০০০০.০১১(প্রঃ).৪৬-২৬(পার্ট-৭.২০১৭/৫৫১ তাং-২৮/০৮/২০১৭ ইং।

সম্মান সহকারে উপর্যুক্ত বিষয়ে জানানো যাচ্ছে যে, বিগত ১৪/০৯/২০১৭ ইং তারিখ মহাপরিচালক, পরিবেশ অধিদপ্তরের সভাপতিত্বে অনুষ্ঠিত উপরোক্ত বিষয়ের সভায় উপস্থাপিত কয়লা পরিবহনের পরিবেশগত প্রভাব সমীক্ষায় (EIA) সংরক্ষিত সুন্দরবনের মধ্যে দু'টি স্থান (আক্রাম পয়েন্ট ও মাজাহার পয়েন্ট) ও সংরক্ষিত সুন্দরবনের বাহিরে একটি স্থান (ফেয়ারওয়ে বয়া) কয়লা খালাসের স্থান হিসেবে প্রতিবেদনে (EIA) ও উপস্থাপনায় উল্লেখ করা হয়েছে (কপি সংযুক্ত-১)।

উক্ত সভায় নিম্নস্বাক্ষরকারী সংরক্ষিত সুন্দরবনের মধ্যে দু'টি স্থানে কয়লা খালাসের বিষয়ে ভিন্নমত প্রকাশ করে এবং সংরক্ষিত সুন্দরবনের বাহিরে কয়লা খালাস করার জন্য মতামত প্রকাশ করে। এখানে উল্লেখ্য যে, এতদবিষয়ে সরকার কর্তৃক গৃহিত Strategic Environmental Assessment (SEA) এর সমীক্ষার ফলাফলের মাধ্যমে প্রাপ্ত তথ্য মোতাবেক পরবর্তী প্রয়োজনীয় সিদ্ধান্ত গ্রহণ করা যেতে পারে।

বিষয়টি আপনার সদয় অবগতি ও প্রয়োজনীয় ব্যবস্থা গ্রহণের জন্য জানানো হলো।

(জহির উদ্দিন আহমেদ)
উপ-প্রধান বন সংরক্ষক
কেন্দ্রীয় অঞ্চল,
বন ভবন, মহাখালী, ঢাকা
ফোনঃ ৮৮৩৪০৯৯

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Responses of Comments of Department of Environment (DoE), Khulna on EIA of Coal Transportation

Meeting held on 22nd March, 2017 at DoE, Khulna

[Participants from DoE (Khulna), BIFPCL and CEGIS]

Sl. No.	Comments	Responses	Action Taken
1	Is PDM output incorporated in the report?	Yes.	Kindly note Section 13.8 EIA Disclosure of Chapter 13. Refer page no. 13-15.
2	Was vessel traffic survey conducted?	Yes.	Kindly note Section 7.7.9 Movement of Mechanized Boats and Crafts of Chapter 7. A map showing vessel survey stations has been given in Figure 7-28. Refer page no. 7-48 to 7-49.
3	Environment friendliness of the tran-shipper including hopper, dust suppression system, etc.	Considered	Kindly note **Section 4.6.2: Tran-shipper.** This section deals with the environment friendliness of transhipper. Refer page no. 4-9.
4	Was Fisheries survey conducted? Reference should be contemporary.	Yes. Fisheries survey had been conducted for about three years. Regarding updating reference it is agreed.	Findings of fisheries survey are given in Sections from 7.9.2 to 7.9.6. Refer page nos. 7-76 to 7-84. The Section 7.9.5 Fish Diversity has been revised and accordingly reference has been updated as suggested. Refer page no. 7-79.
5	How Class vessel is defined?	Responded in the meeting and defined.	The vessel that follows international maritime rules and regulations, such as applicable IMO, IMSBC, MARPOL, etc. are popularly known as Class vessel.
6	The External Monitoring Agency (EMA) team should be trained up so that they can monitor the Project properly and also can interact with the Proponent.	EMA has been changed into Independent Monitoring Agency (IMA) as per the suggestion of DoE, Dhaka. As the Proponent generally award work to a competent authority, So they will have already capacity of monitoring.	The Section 11.5.4 External Monitoring Agency in Chapter 11 has been changed with Independent Monitoring Agency (IMA) as per the suggestion of DoE. Refer page no. 11-5. This issue is also considered in Summary Summary. Refer page no. I.
7	Treatment methodology of liquid waste and specification of ETP should incorporated in the EIA report.	Agreed.	Treatment methodology of liquid waste and specification of ETP have been given in EPC Contract Document. The methodology and specification is appended in Annex 11-5 under the Title of Water Treatment Systems and refrred in Section 11.9.3. Refer page no. 11-21.
8	What is the source of water? Should mention in the EIA Report.	The Passur River with due treatment (Reverse Osmosis/ desalinization)	Section 3.5.4 Coal Terminal/ Plant Site Jetty. Refer page no. 3-5.

Sl. No.	Comments	Responses	Action Taken
9	World Heritage Site should be given emphasis.	Agreed.	Issue based concern for world heritage site (WHS) has been taken care in the following sections and tables: Section 2.10 Relevant International Legal Obligation: Refer page no. 2-18. UNESCO World Heritage Convention-1972 Section 5.1.3 Anchorage Points; Refer page no. 5-11. Section 7.2.6 Wind Speed and Direction; Refer page no. 7-6. Section 7.4 Ambient Noise Level; Refer page no. 7-16. Section 7.8.2 Hot Spots/Area of Conservation Significance; Refer page no. 7-61. Section 7.9.9 Regulations on Restricted Fishing Areas in the Sundarbans; Refer page no. 7-88. Table 9-1: Potential impacts and their significance; Refer page no. 9-4. Section 9.6 Environmental and Social Impacts during Feasibility and Design Phase; Refer page no. 9-72. Table 9-27: Habitat Identification as per IFC 2012 PS 6; Refer page no. 9-7. Table 9-29: Project Area Critical Habitat Screening Assessment; Refer page no. 9-7. Table 11-4: Mitigation Plan; Refer page no. 11-7. Etc.
10	Alternative Route selection score to be defined	Agreed.	Recast of alternative route selection matrix has been done as suggested in Table 5-1. Scores are given based on the importance. Refer page no. 5-7.
11	Justification of study area delineation	Justification of study area is already in the report in different sections (Section 3.3 Study/Project Influenced Area and Para 762).	Recast of Section 3.3 Study/Project Influenced Area is done with minor edit. Refer page no. 3-1.
12	Profile of vegetation should be based on updated reference	Agreed.	Reference has been updated with the EIA study of Gorai River Restoration Project conducted in 2012. Refer page no. 7-22.
13	The general features of the Passur channel should be improved.	Agreed.	The general features of the Passur River in Table 7-7 have been updated with 'Rivers of Bangladesh' of the BWDB, 2005 and 2012. Refer page no. 7-23.

Sl. No.	Comments	Responses	Action Taken
14	Month of discharge data should be mentioned with reference given in Table 7-7.	Agreed.	Months of minimum and maximum discharge data have already mentioned and reference has been given below the Table 7-7. Refer page no. 7-23.
15	Show the locations of shoals in the Passur River.	Bathymetry maps have already been given in Figure 7-23 and 7-26. Refer page nos. 7-32 and 7-34.	-
16	Page 7-35. Wave height should be mentioned. This data should be updated.	Wave height data are already given in Section 7.5(C)	Updated data have also been given in same section with figure (Figure 7-26a) and source of information. Refer page no. 7-35.
17	Reference and standard of oil and grease should be given for Table 7-14.	Agreed. Reference was mentioned below the Table.	Standard for oil and grease for surface water has been incorporated. BCSIR has analyzed surface water sample for oil and grease for CEGIS and data given by them has been presented in the report as in the Table 7-14. Refer page no. 7-39.
18	High and low tide to be mentioned	This issue has been covered in a. Tidal Fluctuations of Section 7.5.4 Riverine and Estuarine Morphology; Refer page no. 7-27.	-
19	Interpretation of water quality issue should be provided in the report. How many sampling locations?	Agreed.	For Water quality interpretation please refer Section 7.6(f). For other quality parameters refer page no. 7-40 of this EIA report. There are 15 sampling locations from where water sampling is done.
20	Regarding river draft under Section 7.5.4: Riverine and Estuarine Morphology in sub-section b. River Draft in Para 475 The analysis indicates…….of the lighterage of 10,000 dwt.	This issue has already been covered in the EIA Study report of Dredging from Mongla Port to Project site jetty conducted by IWM for MPA. It is referred in Para 479 of this report. Refer page no. 7-33.	-
21	Regarding Para 478 It is necessary…… …..Maitree Coal based Power Plant.	Revised	Updated the statement in Para 478 based on the query. Refer page no. 7-33.

Responses of Comments of Department of Environment (DoE), Dhaka on EIA of Coal Transportation

Meeting held on 10th April, 2017 at CEGIS, Dhaka

[Participants from DoE (Dhaka), BPDB, BIFPCL and CEGIS]

Sl. No.	Comments	Responses/Remarks	Action Taken
1	The PSMP, 2010 has been referred in the EIA report of Coal Transportation. By this time, the Government has circulated the PSMP, 2016. So, The PSMP, 2016 should be considered in this EIA report.	Agreed.	The PSMP, 2016 has been considered in the EIA report of Coal Transportation and incorporated in page no. xxxv in Volume– I: Summary Report and in Article no. 1.3 in Volume-II: Main Report. This issue is also reflected in power point presentation.
2	The 53rd condition of the EIA approval letter states that "A separate EIA/morphological study shall have to be conducted for coal transportation and river dredging to develop sound environmental management plan towards conservation of ecosystem and biodiversity". This EIA study is for Coal Transportation, what about EIA for Dredging? Clearly mention.	This issue has already been covered in relevant areas of the EIA report. Refer page nos. xlii and lxxxv in Vol– I: Summary Report and page no. 4-34 in Vol- II- Main Report and other relevant places.	-
3	Has this study followed the World Bank Group's guidelines if so please mention it.	Chapter 2: Policy, Legal and Administrative Framework discusses relevant Operation Policies (OP) of World Bank and World Bank Group's Guidelines. Refer page no. 2-28. EHS Guidelines, IFC 2007 were followed for criteria pollutants like SOx, NOx, $PM_{2.5}$, PM_{10}, etc. Refer Table 7-3, 7-4, etc. IFC Performance Standards (PS) on Environmental and Social Sustainability was followed for relevant issues. PS-4 Community Health, Safety, and Security (Refer page no. 9-17), Critical Habitat Assessment under PS-6 'Biodiversity Conservation and Sustainable Management of	-

Sl. No.	Comments	Responses/Remarks	Action Taken
		Living Natural Resources'. Refer page no. 9-132.	
4	Mention quantity of required coal per annum for the MSTPP.	The estimated maximum amount of coal required for the operation of MSTPP is about 4.7 million tons per annum. This study considers the worst case scenario considered 4.7 million tons of coal in air quality modeling and analysis.	Depending on operational conditions, the required coal may be reduced to 4 million tons annually. This will give easement to the air-shed. Refer page no. 1-1.
5	Biological aspects should be given more emphasis in analyzing the alternatives of the route.	Agreed.	Revised and updated the Table 5-1: Alternative route selection of the EIA report as suggested. Refer page no. 5-7.
6	In Table 5-1: Alternative route selection, the criterion 'Investment' should be more specific.	Agreed.	Updated the table in the EIA report as per suggestion. Refer page no. 5-8.
7	Alternative analysis should be done for all five major components (mentioned in Chapter 3: Project Data Sheet and Chapter 4: Project Description).	Agreed. Alternative analysis for four major components out of five was already given in the EIA report in Article nos. 5.1.1 to 5.1.4. Refer page no. 5-1.	Alternative analysis for the fifth one is added in Article no. 5.1.5 as Alternate Coal and Limestone Handling System in the EIA report as per suggestion.
8	Alternatives of dust suppression /control mechanism should be omitted from the EIA Report.	Agreed.	Updated section XXX as suggested. Refer page no. 5-17.
9	The criteria of Alternative route selection should follow the order of Physical, Biological and Social indicators.	Agreed.	Updated the Table 5-1: Alternative route selection in the EIA report as per suggestion. Refer page no. 5-7.
10	Justification of alternative anchorage point should be more specific and represented in a tabular form.	Agreed.	Updated in the EIA report as suggested. Kindly refer Table 5-2 in page no. 5-15.
11	Justification of study area should be clearly spelled out.	This issue has already been covered in Article no. 3.3 in the EIA report. Refer page no. 3-1.	-
12	The impact of lighting or beaming of vessel on sensitive receptors should be accounted in the report. Sensitivity of microbial and wildlife should be considered.	This issue has already been covered in relevant places. Refer page nos. xlviii, lxii, lxxiii,in the Summary Report and page nos. 9-22, 9-44, 9-51, 9-79, 9-154, 11-28, 11-53, 13-4, and other relevant places.	-
13	Is there any MPA directive on restriction of Ship lighting in Sundarbans area?	The Marine Safety Act requires that lights must be displayed from sunset to sunrise and in times of	Annex 9-1: Vessel Navigation Lights. Refer page no. xcvii.

Sl. No.	Comments	Responses/Remarks	Action Taken
		restricted visibility during daylight hours. Minimum ranges at which lights can be seen refer to conditions on a dark night with a clear atmosphere. The information in this chapter is based on the International Regulations for Preventing Collisions at Sea 1972 (COLREGS), Marine Safety Act and Marine Safety Regulations.	
14	Disturbance of water body and associated ecosystem due to underwater noise produced from vessel movement for coal transportation and piling activities of jetty.	This issue has been covered in the EIA report. Refer page nos. 9-81, 11-56, and other relevant places. ECP 9: Protection of Fisheries (Refer page no. cxiii) in Annex 11-1.	-
15	As the government policy is to increase load of Payra Port and decrease the load of the Mongla Port. Payra Port policy and projection on vessel movement should be made coherence with that of the Mongla Port Authority.	Subjected to the full-fledged operation of the Payra Port, it is expected that some traffic load of the Mongla Port will be diverted to the Payra Port. However, the Project has considered the worst case scenario for the vessel movement in the Passur River.	This article will be added in respective section of the EIA report of Coal Transportation as 'Footnote'.
16	Is there any additional monitoring points considered in the EIA of coal transportation which are being considered with respect to the monitoring points suggested in the approved EIA of MSTPP?	The monitoring points for environmental monitoring study of the MSTPP are so well distributed along the route that additional monitoring point(s) were not needed to be considered.	-
17	Efficiency of coal spillage and dust dispersion prevention should be quantified and mentioned in the EIA report. This is important for affirming the deposition of coal/dust on the river bed and distortion of the habitat.	Accumulation of coal dust in the transhipment point of coal will be periodically monitored. Based on the findings, mitigation measures will be carried out. However, the amount of spillage is so meager that it is not quantifiable.	-
18	A brief description about IMO, MARPOL, IMSBC, SOLAS, etc. conventions/guidelines should be incorporated in the EIA report of Coal Transportation.	Agreed.	Brief description of relevant conventions for maritime vessel has been incorporated in Annex 1-3 captioned under "Brief Outline of the Conventions for Maritime Vessel" of the EIA report. In this regard, conventions like IMO,

Sl. No.	Comments	Responses/Remarks	Action Taken
			MARPOL, IMSBC and SOLAS are considered. Refer page no. xvii in Volume- III: Annexures.
19	Institutional arrangement for the implementation of the EMP should be given in the EIA report by specifying their roles and responsibilities.	Institutional arrangement for the implementation of the EMP has been covered in detail by specifying the roles and responsibilities of the positions assigned. Refer Article 11.5 in page no. 11-2.	-
20	A brief description on spontaneous combustion of coal with reasons should be provided in the EIA report.	This issue has already been discussed in Articles 9.7.14 and 11.9.4. Refer page nos. 9-129 and 11-21 respectively.	-
21	Occupational Health and Safety issue should be considered in the EIA report for the construction phase of jetty and other civil works.	This issue has already been covered in Article no. 9.4 of Chapter 9 of EIA report. Refer impact no. B3 of Table 9-1 in page no. 9-12.	-
22	Draft revised Environmental Conservation Rules (ECR), 2017, Ecologically Critical Area (ECA) Rule, 2016 and Bangladesh Biodiversity Act, 2017 should be included in the Policy, Legal and Administrative Framework chapter.	Agreed.	Updated the EIA report as suggested by incorporating Draft ECR, 2017; ECA Rules, 2016; and Biodiversity Act, 2017. Refer Table 2-1 in page no. 2-3 and other relevant places.
23	Include Draft MoU with MPA and BIFPCL on Emergency Response Plan (ERP) in the EIA report.	Agreed.	A small write up will be included in main body mentioning the same.
24	Specification of appropriate Class Vessel, unloader, etc. should be included in the report with reference.	Detail specification of the lighterage vessel has not yet been finalized. However, it would be IMO certified. The specification of the unloader is already mentioned in EIA report. Refer page no. 4-17.	-
25	Keep harmony in writing chemical formula of criteria pollutants and should follow either NOx or NO_2…..etc.	Chemical formula of criteria pollutants have been written as where appropriate.	-
26	Speed limit for the vessels imposed by MPA should be incorporated in the EIA report.	Speed limits vary for different type of vessels and also limits may get revised with time. However, speed limits are mentioned in the Volume- I: Summary Report in page nos. lxv, lxxv and lxxvi; in the Volume- II: Main Report in page nos. 8-14, 9-28…..etc.	-

Sl. No.	Comments	Responses/Remarks	Action Taken
27	Quantification of spillage of coal and coal dust in percentages should be done and incorporated in the report.	Accumulation of coal dust in the transhipment point of coal will be periodically monitored. Based on the findings, mitigation measures will be carried out. However, the amount of spillage is so meager that it is not quantifiable. (Ref……..)	-
28	Management Plan for noise, air quality, lighting/beaming, etc. should consider in the EIA report of coal transportation for protecting flora, fauna and wildlife.	• These issues have already been addressed in relevant places in the said EIA report. Refer Table 9-1, Articles 9.7.11, 9.7.12, 9.7.15, 9.7.16, 9.7.20. • Air Quality Management Plan is given in the EIA report on page no. 11-13 for implementation phase; on page no. 11-17 for operation phase and as EMP-Subplan 1 under Article 11.10.1 for both implementation and operation phases. • Noise Management Plan is given in the EIA report on page no. 11-14 for implementation phase and on page no. 11-29 for operation phase. • Lighting Plan is given on page no. 11-28 for operation phase.	-
29	Mention Article or page no. about the write ups on Dolphin sanctuary, location of Batagur Baska (Turtle).	• Details about Dolphin sanctuary are given in Para- 564-566 under Article no. 7.8.2; visualized Dolphin sanctuary on Map in Figure 7-32 and 7-33. Refer page nos. 7-68 to 7-72 for Dolphin issues. • Matters regarding Batagur turtle have been discussed in Para- 561. Refer page no. 7-68.	-
30	Institutional arrangement should specify roles and responsibilities of the positions so that EMP is implemented properly.	An Institutional Arrangement has been proposed in the EIA report defining roles and responsibilities of the positions assigned for the proper implementation of the EMP. Refer Article no. 11.5 in page no. 11-2.	-

Sl. No.	Comments	Responses/Remarks	Action Taken
31	The title of the report should match with the approved ToR of DoE for Coal Transportation, i.e., title should be EIA instead of ESIA.	Agreed.	Updated the title of the report for Coal Transportation as well as inside the report where applicable as per suggestion.
32	Some responses of queries of the participants of the Public Disclosure Meeting (PDM) should be reviewed. Some observations (e.g., plantation, fly ash & bottom ash, etc.) which are not linked with this study can be omitted.	Agreed.	Updated the respective sections of the EIA report as per suggestion.
33	What is the basis of analogies regarding dolphin and fisheries; they are habituated in the Passur Channel as it is operating as vessel route for about 100 years.	Mechanized vessels are sailing in the Passur River for the decades. So far the knowledge we have gathered there is no report of accident of cetaceans/Dolphin with ship/vessel. According to the study captioned under "Abundance estimation of Ganges River dolphins (Platanista gangetica gangetica) and Irrawaddy dolphins (Orcaella brevirostris) using independent concurrent counts in waterways of the Sundarbans Mangrove Forest, Bangladesh" conducted by WCS for USAID in 2005. Quotation "This was despite indications of increasing threats to cetaceans in the area from incidental killing in gill net fisheries, destruction of fish-spawning habitat through mangrove deforestation, toxic contamination from large human population centers located upstream (e.g., Dhaka and Kolkata), non-selective catch of fish fingerlings and crustacean larvae in small mesh "mosquito nets" and increased vessel traffic (Reeves et al. 2003).	This issue has been addressed in Table 9-1. Refer page no. 9-6.
34	Harmonizing of spelling and rephrasing of Sundarbans as 'the Sundarbans'.	Agreed.	Updated as suggested in every case.
35	External Monitoring Agency (EMA) should be replaced with the Independent Monitor to be	Agreed	Chapter 12 is revised accordingly.

Sl. No.	Comments	Responses/Remarks	Action Taken
	engaged by the Proponent. The duties and responsibilities of the Independent Monitor should be defined properly.		
36	A budget for Independent Monitoring should be developed and responsibility should be given to the Proponent.	Covered in Chapter 12.	-
37	Executive summary should be replaced by Summary Report by providing relevant figures, tables, institutional arrangement, EMP matrix, etc.	Agreed.	Executive Summary has been separated from the Main Report as Volume- I and captioned as Summary Report.
38	Methodology in the Executive Summary should be avoided.	Agreed.	Updated as per suggestion.

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Abbreviations and Acronyms

ADB	Asian Development Bank
AIDS	Acquired Immuno Deficiency Syndrome
BIFPCL	Bangladesh India Friendship Power Company Limited
BIWTA	Bangladesh Inland Water Transport Authority
BWDB	Bangladesh Water Development Board
CD	Chart Datum
dB/dBA	Decibel
DC	District Commissioner
DoE	Department of Environment
DoF	Department of Fisheries
DWT	Dead Weight Tonnage
ECA	Environment Conservation Act /Ecologically Critical Area
ECR	Environment Conservation Rules
EHS	Environmental Health and Safety
EHSU	Environmental Health and Safety Unit
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EP	Equator Principles
EPC	Engineering, Procurement and Construction
ERP	Emergency Response Plan
EP	Equator Principles
FD	Forest Department
FGD	Focus Group Discussion
FTS	Floating Transfer Station
HIV	Human Immunodeficiency Virus
HME	Harmful to the Marine Environment
IFC	International Finance Corporation
IMA	Independent Monitoring Agency
IMO	International Maritime Organisation
IMSBC	International Maritime Solid Bulk Cargoes Code
IT	Interim Target

IUCN	International Union for Conservation of Nature
IWM	Institute of Water Modelling
km	Kilometer
LGRC	Local Grievance Redress Committee
MARPOL	Marine Pollution
MPA	Mongla Port Authority
MW	Mega Watt
NM	Nautical Mile
NTPC	National Thermal Power Corporation Limited
OE	Owner's Engineer
PAP	Project Affected People
PCM	Public Consultation Meeting
PDM	Public Disclosure Meeting
PGRC	Project Grievance Redress Committee
PMCC	Project Management Control and Commercial
PPE	Personal Protective Equipment
PPT	Parts per Thousand
PSMP	Power System Master Plan
REA	Rapid Environmental Assessment
SPM	Suspended Particulate Matter
SPS	Safeguard Policy Statement
SRF	Sundarbans Reserve Forest
SSWS	Sundarbans South Wildlife Sanctuary
STD	Sexually Transmitted Disease
STPP	Super Thermal Power Project
STI	Sexually Transmitted Infection
TB	Tuberculosis
UNESCO	United Nations Educational, Scientific and Cultural Organization
WBG	World Bank Group
WHS	World Heritage Site

1. Introduction

1.1 Background

Based on present and future power demand of Bangladesh, the Power System Master Plan (PSMP), 2010 has recommended diversification of fuel for power plants with coal as most suitable alternative. Based on the PSMP, 2016 the projected peak demand of electricity is about 15,000 MW in 2021 and about 30,000 MW in 2031. It has also stressed the need of diversification of fuel. In accordance to PSMP a Coal Sourcing, Transportation and Handling study for Khulna, Chittagong and Maheshkhali was carried out by BPDB in 2011.

The Government of Bangladesh and that of India represented by BPDB and NTPC respectively have formed a joint venture company known as “Bangladesh-India Friendship Power Company Limited (BIFPCL)” to build and operate 2X660 MW Maitree Super Thermal Power in Rampal, Khulna.

The power plant site is about 14 km away from the nearest tip of the Sundarbans. Coal for the power plant will be transported through Mongla Port’s designated route. The Department of Environment (DoE) has issued approved Terms of Reference (ToR) for Environmental Impact Assessment (EIA) study for Coal Transportation from Fairway Buoy to the plant jetty.

Accordingly, BIFPCL has entrusted CEGIS to conduct EIA study and develop study report for submission to DoE for necessary clearance under a contract signed on dated 31st January 2016.

The aim of the EIA study is to propose an environment friendly and socially benign navigation route for transportation of coal from Fairway Buoy to plant site jetty including environment friendly transhipment activities.

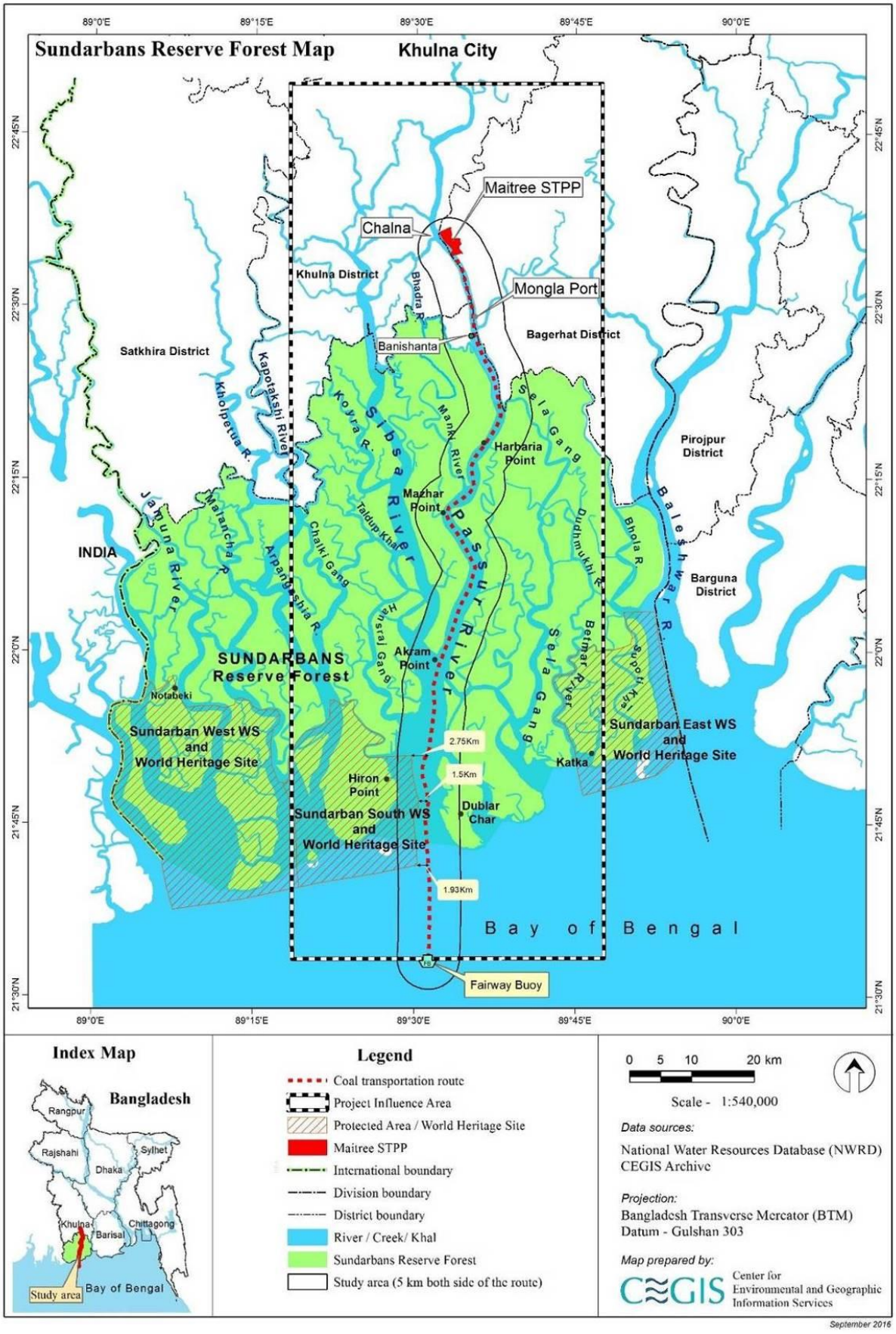
Depending on the weather condition, coal will be transported up to the transshipment points at Fairway Buoy, Akram Point and Mazhar Point (Harbaria) on the Passur River by mother vessel from sourced countries and then to the power plant jetty by lighterage (smaller barges).

For the collection of primary data, numbers of site visit were made, several institutions were consulted, desk study to analyze secondary information, and formal and informal consultations with various stakeholders were conducted to obtain institutional insights, data and information for assessing the possible impacts and risks of coal transportation. Following figure shows the Passur River system and potential Coal Transportation Route.

1.2 Project Justification

The project is an integral part of the Maitree Power Plant. The rationale of the study has both regulatory and technical aspects. The regulatory aspect includes the legal obligations for Conducting EIA Study of Coal Transportation with the compliance of condition # 53 of power plant EIA study approval letter which states that “A separate EIA/morphological study shall have to be conducted for coal transportation and river dredging to develop sound EMP towards conservation of ecosystem and biodiversity.” The technical aspect of the study includes the maintenance of year-round uninterrupted coal supply to the Plant and assurance of environment friendly and cost effective transportation of coal considering the Sundarbans Reserve Forest (SRF) and World Heritage Site (WHS).

This study has identified important environmental components related to coal transportation and evaluated potential environmental impacts, risks and cumulative impacts considering other developmental projects and measures to address these impacts, risks and cumulative impacts.



Passur River system & Potential Coal Transportation Route

The study has also suggested an environmental management plan (EMP) including mitigation measures for potential adverse impacts, conservation of ecosystem and biodiversity, management of risk due to coal transportation to facilitate the planning and designing of the proposed Project in a more environment friendly manner.

1.3 Project Category and Regulatory Requirement

In regard to the regulatory requirements for the proposed coal transportation project, the notable driving regulations are the ECA, (1995) and ECR, (1997) which outline the regulatory mechanism to protect the environment in Bangladesh. In addition, there are also key regulatory frameworks relevant to the project which includes national regulations and also international treaties and conventions applicable for the project. It may be noted that the proposed coal transportation project EIA study is initiated as a compliance requirement under 53rd clause of EIA study approval letter by DoE.

1.4 Objectives and Scope of the Study

The overall objective of the study is to carry-out an EIA of the Coal Transportation to comply with the requirements of the Government of Bangladesh (GoB). With the specific objectives being: (i) Review of earlier reports; (ii) Preparation of an environmental baseline; (iii) Identifying environmental and other regulatory requirements of DoE, FD, DoF, BIWTA, Mongla Port Authority, Navy, Coast Guard and other relevant organization within Bangladesh and etc.; (iv) Assessing weather, sea conditions and other factors related to coal transportation; (v) Assessing potential environmental and social impacts of the proposed project; and (vi) Preparing an EIA Report, including EMP and mitigation measures for the safe transport of coal from the transshipment point to the plant jetty.

The focus of the study also includes stakeholder engagement by identifying and addressing key issues with an opportunity for participation of all parties including subject matter specialists of the relevant area.

2. Policy, Legal and Administrative Framework

2.1 Requirement for Environmental Clearance Certificate

This project falls within “Red Category” as per DoE project categorization.

2.2 Key National and International Regulations

Key national and International regulations in regard to Ecological Critical Area (ECA) and heritage include ECA, 1995 (including all amendments), Wild life Act, 2012, Forest Act, 1927, The Protection and Conservation of Fish Act, 1950 etc. The ECA, 1995 restricted any industrial establishment causing pollution of soil, water, air quality and noise level within ECA jurisdiction. In addition, Wildlife Act-2012 restricted any establishment or industrial activities within the heritage. Moreover, this Act, also stipulated that no person, institution or company shall establish or operate any industrial factory or brick-field within 2 (two) kilometers from the boundary of a sanctuary. Apart from national regulations, the International conventions/treaties (such as UNESCO heritage, 1972, Convention on Wetlands of International Importance "Ramsar” 1971, Convention on the Conservation of Migratory species of wild Animals, 1979, Convention on Biological Diversity, 1992, IMO conventions etc.) which are applicable for this proposed project.

The proposed coal transportation project will follow the MPA designated maritime route which at places through ECA area and passes 1.5-2.75 km away from the World Heritage Site (WHS). So, utmost care was taken during preparation of this EIA. It may be noted that all applicable national regulations and International conventions/Treaties including guidelines of international financial agencies as appropriate are described in details under chapter-2 of this document.

2.3 World Bank's Environmental Safeguard Policies

The World Bank requires environmental screening and classification for all investment projects (including ones financed by Trust Funds, Project Preparation Facilities and Guarantees) proposed for Bank financing, to help ensure that they are environmentally and socially sound and sustainable. Screening and classification take into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, Indigenous Peoples); cultural property; and trans-boundary and global environmental aspects.

2.4 ADB Safeguard Policies

The Asian Development Bank’s policies state that all investments are subject to categorization to determine environmental assessment (EA) requirements. A project is therefore, categorized in to one of the three environmental categories (A, B or C) to determine the level of environmental assessment. The process of determining a project’s environment category is to prepare a Rapid Environmental Assessment (REA) screening checklist, taking into account the type, size, and location of the proposed project. A project is classified as one of the four environmental categories (A, B, C, or FI). SPS 2009 comprises three key safeguard areas: environment, involuntary resettlement, and indigenous people; and aims to avoid adverse project impacts to both the environment and the affected people; minimize, mitigate and/or compensate for adverse project impacts; and help Borrowers to strengthen their safeguard systems and to develop their capacity in managing the environmental and social risks.

2.5 Equator Principles of Financial Institutions

The Equator Principles (EP) provide a framework to guide financial institutions to address potential environmental and social risks when providing project finance loans or project finance advisory services. The Principles are as follows: Principle 1: Review and categorization, Principle 2: Environmental and social assessment, Principle 3: Applicable environmental and social standards, Principle 4: Environmental and social management system and action plan, Principle 5: Stakeholder engagement, Principle 6: Grievance mechanisms, Principle 7: Independent reviews, Principle 8: Covenants, Principle 9: Independent monitoring and reporting, and Principle 10: Reporting and transparency.

2.6 IFC Safeguard Policies

For accessing funds under this institution for the project, the IFC safeguard policies must be followed. Eight Performance Standards, which clients must cover, include: 1) Assessment and Management of Environmental and Social Risks and impacts; 2) Labor and Working Conditions ;3) Resource Efficiency and Pollution Prevention; 4) Community Health, Safety, and Security; 5) Land Acquisition and Involuntary Resettlement; 6) Biodiversity Conservation and Sustainable Management of Living Natural Resources; 7) Indigenous Peoples; and 8) Cultural Heritage.

3. Project Data Sheet

3.1 Project Location

The 1,320 MW Maitree coal fired Power plant will be set-up in RampalUpazila of Bagherhat district under Khulna division, Bangladesh. Coal for the Power plant will be imported from overseas and depending on weather and seasonal conditions, will be transported by mother vessel up to the transshipment points at Mongla Port's Fairway Buoy, Akram Point and Mazhar Point or other suitable place designated by the MPA. Coal will be transported by the covered class vessel, transshipped by environment friendly transhipper from the mother vessel to lighterage vessel and conveyed to the covered coal storage through covered conveyor belt from the power plant jetty.

3.2 Study/Project Influence Area

The coal transportation route is spreaded over both Bagerhat and Khulna districts and in Mongla and RampalUpazila of Bagerhat and Dacope and Batiaghata Upazila of Khulna districts in the southern part of Bangladesh. Also, the transportation route, which is also the MPA's designated route passes through the Sundarbans. The study/project influence area will include the following: (i) The Passur River, the designated route of Mongla Port from Fairway Buoy to power plant jetty (a total distance of 115 km). A total of 140 km length (extending 25 km radius from the stack of the plant) and with a width of 50 km along the Passur River. (ii) The land resources affected by construction activities related to the plant jetty and coal stackyard at Sapmari village of Katakhali Mouza.

3.3 Project Components and Activities

The project can be divided into five major components: (i) Mother Vessel; (ii) Transhipper; (iii) Covered Lighterage/Smaller Barge; (iv) Unloading at Plant Site Jetty, and (v) Coal and Limestone Transfer to Coal and Limestone Stack Yards. The associated components of the project are the maintenance of the navigability of the route for which MPA is responsible in its jurisdiction. The expected major activities of the project include: (i) Construction of the power plant jetty with necessary infrastructures and equipment; (ii) Preparation of coal stackyard complying with design requirements; (iii) Negotiations with coal exporter, shipping companies, and Transshipper; (iv) Transporting coal by mother vessel from load port to the transshipment points; (v) Transshipment of coal from mother vessel to lighterage; (vi) Transportation of coal by lighter vessel to plant jetty through designated route complying with Mongla Port and applicable IMO requirements; (vii) Unloading coal from smaller vessel to coal stackyard; and (viii) Maintenance dredging of the route as a continuous basis to keep the transportation route fully operational.

4. Project Description

4.1 Objectives of the Study

The main objective of the Project is to transport maximum 4.7 million metric tons of coal per annum along with limestone from overseas via Fairway Buoy to the Maitree Coal Fired Power Plant jetty, located in Rampal, Bagerhat. The Project also involves transhipment of coal from mother vessel to lighterage vessel and unloading coal at Plant jetty and conveying coal to the covered coal stackyard at plant site using covered conveyor belt.

The study also aims to explore a safe, environmentally friendly and economically viable navigation route for transshipment of coal from the Fairway Buoy to plant jetty. Thus, the significance of the project is very high.

4.2 Project Details

The project includes the waterway from Fairway Buoy to the Maitree plant jetty which is the Mongla Port's designated and established route along the Passur River (Figure 4-1 in Vol. II).

The most preferred options for coal transportation from load port to destination (power plant jetty) are as follows:

Mother vessel from load port (coal exporting country) to any designated anchorage area of the MPA like Fairway Buoy or Akram Point or Mazhar Point (Harbaria)[2] depending on the weather condition.

Transhipment of coal from mother vessel to covered class lighter vessel by environment friendly transshipper and transport to the berth/jetty at power plant site. Unloading of coal will be done to the covered coal stackyard by covered conveyor belt.

Construction of the jetty or coal terminal at project site is considered more effective in saving time and cost for coal transportation than berthing at the Mongla Port Jetty and transporting by conveyor belt to the Project Site.

Suitable mooring arrangements and fenders shall be provided on the jetty. Unloading system considers two rail mounted grab type unloader with average capacity of about 900t/h each. For the stability of the jetty, shore line facilities and revetment will be constructed.

Lighterage vessel of about 10,000 DWT with the draft of 5-5.5m will be engaged for transhipment of coal from mother vessel to the plant jetty. Flat bottom shallow draft type barges will be engaged for coal transportation through inland waterways to the plant jetty from the anchorage point of mother vessel. To ensure uninterrupted operations of power plant, the jetty will be operational and fully capable of handling vessels/ barges of different sizes at a time. Various bulk materials like coal, lime stone, fly ash, bottom ash and gypsum will be handled from this berth. The infrastructure required for handling of coal at jetty will include covered conveyor belt, unloader, hopper, crane, and other mobile equipment.

[2] Three transshipment points were recommended by the coal logistic study. During the EIA study it was decided that two transshipment points are sufficient for the project, to minimize activities within the Sundarbans.

The plant site jetty will have berthing facilities including but not limited to the following:

- Bunkering facilities; fresh water supply
- Mooring bollards; fenders; bits and rings for securing cables; firefighting system etc.

4.3 Land Requirement

About 6-7 acres of land will be required for the construction of coal terminal/jetty facilities. About 75.0 acres will be required for coal stackyards. This land has already been acquired with due process through DC office.

4.4 Vessels, Carriers and Transhipment

Vessels: The project has considered two types of mother vessels, Capesize and Handysize. Capesize will be used for transporting coal with a load of 80,000 tons or more from load port to Mongla Port Fairway Buoy and Handysize initially with a load of 25,000-30,000 tons from load port to Mazhar Point.

Tran-shipment: will be carried out by a transhipper (floating transfer station) or by direct unloading preventing coal spillage/ overflow into water and dust emission in the surrounding environment. The trans-shipper will be attached with the house boat or self-accommodation for the workers. Waste of the trans-shipper will be disposed of at the port facilities maintaining applicable IMO and Environmental Rules and Regulations. Coal spillage and pollution will be prevented by the appropriate devices/equipment design in a floating transfer station (trans-shipper).

4.5 Coal Handling System at Plant Jetty

The Plant site Jetty will be fixed and cannot be shifted in the future. Thus, it will be designed such that it can handle multiple vessels of coal, lime stone, gypsum, etc. at given time and have additional space available for handling of smaller barges for fly/bottom ash, gypsum and supply of fuel and water to barges. Jetty construction along with others (Coal Stack-Yrard, etc.) was considered in the EIA study of the 2x660 MW Maitree Super Thermal Power Project, which was approved by DoE. The Construction of Jetty already been awarded to EPC contractor under EPC contract for Main Plant. The infrastructure required for handling coal at jetty will include conveyor, hopper, crane, and other mobile equipment. A fully mechanized coal handling system at Power Plant Jetty will be established. The following major equipments are proposed to be deployed for the coal unloading:

- Rail mounted grab type or continuous ship unloader at berths.
- Covered conveyor belt for transport of coal from the berths.
- Rail mounted stackers/ re-claimers in the covered coal stackyard.

4.6 Associated Component (Navigability of MPA Route)

The MPA is responsible for maintaining the navigability of the maritime channel under its jurisdiction. For improving the navigability of the route, it has a dredging plan in the following sections: (i) At Outer bar (Length 38 km, Channel width- 200m, Depth- 8.5 m CD and (ii) Base Creek to Mongla Port (Length-10 km, Channel width-200m, Depth-5.5m CD) for maitaining the navigability of the Mongla Port.

The MPA will also undertake the dredging activities from Mongla Port to Project site (Length-8 km, Channel width-200m, Depth-5.5m CD) for coal transportation of Maitree STPP. All dredging activities will be administered by the Mongla Port Authority to keep the route operational with the required draft. The MPA has also carried out EIA studies for dredging by IWM and duly approved by the DoE.

5. Analysis of Alternatives

5.1 Analysis of Alternative Routes

Three routes were studied to assess for coal transportation from Fairway Buoy to the plant jetty. These are: (1) Passur Channel: Fairway Buoy to Power Plant Jetty via Hiron Point-Akram Point-Harbaria-Mongla (Option-1); (2) Sibsa River: Fairway Buoy to Power Plant Jetty via Hiron Point-Akram Point-Chalna and through Sibsa-Dhaki-Chunkuri (Option-2); and (3) Mongla-Ghasiakhali Canal (MG Canal): Fairway Buoy to Power Plant Jetty via Mongla Port through Baleswar-Ghasiakhali- Mongla Nulla-Passur (Option-3). The Passur Channel is the designated maritime route of the MPA having routine bathymetry survey report and maintaining the draft, signaling system of the channel to keep the port operational. Travel length (78 NM) of MPA designated route is relatively less with negligible bents and eroding tendency having suitable draft for the vessel of required capacity (about 10,000 dwt) compared to other options.

5.2 Analysis of Anchorage Points

There three possible anchorage points on this route, such as Fairway Buoy, Akram Point and Mazhar Point. A little additional investment may be needed to keep the route operational, relatively less movement of lighterage vessel and is more adaptable in terms of habitat stability. For mooring large vessels in the Passur Channel, there are two potential anchorage points, i.e., Akram Point and Mazhar Point. According to MPA, similar draft and almost similar size vessels will be able to anchor both in the Akram Point and in the Mazhar Point if restriction at Outer bar is removed. Considering these issues, EIA study envisages that Mazhar Point (Harbaria) is more suitable than the Akram Point because it is closer to the Project site jetty and more distant from the World Heritage Site (WHS). Moreover, weather condition at Mazhar Point is more calm and quiet than that of Akram Point.

6. Detail Description of the Study Area

The total land of the study area is 320,500 acres. The major land uses are agricultural land, permanent fallow land, forest, industrial area, intertidal area, road, rural settlement with homestead vegetation, built-up area and water bodies. The area is mostly surrounded by mangrove forest except the upper part which is surrounded by agricultural land and other land uses. The land uses percentages of the study area are as follows: (i) water Bodies 48.3%, (ii) followed by Mangrove Reserve Forest 36.0%, (iii) agricultural land including permanent and seasonal Shrimp Gher 11.8% and (iv) the rural settlement with homestead vegetation 2.34%.

7. Environmental and Social Baseline

The baseline condition of the study area has been delineated in respect of physical environment (e.g., including meteorological, hydrological, morphological components and processes), land resources (e.g., including land use pattern and soil quality), biological environment (e.g., including flora, fauna, fisheries resources and other ecosystems goods and services), and socio-economic condition (e.g., including livelihood pattern, historical, cultural and archaeological sites, economic status, etc.).

7.1 Climate and Meteorology

The selected coal transportation route lies in two climatic sub-regions of the country, e.g., South-central climatic zone, characterized by severe hailstorms, nor'westers and cyclones; and South-eastern climatic zone, characterized by a small range of temperature, heavy rainfall during summer and fog in winter. The study area falls under tropical climate with distinct monsoon season which influences all other climatic parameters. Monthly maximum temperature varies from 30.4°C to 40.4°C, and April and May are the warmest months and minimum temperature varies within a range of 8°C to 23.7°C. Annual average rainfall is about 357 mm/yr during dry season and about 1563 mm/yr during monsoon season. Monthly average sunshine hour varies from 4:22 to 8:68 hour/day and monthly maximum of average sunshine hour occurred in February i.e. 9:97 hour/day. Sunshine hour reduces during monsoon period. Wind direction is predominantly from southeast direction April to October and south east to north west and from November to March it is north-west to south east.

7.2 Ambient Air Quality

The air quality monitoring data at different locations considered the measurement of parameters like SOx, NOx, SPM, PM10, PM2.5, CO and O3. No exceedances were observed for any of the parameters at any of 11 locations except SPM at Khanjahan Ali Bridge and Project area. Exceedance of two-year (2014 and 2015) average SPM is observed in the Khanjahan Ali Bridge and Project area during pre-monsoon, monsoon and winter season. At the bridge point prevalence of SPM is more because of vehicle movement while in the Project are it comes from construction machinery, generator, land development, etc.

7.3 Acoustic Environment

The results of noise level measurements at different locations were as follows: The results of noise level measurements at different locations were as follows: (i) Chalna, Dacope- no exceedance of noise levels was observed throughout the year; (ii) North West Corner of the Project Area- no exceedance of noise levels was observed throughout the year; (iii) Chunkuri-2 Bajua- exceedance of noise levels was observed in 1st Quarter (July, 2014), 57.76 DB(A) where standard is 55 dB(A); (iv) SW Corner of the Project Site- exceedances of noise levels were observed in 8th Quarter (Jan, 2016), 60.44 dB(A) and 10th Quarter (July, 2016), 65.37 dB(A) where standard is 55 dB(A); (v) Proposed Township Area at Project Site- exceedance of noise levels was observed in 10th Quarter (July, 2016), 55.79 dB(A) where standard is 55 dB(A); (vi) Barni, Gaurambha- no exceedance of noise levels was observed throughout the year; (vii) Khan Jahan Ali Bridge, Khulna- exceedances of noise levels were observed in 1stQuarter (Mar, 2014), 71.7 dB(A) and 5th Quarter (Apr, 2015), 73.45 dB(A) where standard is 70 dB(A); (viii) Mongla Port area- no exceedance of noise levels was observed throughout

the year; (ix) Harbaria Point, the Sundarbans- no exceedance of noise levels was observed throughout the year; (x) Akram Point, the Sundarbans- exceedance of noise levels was observed in 5th Quarter (Apr, 2015), 54.86 dB(A) where standard is 50 dB(A); and (xi)Hiron Point- exceedance of noise level was observed in 2nd Quarter, 51.29 dB(A) (July, 2014) where standard is 50 dB(A).

7.4 Water Resources and Hydrography

River System: Three rivers connect to the coal transportation route: The Passur River, Sibsa River and the Maidara- Ichamati River. The Maidara-Icchamati river system serves as a tidal creek on the left bank of the Passur River and supporting the parcels of mangrove vegetation along the banks. The Coal transportation route runs through the Passur River, which is mainly a tidal river, and receives fresh water mainly during the monsoon through the Gorai-Madhumati system. The river is flowing on the moribund delta and has a wide eroding estuary.

Tidal Fluctuations: The Passur River rises from April to August and then recedes up to January. On average, the tidal variation of Hiron Point is about 2 m. Daily minimum water level increases by 0.5 m during the monsoon. The water level inside the coastal river increases through a number of causes, such as intrusion of sea water, backwater effects and increasing the upstream flow. Climate change has also the significant impact on the water level.

River Draft: No drastic ripple in the draft but the analysis indicates that from Mongla Port to the project site, 0-4 km and 8.7 – 12.3 km stretches have less draft compared to the required draft (minimum 5.5m) for navigability of the lighterage vessel of 10,000 dwt. In existing condition, Akram point area has drafts of 15 m to 20 m but there are some shoals in the outer bar that restricts the vessel having draft over 8 m. If the restriction at outer bar be removed mother vessel (about 45,000 tons) would able to proceed up to Mazhar Point which is 30 NM from the Plant Jetty. Erosion and accretion rates are almost equal in both banks of the Passur Channel.

Water Salinity: The salinity at Hiron Point varies from 2 ppt (October, 2014) to 25 ppt (April, 2015).

Wave Height/Action: The wave at the Bay of Bengal has a significant wave height (Hs), equal to three meters, a wave period of 8.8 seconds and a wavelength of 125m IWM (2005). Waves propagate over the Outer bar and slowly reduce in height when progressing over the outer Bar towards the Passur River. Approximately 23 km from the entrance to the Bay of Bengal, the wave height is reduced to less than one meter (SMEC, 2006a). The wave height (Hs) in the Passur River is 0.5 m.

7.5 Maritime Vessel Traffic

In the year 2014-15, the number of ships calling at Port was 416 and about 406 vessels sailed from the Mongla Port, compared to calling 345 ships in the previous year (growth is about 20%). About 5,000 Indo-Bangla IWT protocol vessel and 5,179 lighter vessels also ply through the Passur Channel in the FY 2014-15. Mongla Port may emerge in competition with the major maritime Port of Chittagong, 15% traffic growth may continue over the period up to 2030. It is estimated that further, growth from 2030-31 to 2033-34 will be 9%, from 2034-35 to 2036-37 it will be 6% and from 2037-38 to 2039-40 growth will be 4%. According to the projection, the MPA has plan to develop facilities to anchor more than 600 mother vessels per year by 2020 and more than 1000 mother vessels per year by 2030.

7.6 Biological Resources

Areas of Conservation Significance: The route traverses tidal ecosystems and two BEZs, such as 7a (The Sundarbans) and 10 (Saline Tidal Floodplains). The area of conservation significance along the route includes SRF, WHS, ECA, SSWS.

The Sundarbans Reserve Forest (SRF): The SRF is grazed by iconic and endangered species, such as, Bengal tiger (*Pantheratigristigris*), critically endangered; Ganges river dolphin (*Platanistagangetica*), vulnerable; Irrawaddy dolphin (*Orcaellabrevirostris*), near threatened; finless porpoise (*Neophocaenaphocaenoides*), near threatened; small clawed otter (*Aonyxcinerea*), endangered; smooth coated otter (*Lutrogaleperspicillata*), critically endangered; estuarine crocodile (*Crocodylusporosus*), endangered; masked fin foot (*Heliopaispersonatus*), endangred; fishing cat (*Prionailurusviverrinus*), Pallas' fishing eagle (*Haliaeetusleucoryphus*), endangered, river terrapin (*Batagurbaska*), critically endangered; and white-rumped vulture (*Gyps bengalensis*), critically endangered; and lesser adjutant (*Leptoptilosjavanicus*), vulnerable as per IUCN Red List, 2015. There are many other threatened and endangered species in the SRF, including two amphibian, 14 reptile, 25 bird and five mammal species. Some of the most iconic species are on the verge of extinction in the SRF.

Dolphin Sanctuaries: Two Dolphin sanctuaries are located in the Dhangmari Gang and Chandpai-Sela Gang which are tributaries of the Passur Channel. The recorded number of individuals in the Dhangmari Gang were 164 (observation 5 dolphins/km/hr) and in the Chandpai-Sela Gang were 80 (2 dolphins/km/hr).

World Heritage Site: Three wildlife sanctuaries are located in the Sundarbans, the closest to the MPA's route, which is also the coal transportation route passes 1.5 km to 2.75 km away at places from the outer boundary of the WHS at the Sundarbans South Wildlife Sanctuary.

Ecologically Critical Area: The Coal transportation route will cross the ECA of the Sundarbans, a 10 km buffer zone that forms the outer boundary of the SRF. In addition eastern bank of the Passur River is greatly used for industrial development. Floral pattern of ECA at countryside is now mixed mangrove vegetation with planted homestead flora.

Fisheries Resources: There are about 222 species of fin fish, about 100 species of shellfish, about 15 species of shrimp, about 8 species prawn, 1 species lobster, about 5 species crab, about 3 species of snail and about 22 species mussels in the study area. The fish habitats are in the range of inland fresh water to marine, moderate to rich in species diversity. However, the fish composition does not show dominance of any particular species. Fish production of the Sundarbans habitats is about 18,400 tons, which has the increasing trend adding on an average about 667 tons fish per year.

Agriculture Resources: The major cropping pattern is Fallow- LT. Aman-Fallow which covers about 48.1% of the net cultivable area (NCA). The total crop production is about 85,000 tons of which about 80% comes from non-rice crops and 20% comes from rice crop. The single, double and triple cropped area is about 56%, 36% and 8% of the NCA respectively. The cropping intensity of the study area is about 151%, which is much below the national average of 191%.

7.7 Socio-Economic Environment

Administrative Boundaries: The study area spreads over a number of administrative units, such as Mongla and RampalUpazila of district, and Batiaghata, Dacope and Koyraupazilas of Khulna district. There are 20 unions and 2 paurashavas in the mentioned 6 Upazilas.

Population and Household: There are 8,626 households consisting of 36,104 populations in the study area which includes 18,409 (51%) males and 17,698 females (49%) in 2016. The household size is 4.2. The average male-female ratio is 104 which is higher than the national figure of 100.3 (BBS, 2011). The density of population on an average is 1015 persons per square kilometer which is equivalent to the national population density rate (1015). There are no ethnic minorities in the area. The inhabitants belong to three major religious groups in order of, i.e., the Muslim, the Hindu and the Christian.

Diseases: The major common diseases of the area are waterborne diseases, coldness, common fever, respiratory and skin diseases. There is no statistics of HIV/AIDS but has the susceptibility as there is a Semen Haven at Baniashanta in the study area.

Poverty: About 28% households are multidimensional poor, where about 43% of the population is living in the poor households. About 85% of poor people are deprived of any indicator.

8. Hazard and Risk Identification and Management

Potential impacts due to the project have been scaled and prioritized based on the magnitude of those potential impacts and the likelihood of them occurring. Based on the impact consequence and likelihood analysis, a risk matrix was created (Following table shows the risk matrix for the potential impacts and their likelihood for occurrence).

Table: Matrix of impact significance

Magnitude of Risk/ Impact	Sensitivity of Receptors			
	Very High (4)	High (3)	Medium (2)	Low (1)
Major (4)	Critical (16)	Major (12)	Moderate (8)	Minor(4)
Moderate (3)	Major (12)	Major (9)	Moderate (6)	Minimal (3)
Minor (2)	Moderate (8)	Moderate (6)	Minor (4)	Minimal (2)
Minimal (1)	Minor (4)	Minimal (3)	Minimal (2)	Minimal (1)

Coal transportation related major hazards and associated risks by activities have been identified. The major hazards associated with the movement of mother and lighterage vessels include spontaneous combustion of coal, generation of leachate responsible for corrosion of ship walls, hitting ground of or getting stuck with underwater roots/vegetation/mud/sand and colliding with other ships/barges, dispersion of coal dust and coal spillage on surrounding environment, etc. For berthing and trans-shipment, the major hazards are spontaneous combustion of coal, coal spillage, exposure of coal dust the workers and accumulation of oil/oily effluent, etc. For transshipping, the major hazards are contamination of water by food / sewage / household waste, etc. and for coal unloading at jetty, the hazards are dispersion of coal dust from stackyard, spontaneous combustion of coal, etc.

During sailing of mother and lighterage vessel, it should follow IMSBC Code in managing coal and leachate, consulting ship's agent before opening cargo hatches or entering into the cargo space if concentration of methane, CO or temperature are suspected and checking of any seal leakage of the cargo space and re-seal if required. Efficient usage of navigation aids, regular maintenance of vessels, usage of compartmentalized coal carrying barges for avoiding accidental events. Utilize comprehensive water-based dust suppression system, usage of grabs in floating transfer station (FTS) equipped with dust cover plates to prevent fugitive dusting during barge transit, avoid barge operation in such a high wind speed as suggested in the IMO rules and regulations, maintenance of facilities and regular cleaning.

In addition to above measures, during berthing and transshipment ensure adequate port reception facilities for the collection of dry residues and/or wash water, dust suppressants in combination of covered dumping shed and conveyors, ongoing site cleaning and system maintenance, misting and sprinkling at coal transfer and handling areas, usage of personal protective equipment (PPE) for avoiding inhalation of dust by the workers, identification of substances harmful to the marine environment (HME) based on IMO convention. Coal transportation should follow existing navigational route of MPA and BIWTA and strictly follow MARPOL Convention in discharging of bilge, ballast and oily water, waste and wastewater.

During unloading of coal at jetty to conveyer, usage of water/mist system to spray on coal during the unloading, minimize drop heights and curved chutes at transfer points, usage of enclosed conveyor system equipped with water spraying nozzles mechanical profiling of coal for limiting exposure to air flow, implementation of fire safety plan including fire resistant hydraulic fluids and belting, prohibiting of open flame/ignition source/hot work.

9. Environmental Impacts and Mitigation Measures

Environmental and social impacts were identified on the basis of the review of coal logistics study through a Consultant by BIFPCL, field visit, environmental quality baseline monitoring, ecological and fisheries surveys, stakeholder consultations, air quality dispersion modeling using CALPUFF, and noise modeling using SoundPlan etc. The significance of potential impacts was assessed using the following criteria and methodology:

Impact Magnitude: Potential project impacts have been categorized as major, moderate, minor or nominal based on consideration of factors such as: duration; spatial extent; reversibility; likelihood; and Compliance to Standards before Mitigation Measures.

Sensitivity of Receptor: Receptor sensitivity has been determined based on review of the population and presence of features on the site or the surrounding area.

Anticipated Impacts and Risks:

Key Major anticipated impacts and risks of the Project components are summarized below:

Navigational Impacts:

For coal transportation all kinds of navigational impacts such as selection of improper route for coal transportation, coal combustion due to spontaneous potentiality; Spillage of coal and oil due to collision of ship; spillage of Coal/oil due to sinking of ship, dusting during transportation, release of toxic chemicals, unnecessary whistling and beaming of light, etc.; and their motivational measure have been prescribed in MPA rules and IMO convention.

Underwater Noise and Vibration:

Underwater noise and vibration generated during construction of jetty may disrupt fish and dolphins and above water noise and vibration can create nuisance to local community, disturb birds, etc. Sudden and periodic noises may affect animals behaviorally and physiologically.

Increased Lighting:

Lighting from ships/barges and etc. may affect the surrounding wildlife, including resident and migratory birds, the Masked Fin foot, Spoon Billed Sandpiper, White Romped Vulture, Slender-billed Vulture, White-headed Duck, and Greater Spotted Eagle are considered to be endangered.

Increased Maritime Traffic:

Enhanced maritime traffic may pose a disturbance to the dolphins, fish, and crustacean and the ecology of the project site such as: vessels collide with freshwater dolphins resulting in injuries.

Spillage and Dusting:

During unloading and loading coal from the mother vessel to smaller vessel and unloading at plant site jetty will affect riverbed, aquatic species, water quality and benthos, vegetation in the Sundarbans, and operation staffs. It is suggested to follow environmentally sound transshipment procedures such as specific technology to minimize dust emission, covered lighterage and conveyors, MPA guidelines and IMO convention for the mitigation. In addition

to this, anchorage points have been selected avoiding the World Heritage Site (The Sundarbans) and minimal disturbance to the Sundarbans ecosystem. Two anchorage points would be used (based on present knowledge); one at the Fairway Buoy for 4-5 months from November to March and another at the Mazhar Point for rest of the year. Both of the anchorage points are designated by the MPA.

Pollution:

Wastes from ships may degrade habitats and reduce fish and crustacean production and recruitment. Countering such pollution it is suggested to ensure adequate port reception facilities, such as a scientifically developed pit for collection of dry residues and/or the wash and bilge water that contains residues ofthe contaminants, which are harmful to the marine environment (HME).

Structural or Mechanical failure of coal vessel may lead to sinking, spilling oil and fuel into the river. For getting rid of such impact, avoid barge operation in such a high wind speed as suggested in the IMO rules and regulations, transport coal should follow IMSBC Code in Cargo B, Spill Response Containment plan to be implemented in case of accident.

Risk of Collision:

There is a risk of collision and grounding of vessel. For avoiding such effect, the route should be equipped with proper and adequate navigational aids, appropriate equipment to be selected in accordance with specific weather conditions and vessel load characteristics, ensuring regular tug operations, piloting of vessel, etc.

Spontaneous Combustion of Coal: Risk of fire from spontaneous combustion of coal during conveyor transport and storage, which could be avoided by the implementation of Fire Safety Plan and train all employees, fire resistant hydraulic fluids and fire resistant belting should be used for the conveyor system.

HIV/AIDS Risk:

There is a risk of the likelihood of spread of HIV/AIDS, STD/STI and TB infection and diseases through interaction between migrant workers and community women during project construction.

Impact on Livelihoods:

An increase in shipping may affect fishing activities, on which livelihood of local communities depend on. On the other hand, disturbance to catching of shrimp post larvae and mother fish in turn would be beneficial for the wild fisheries and dependent livelihoods.

Positive Impacts: There are positive impacts, which include increase generation of employment and increased economic activities by and large during construction and operation phases. Revenue earning of the MPA will also be increased substantially.

Noise Level:

Noise generated from Vessels and Transhipper will negatively affect surrounding environment and wildlife, including resident and migratory birds if not used in controlled mannar. For Noise modeling, two impact scenarios have been developed based on the changing position of transshipment point and vessel types; (i) Impact Scenario I –trans-shipper will unload coal from Capsize vessels to the lighterage at Fairway buoy; and (ii) Impact Scenario ll –trans-shipper will unload coal from Handysize mother vessels to the lighterage at Majhar Point which is slightly downstream from Harbaria. For both scenarios the modeling shows that the noise levels will be well below the limit of the Noise Control Rules (2006) for both day and night standards.

Ambient Air Quality:

CALPUFF was used to predict the effects of criteria pollutants from major emission sources in the Project area for criteria pollutants SO_2, NOx, CO, $PM_{2.5}$ and PM_{10}. The modeling analysis predicts and shows:

For NOx, both baseline and Project case are within the standards and there is no exceedance of standards due to the implementation of the project.

The CO concentration is very small, a fraction of the standards, therefore is of no concern and there is a negligible increase in maximum CO concentration from baseline to project case.

$PM_{2.5}$ concentrations for baseline and project case are well within the National Bangladesh standards. There is a negligible increase in $PM_{2.5}$ concentration from baseline to project case (due to implementation of Maitree STPP). The maximum predicted $PM_{2.5}$ concentration occurs near Mongla Port, close to the Cement Factories, where baseline itself is high and predicted concentration does meet WBG interim target. Interim targets[3]are provided for developing countries in recognition of the need for a staged approach to achieving the recommended guidelines.

PM10 concentrations for baseline and project case are well within the National Bangladesh standards. Similar to PM2.5, there is a negligible increase in PM10 concentration from baseline to project case (due to implementation of Maitree STPP). The maximum predicted PM10 concentration occurs near Mongla Port, close to the Cement Factories, where baseline itself is high and predicted concentration does meet WBG interim target.

All the predicted maximum concentrations due to implementation of Maitree STPP for $PM_{2.5}$ and PM_{10} in the Sundarbans Reserve Forest Area are much below the Bangladesh National standards and WBG/IFC guidelines for 24 hours average and as well as annual averaging period.

SO_2 concentrations for baseline and project case are well within the Bangladesh National Ambient Air Quality Standards. There is a negligible increase in SO_2 concentration from baseline to project case (due to implementation of Maitree STPP). The maximum predicted SO_2 concentration occurring close to Khulna, where the brick fields are located.

[3]According to EHS Guidelines, IFC, 2007, Interim targets (IT) are provided in recognition of the need for a staged approach to achieving the recommended guidelines (G).

All the predicted maximum concentrations of SO_2 due to implementation of Maitree STPP for 24 hours and as well as annual average in the Sundarbans Reserve Forest Area are within the Bangladesh National standards and WBG/IFC Standard.

Impacts from Associated Components (Navigability):

For improving the navigability for the coal transportation would require dredging from Mongla Port to Project Site Jetty. As such a separate EIA study was conducted by the MPA for dredging and duly approved by the DoE, where details on impact and mitigation measures for dredging have been suggested in the EIA.

10. Cumulative Impacts

Cumulative Impact on Air Quality:

Including a future increase in emissions from brick fields, road and marine vessel traffic (Rampal Phase II has not been considered as it will be developed for Solar Power Plant and Orion Project is unlikely to get approval of DoE) in the emissions modeling and assessment shows:

There is an increase of about 2.16 µg/m³ in the maximum annual averaging NOx concentration from the project to cumulative case. This is due to an increase in pollution from road vehicle and marine vessel traffic. However, the values are still within the standards (Bangladesh National Standard and WB/IFC Standard).

There is a negligible increase in maximum predicted levels for 24-hr and annual averaging from the project to the cumulative case for PM2.5 and PM10 except Mongla, ChunkuriBazua and SW corner of the Project due to an increase in emissions from brick fields, road and marine vessel traffic. Similar to the project case, maximum concentrations occur near Khulna, close to the brick fields and Highway N7. The predicted maximum concentrations for $PM_{2.5}$ and PM_{10} are within the National Bangladesh standards and meet WBG interim target-1 (75 µg/m³) and interim target-1 (150 µg/m³) for 24-hr averaging, respectively.

All the predicted maximum cumulative concentrations for $PM_{2.5}$ and PM_{10} in the Sundarbans Reserve Forest Area are well below the Bangladesh National standards and WBG/IFC guidelines for 24 hours averaging and annual averaging period.

There is a negligible increase in 24-hr predicted SO_2 concentrations from the project to cumulative case except Upper Harbaria Point. The predicted maximum concentration of SO_2 for 24-hr averaging value are within the Bangladesh National standards and does meet the WBG interim target-1 (125 µg/m³).

All the predicted maximum cumulative concentrations for SO_2 in the Sundarbans Reserve Forest Area are within the Bangladesh National standards and WBG/IFC guidelines for 24 hours averaging and as well as annual averaging period.

Cumulative Impact on Biodiversity:

Increased inland water transport through the Passur River is not going to increase significantly (only three vessels in two days), hence the potential of collision and injury of dolphins may not be significant and adversely affect the aquatic biodiversity, including finfish and crustaceans. Even collision with dolphins has not been reported (discussions were held with concerned authorities, fishermen association, vessel owner association, etc.) yet with the present movement of vessels. EMP measures should be properly implemented to avoid emission of coal dust due to coal transportation through the designated route and future growth in inland water transport to ensure the habitat quality and maintain the equilibrium condition of the Sundarbans ecosystem and biodiversity.

Further EMP measures as suggested should be implemented during Power Plant operation to avoid coal dust accumulation on floral leaves (that may prevent normal physiological activities like photosynthesis and transpiration) on the Sundarbans ecosystem.

11. Environmental and Social Management Plan

A detailed Environmental Management Plan (EMP) has been suggested for feasibility and design, implementation and operation and Maintenance phases of coal transportation for the proper implementation of the project. Feasibility and design phase includes activities related to navigability of the route. Implementation phase includes site preparation and construction of plant jetty– whose impacts will be mitigated through Environmental Code of Practices and other relevant mitigation measures including construction environmental management plan, communication plan and plant jetty construction. Coal Transportation process (or operation and maintenance phase includes, (i) Mother Vessel; (ii) Trans-shipper; (iii) Smaller Barge; (iv) Unloading at Plant Jetty, and (v) Coal and Limestone transfer to Coal and Limestone Stack Yards. The Management plan has been categorized into inbuilt abatement measures and external management measures that have been described elaborately in relevant chapter. Routine monitoring of coal dust accumulation in water/sediment of the plant jetty and transhipment footprint areas and surrounding environment has been suggested.

Institutional Arrangements: BIFPCL would establish the Project Management Control and Commercial (PMCC) unit, who would in turn create an Environmental, Health and Safety Unit (EHSU). The EHSU would be responsible in supervising, facilitating and coordinating the implementation of environmental management plans including Emergency Response Plan. BIFPCL has engaged a German Engineering Consultant M/S FICHTNER as an Owner's Engineer (OE). The OE and the EPC Contractors who, in coordination with EHSU staffs, will also ensure the implementation of environmental management practices at each stage of the project activities. Apart from the internal monitoring agencies, BIFPCL would also acquire the assistance from an Independent monitoring agency (IMA) a professional organisation will carry out quarterly third party monitoring and auditing of EMP and make further modifications, if required.

Grievance Redress Mechanism:

Grievance redress is a very important part of EMP where any grievances caused by the potential impact of the project shall be addressed and prevented through the implementation of impact mitigation measures and community liaison activities. Minor issues will be resolved by the Contractor in consultation with Owner's Engineer. BIFPCL would form a grievance redress committee who would further form a local grievance redress committee (LGRC) and project grievance redress committee (PGRC). LGRC would address local level grievances, such as, mistakes related to temporary disturbance due to construction works, unauthorized disposal of solid and hazardous wastes, noise and vibration due to the use of heavy equipment, access restrictions, etc. and would work towards mitigating them. Any grievances that are not resolved at the LGRC will be forwarded to the PGRC. Most of the grievances would be resolved at LGRC within 7 days of receipt of compliant, whereas grievances forwarded to PGRC, would be resolved within two weeks of receipt of compliant.

Mitigation Plan:

The following table shows the mitigation plan, which includes various actions identified under the mitigation measures, defines responsibilities for implementation as well as supervision of each action, and also shows the timing of these actions.

Table: Mitigation Plan

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
A. FEASIBLITY AND DESIGN PHASE				
A1. The Sundarbans Ecosystem	Adverse impacts on the Sundarbans ecosystem due to improper selection of coal logistics (i.e., transportation route, and anchorage point and trans-shipper).	• Findings of alternative analysis reveal that the designated route of the Mongla Port Authority (MPA) along the Passur River is the best feasible route, which will have less environmental impacts compared to other alternatives.Other routes require significant dredging, longer distance, and smaller vessels with more traffic. • Anchorage points were selected by the MPA based on river draft and other relevant factors. The study also considers the selected anchorage points (Mazhar Point in in the Sundarbans) in view of avoidance of close-proximity of World Heritage Site and in accordance with national guidelines to entail minimal disturbance to the Sundarbans ecosystem. • EIA study has recommended to reduce transshipment points from two to one to minimize impacts in Sundarbans. • EIA study has revealed that Harbaria/Mazhar point will be used for transshipment of coal due to its present draft and closeness to the power plant jetty site. However, in cousrse of time, new or alternate transshipment point may be designated by the MPA considering draft and other factors of that time. At present, Harbaria is being used as transshipment point for Mongla Port. Additionally, Fairway Buoy will also be used during the fair weather as a transshipment point.	Coal logistics and EIA Consultant	Forest Department, MPA, EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
		• Preparation of the plans and required institutional set up for their implementation to minimize impacts in the Sundarbans. ○ Construction Environmental Action Plan (CEAP) ○ Social and Environmental Management Plan (SEMP) and ○ Emergency Response Plan (ERP) system and ○ Grievance Redressal Mechanism (GRM).		
Aquatic Species A2. Gangetic Dolphin and Threatened Irrawaddy Dolphin	Dolphins, including vulnerable Gangetic dolphin (*Platanistagangetica*) and near threatened Irrawaddy dolphin (*Orcaellabrevirostris*) can be impacted by an improper route selection.	• Route selection was finalized with the intention of avoiding dolphin sanctuary in Shela and Dangmari. • Primary survey on dolphin abundance was conducted in both Chandpai and Dangmari sanctuaries. • Research on dolphins conservation may be promoted as a part of Corporate Social Responsibility (CSR) as measures beyond compliance. • Almost for the last 60 years, ships have been sailing through the MPA's designated route. So far, no noticeable incident of death of dolphin due to collision with vessels have been reported. • Additionally, dolphin abundance has been studied and found that dolphins are mostly congregated in the tributaries of the Passur for preying facilities. Fishing nets induced casualty of dolphins is dominant factor in this area. Collision of dolphin with the vessel in the Passur Channel is rare. As the passur Channel has long been used for navigation of vessels, dolphin has been habituated with movement of vessels.	Coal logistics and EIA Consultant	Forest Department, MPA, EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
A3. Aquatic Species, including Critically endangered Batagur turtle, Leather back sea turtle and endangered small clawed otter	Aquatic species, such as the critically endangered Batagur turtle (*Batagurbaska*) lives inside the Sundarbans but travels to sandy banks crossing substantial distance (50-60 km) during breeding period (Dec-Mar).The leather back sea turtle (*Dermochelyscoriacea)* lives in the sea but comes to sandy beach during breeding. The endangered small clawed otter (*Aonyxcinerea*) generally predates in the creeks and can be impacted by an improper route selection.	• Batagurturtle is generally available in the Karamjal canal, which is inside the Sundarbans and falls on the Passur River. There is also a captive breeding area of Batagur turtle. The route is about 500 m away from the confluence of Karamjal canal and the Passur River. • Research on Batagur turtle, small clawed otter, etc. conservation may be promoted as a part of Corporate Social Responsibility (CSR) as measures beyond compliance. • Almost for the last 60 years, ships have been sailing through the MPA's designated route. So far, no noticeable incident of death of Batagur turtle due to collision with vessels have been reported. • Proper management of bilge water of the lighterage should be carried out for avoiding contamination of water.	-	-
A4. Fish and Shrimp farming	Improper selection of coal logistics (i.e., transportation route, anchorage point and trans-shipper) may lead to loss of fish and shrimp, on which many people depend on for their livelihoods.	• MPA designated route was selected for coal transportation. • For mooring large vessels inside the Sundarbans there are two potential anchorage points, i.e., Akram Point and Mazhar Point or other area to be selected by the MPA in future. According to MPA, similar draft and almost similar size vessels will be able to anchor both in the Akram Point and in the Mazhar Point. Considering these issues, EIA study envisages that Mazhar Point is more suitable at the moment than the Akram Point because it is closer to the	Coal logistics and EIA Consultant	Forest and Fishing Departments, MPA

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
		Project site jetty and more distant from the World Heritage Site (WHS). • No fishing and catching of shrimp post larvae (PL) is allowed in the transportation route of the MPA. • Due to frequent movement of vessel illegal fishing and catching of PL will be discouraged as such, fish production will be increased in the wild. If regular monitoring demonstrates disruption of habitat due to coal transportation vessel and corresponding decline of shrimp and fish production, necessary measures need to be undertaken to address the issue.		
A5. Conventions and Codes	Suppliers/shippers of coal are obliged to comply with International Convention for the Prevention of Pollution from Ships to prevent pollution of the marine environment and International Maritime Solid Bulk Cargoes (IMSBC) Code, which has the objective of ensuring safe transport of solid bulk cargoes including coal.	• Shippers will be responsible for assessing and declaring whether cargoes are harmful to the marine environment (HME) using specific environmental classification criteria. • Shippers will maintain updated documents in compliance with the requirements of MARPOL and the IMSBC Code with respect to coal cargoes. • Maintain documents with a comprehensive review of the properties of coal, like GCV, moisture, ash, sulphur content, etc. • Maintenance of environment friendly operation of vessel with low noise, low air emission, and ante-oil spillage technology.	Shippers	MPA, CPO/BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
B. IMPLEMENTATION PHASE				
Social Impacts				
Employment opportunities B1. Economic activities	Generation of employment.	• In employing workforces in different Project activities during construction, it is suggested to involve largely the local people particularly the Project-affected Persons (PAPs) directly or indirectly.	EPC Contractor	BIFPCL
B2. Economic activities	Increased economic activity.	• New market for local produces, more sales and services andrevenue generation during dredging activity and jetty construction. • As a result of the influx of a workforce, there shall be a higher demand for locally produced food, goods and services benefiting local farmers, producers, traders including small shops within project area and thereby reduce dependency of locals on the Sundarbans for thier livelihoods. • Due to increased transportation of materials and goods through MPA's maritime route and its jurisdiction, revenue of the MPA will be increased substantially. • The Proponent should provide temporary/ permanent market place facilities and the EPC Contractor or the Labour Contractor will facilitate the access of the workforce to shopping in that market place.	EPC Contractor	BIFPCL
B3. Accidental risks	Risk of accidents and unsafe working conditions for workforce.	• Occupational Health and Safety Plan (OHSP) to be implemented. • Ensure the use of Personal Protective Equipment (PPE). • Emergency Preparedness Plan (EPP) to be implemented.	EPC Contractor	MPA, EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
		• Observance of mock drill on OHSP & EPP at regular interval. • Contractor should follow relevant IFC Performance Standard (PS) like PS-2 on Labor and Working Conditions; PS-3 on Resource Efficiency and Pollution Prevention and PS-4 on Community Health, Safety, and Security. • Safety training for all workers should be ensured prior starting work. • Kitchen waste should be dumped in defined bins by category and sent to the landfill.		
B4. Security risks	Security risks for workers and project staffs, especially from pirates and bandits who are known to roam the area and carry-out kidnappings for ransoms.	• Continued consultations with the local leaders and local community representatives on security matters. • Keep close liaison with the Law Enforcement Authorities (for pirates, the scope will be under the jurisdiction of regulatory authorities, e.g. coast guards, MPA and Police). • Ensure the presence of armed and trained security guards at the work sites and camps. • Issuance of identity cards to workers and checking them properly when enter into the workplace. • Access to the camps and accommodation facilities must be controlled through gated entrances and entrance and exit logs with security personnel shall be maintained at each entrance. • Preparation and implementation of the contractor's Communication Plan to engage local elected representatives and community.	Coast Guard, Navy, EPC Contractor	EHSU-BIFPCL/MPA

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
		• Every labour camp should have lockers for safe keeping of money, stuffs and belongings for labour. • Implement ECP 14: Construction and Operation Phase Security.		
B5. Risk to assets	Inadequate construction site security poses a significant risk to assets, construction materials and property. Theft/vandalism of assets, materials and property would increase construction costs and cause delays in project completion.	• Ensure security at the work sites and camps. • Employ night watchman significant on-site storage or when the area necessitates. • Ensure there is proper fencing around construction site perimeter. • Pre-employment screening investigations should be used to verify the applicants relating to their employment, education and criminal history background. • Issuance of identity cards to workers • Implement ECP 14: Construction and Operation Phase Security	EPC Contractor	EHSU-BIFPCL
B6. Cultural conflicts	Possible cultural conflicts between communities and workers.	• Conduct awareness campaign and develop Code of Conduct for workers on local cultural affairs. • Develop and function the grievance redressal mechanism along with formation of grievance redress committee. • Develop and implement disclosure system and strong community participation plan.	EPC Contractor	EHSU-BIFPCL
B7. HIV/AIDS/STI risks	Risks of HIV/AIDS and STI due to the flow of migrant workers.	• Awareness creation on HIV/AIDS infection and diseases through a well-designed campaign implementation plan targeting all risk-prone groups. • The awareness programme will be conducted by EPC contractor at the time of induction training and periodic update on HIV/AIDS shall also be shared as and when	EPC Contractor	EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
		received from the Govt agencies or NGOs. Hand Leaflet and posters/ banners in using Bangla/ English shall be issued. • Empowering women as much as possible through employment in the construction and other official work as eligible. • Unskilled and semi-skilled workers should be engaged from the affected communities so that they can be close proximity of their families and reduce the risk of mixing with other genders.		
B8. Local facilities	Increased pressures on local facilities (i.e., mosques, health care facilities) due to in-flux of migrant labors/workers.	• Construction contractors will provide all required facilities for workers; provide maintenance and repairing of damages of existing infrastructure facilities, if any due to project activities to minimize pressure on local social facilities. • Community engagement plan will be prepared by the EPC Contractor as part of the CEAP and made functional for bringing cultural and communal harmony between the community and the workers.	EPC Contractor	EHSU-BIFPCL
B9. Risk from hazardous chemicals	Health and safety risk of the community due to the existence of a construction site(s) and the storage and use of hazardous chemicals.	• The Contractor shall follow WBGEHS guidelines and PS-4 on Community Health, Safety, and Security. • Exposed stockpiles of materials will be covered with tarpaulin or impervious sheets before a rainstorm occur. • Disposal of hazardous materials following environment friendly manner.	MPA, EPC Contractor	MPA,EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
		• During construction phase the contractor site camps should be properly managed and should maintain proper housekeeping.		
B10. Change in land use	Temporary land requisition by the contractor during construction activities may bring change in existing land use.	• The Contractor will seek permission for a parcel of rasied land from the Proponent for conducting temporary construction activities for avoiding further disturbances to environmental components. • In case of permission required for river front activities, the Proponent will seek permission from the competent authority in accordance with the law of the land. • Greenery should be developed in the open space allocated for labour camp. • Site closing, decommissioning and proper site remediation works.	EPC Contractor	EHSU-BIFPCL
B11. Risk from increased traffic	Safety hazards due to increased traffic especially for children and elderly people.	• ECP 10: Traffic Management Plan including community friendly traffic schedule for addressing general access to be implemented. • Most of the construction materials will be transported using inland water transport. • Safety and security actions and procedures to protect local community during construction phase.	EPC Contractor	EHSU-BIFPCL/MPA
B12. Consumptive water requirement	Impact on water resources particularly on ground water from Construction Labour Camp	• Considering the poor quality of surface water and low availability of ground water, it is suggested to avoid extraction of ground water for non-potable and other uses in the labour camp instead it is recommended to continue with Reverse Osmosis (RO) Plant throughout the Project period.	EPC Contractor	EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
		• Effective and efficient use of water should be ensured. • Reuse of water with due treatment in suitable water use area. • Sludge collection sump should be built.		
B13. Sewage/ solid waste management facilities	Impact on surrounding environment and community	• The tentatively required dimension of sewage/organic solid waste tank should be 25 m3 (L-4mXW-2.75mXH-2.25m) for capacitating the 41-55 metric tons of organic solid waste in three years. • The tank should be septic tank for better absorption of liquid by the soil. • Maintain hygienic condition of the water closet (WC) for the next person's use. • Dismantling of septic should be done with proper care and release gases arrested in the tank carefully for avoiding casualty. • Proper sanitation will be maintained according to environmental standards.	EPC Contractor	EHSU-BIFPCL
Environmental Impacts				
B14. Air Pollution	Emissions of dust and air pollution will be generated from operation of construction equipment and vehicles, material transport, and site clearance.	• Water the soil surface and any non-asphalted roads, especially in the dry season. • Water the soil before starting excavation. • The storage and handling of spoil, subsoil, topsoil and materials will be carefully managed to minimize the risk of wind-blown material and dust. • Cover hauling vehicles carrying dusty materials moving outside the construction site.	EPC Contractor	MPA/ EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
		• Fit vehicles with appropriate exhaust systems and emission control devices. • Implement Air Quality Management Plan. • Use wind fencing in construction areas that are frequently subjected to high winds. • Reduce activities that create fugitive dust during windy conditions.		
B15. Increased Use of Lights	Increased lighting during construction will impact the surrounding wildlife and birds.	• Minimize night-time construction activity (where practical). • Use light on an “as and when needed” basis. • Direct lighting toward the ground on working areas, reducing the height of lighting to the extent possible and minimizing the number of lights required through strategic placement. • Use fittings on lamps to direct light and confine the spread of light. • Follow lighting plans. • Halogen bulb/light can be used for its longevity, higher efficiency, money saving, etc. • Avoid mercury vapour lamp.	EPC Contractor	EHSU-BIFPCL
B16. Fuel and Chemical Spillage	Contamination of soil and surface water due to the accidental spills and leakage of fuels and chemicals.	• Contractor will prepare and implement Pollution Prevention Plan as part of the CEAP. • Implement ECP 2: Fuels and Hazardous Goods Management. • Contractor to confine the contaminants immediately after such accidental spillage.	EPC Contractor	MPA EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
		• Contractor to collect contaminated soils and washouts containing petroleum products treat and dispose them in environment friendly manner. • All areas intended for storage of hazardous materials to be quarantined and provided with adequate facilities to combat emergency situations complying all the applicable statutory stipulation.		
B17. Solid Waste and Effluent	Indiscriminate and unplanned disposal of solid and liquid waste may affect local environment adversely.	• Implement ECP 1 Waste Management. • Siting of fuel and hazardous material storage sites, including refuelling facilities, batching plants and construction yards are to be located inside the flood embankments. • Hazardous waste will be disposed of following environment friendly manner by designated contractors. • Good housekeeping will be adopted to reduce generation of construction wastes and the potential water pollution.	EPC Contractor	EHSU-BIFPCL
B18. Aquatic Wildlife and Fisheries Habitat	Impact on river habitats by sediment flow (i.e., general habitat and passage of dolphins, fishes and other animals) from construction activities, including clearance of a shabby patch of river bank vegetation.	• Control of sediment flow from the construction activities • Silt curtains along river training works and/or other industry good practice management controls will be used to restrict the spread of sediment released during construction of Terminal/Jetty/Materials Offloading Facility earthen causeway. • Minimize and restrict clearing of river slope and river bank vegetation as much as possible. • Implement ECP 8 Protection of Fauna for species with conservation significance especially endangered and near threatened.	EPC Contractor	MPA/FD/ EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
B19. Pile driving activities	Most of the piles will be cast in-situ type. So, overpressure from piling activities will be remote. In case of pre-cast pile driving activities following concern may arise: Overpressure from pile driving activities will harm riverine animals, including dolphins inhabited in the confluence of the Moidhara and the Passur Rivers, which is about 2 km downstream of the jetty construction site.	• In case of pre-cast pile driving activities following measures will be applicable: • Pile driving will be completed using Best Management Practices for Pile Driving and related Operations. • Conferring with appropriate organizations to determine the preferred timing and methods of the pile driving.	EPC Contractor	EHSU-BIFPCL
B20. Underwater Noise Level	Most of the piles will be cast in-situ type. So, underwater noise from piling activities will be remote. In case of pre-cast pile driving activities following concern may arise: Noise from in-water construction along with pile driving generates intense underwater sound pressure waves that will adversely affect riverine organisms including vocalization and behavior of	• In case of pre-cast pile driving activities following measures will be applicable: • Use of vibratory hammers instead of impact hammers. • Monitoring of underwater noise levels and use of underwater air bubble curtains, metal or fabric sleeves to surround the piles to reduce noise levels if required. • A large bubble curtain consists of a hose with drilled holes, supplied with compressed air. The hose is placed on the river bed and the air escaping from the holes forms the bubble screen. [Single bubble curtain reduce noise by: 12 dB (SEL), 14 dB (peak); Double bubble curtain by 17 dB (SEL), 21 dB (Peak)].	EPC Contractor	EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
	fish, dolphins and other animals concentrated in the confluence of the Moidhara and the Passur Rivers, which is about 2 km downstream of the jetty construction site.	• Hydro Sound Damper consists of fishing nets with small balloon filled with gas and foam - tuned to resonant frequencies fixed to it. It can be applied in different ways. [Hydro Sound Damper reduce noise by 4 - 14 dB (SEL)] • Setting up cofferdam which consists of a rigid steel tube surrounding the pile. Once the pile is stabbed into the cofferdam, the water is pumped out. [Cofferdam up to 22 dB (SEL) and 18 dB (Peak)]. • Conduct pile driving during low tides in intertidal and shallow subtidal areas. • Implement seasonal restrictions when necessary to avoid construction-related impacts to habitat during species' critical life history stages (e.g., spawning and egg development periods). • Reduce sound pressure impacts during pile installation by using wood or concrete piles, rather than hollow steel piles which produce intense, sharp spikes of sound that are more damaging to fish and dolphins having air cavities. • Underwater noise during piling activities could be carried out with a hydrophone sensor which is normally placed in a water column at least 1 metre deep, with the sensor located at a depth of 0.5 metre above bottom of the water column. 'Reference sound levels from pile driving normally are reported at a fixed distance of 10 meters'.		
B21. Collision with Dolphin	Risk of dolphin collision with construction vessels in River.	• Restrict the motor boat speeds as per MPA rules (MPA Traffic Guidelines). • Restrict boat movement within safe distance around the construction site if river width permits. Avoid areas where Dolphins are known to congregate at the confluence of	EPC Contractor	MPA/FD/ EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
		Moidara and Passur River, which is 2.0 km away from the jetty site.		
Terminal, Jetty, Conveyor System and Coal Stackyard B22. Clearing of natural vegetation	Clearing of natural vegetation and trees during construction activities of jetty in project areas.	• Vegetation clearance shall be limited to the extent required for execution of works. • Contractor will follow ECPs 7 and 8 on Protection of Flora and Fauna while tree felling. • Include environmental management and awareness as part of training for employees during construction.	EPC Contractor	EHSU-BIFPCL
B23. Loss of faunal habitat	Loss of faunal habitat at locations of construction works, camp, staff quarters and on access/haul routes due to the felling of trees.	• Minimize construction or civil works in the shabby patch of plants where birds take shelter. • Use of existing access road. • Implement ECP 8 Protection of Fauna for species with conservation significance especially endangered and near threatened. • Plantation of native trees for restoring the lost habitats of birds and other wildlife. • MoU has already been signed with Forest Department for plantation of 0.2-0.3 million native tree species under Greenbelt Development Programme.	EPC Contractor	FD/ EHSU-BIFPCL
B24. Impact on top soil	Earthworks will impact the fertile top soils that are enriched with nutrients required for plant growth	• Strip the top soil to a depth of 35 cm and store in stockpiles of height not exceeding 2m. • Remove unwanted materials from top soil like grass, roots of trees and others. • Spread the topsoil to maintain the physico-chemical and biological activity of the soil. The stored top soil will be utilized for covering all disturbed area and along the proposed plantation sites.	EPC Contractor	EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
		• Contractor will prepare Top Soil Management plan as part of the CEAP/SEMP.		
B25. Terrestrial invertebrates	Excavation works will impact on the loss of habitats especially the terrestrial invertebrates that live in the ground.	• Avoid construction during effective rainy days in the monsoon. • Minimize digging of trenches and vegetation clearance to minimum required level.	EPC Contractor	EHSU-BIFPCL
B26. Increased traffic congestion	Increased Traffic on local roads will affect access to the trading centre and, houses close to the road, deteriorate safety (especially the school children), spillage of fuels and chemicals, and damage to infrastructures and properties due to vibration	• Contractor will implement traffic management plan to ensure uninterrupted traffic movement during construction. • Restrict truck deliveries, where practicable, to day time working hours. • Restrict the transport of oversize loads. • Use covered trucks to avoid spreading of dust. • Ensure proper maintenance of vehicles and roads.Enforce on-site speed limit, especially close to the sensitive receptors, schools, health centres, etc. • Implement ECP 10: Traffic Management • Inspect structures within the close proximity of construction site for damages.	EPC Contractor	EHSU-BIFPCL
B27. Noise and vibration from operation	Operation of heavy equipment and construction vehicle movements will cause noise and vibration affecting workers and the nearby community. Most of the construction materials and plant equipment will be	• Construction activities near settlements will be limited to day time mostly. • High noise producing equipment will be provided with mufflers or acoustic hood/enclosures. • Install acoustic enclosures around generators and install temporary noise control barriers where appropriate to reduce noise levels.	EPC Contractor	EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
	transported using water vessels.	• Fit high efficiency mufflers to appropriate construction equipment. • Notify affected communities in advance regarding major noisy operation. • Implement Noise Management Plan		
B28. Temporary breeding pools	Loss of temporary breeding pools and pans due to refilling of such pools by construction soil or gravel while constructing the jetty and coal stackyard.	• Schedule trench construction during dry season to reduce impact since the amphibian populations will be low during non-breeding season • Fence off the trenches with nets to prevent amphibians falling into the trap. • Implement ECP 8 Protection of Fauna for species with conservation significance especially endangered and near threatened.	EPC Contractor	EHSU-BIFPCL
B29. Borrow and quarry activities	Impact of borrow materials and quarry activities.	• Borrow/quarry areas will be developed close to the project area for extraction of earth material and aggregates for river protection works. • No private lands or agriculture lands will be used for borrowing. • Minimize volume of borrow material by using dredged material generated from the associated component of the project. • Control dust and air pollution by application of watering. • Photographs recorded of each borrow area showing pre-construction baseline for comparison with after rehabilitation.	EPC Contractor	EHSU-BIFPCL
B30. Archeological assets	Damage to unidentified archaeological asset(s)	• In case of any artefact or site of archaeological, cultural, historical, or religious significance are discovered during	EPC Contractor	EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
	during quarry activities for trenching of civil structure and river protection works.	construction activities, the works will be stopped in that area, and the appropriate department will be informed. • Contractor will develop a procedure for management of 'Chance Finds'. THE ANTIQUITIES ACT, 1968 of Bangladesh (Draft ANTIQUITIES ACT, 2015) and IFC's PS 8- Cultural Heritage will be followed by the Contractor.		
C. OPERATION AND MAINTENANCE PHASE				
Social Impacts				
C1.Employment Opportunities	Generation of employment.	• Employment for local workers and technicians, local unskilled labors during operation of the coal transportation and handling. • New employment opportunities in shipping and related businesses. • Due to availability of quality and uninterrupted electric supply, lots of industries will be developed in Khulna area, which will create a huge employment opportunities and economic activities.	BIFPCL	IMA
C2.Economicactivities	Increased economic activity.	• At present about 4.5 million tons of materials and goods area being handled by MPA per year. During operation of this project, MPA would handle more than 4.5 million tons of materials and goods for this project only. As such, MPA would be able to generate a substantial amount of income from this project. • Establishment of new private businesses and commercial enterprises in shipping and at the anchorage points.	BIFPCL	IMA

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
		• Increase in local business opportunities due to shipping.		
C3. Fishery productivity	Increased movement of vessel may cause disturbance to post larvae (PL) catching which in turn will facilitate wild shrimp production, mixing of oxygen into water and increase in dissolved oxygen.	• Since catching of fish and post larvae will be discouraged during operation of the project, as such, the production of shrimp and fish will increase in the area. If regular monitoring demonstrates decline of shrimp and fish production, necessary measures need to be undertaken to address the issue. • Shrimp post larvae catching dependent livelihood will be restored in different phases of power plant construction and operation and also in the industries to be developed in the EPZ, Mongla. • Government should bring the post larvae catchers into the social safety net program.	BIFPCL	IMA
C4. Social disturbance	Social disturbance due to poor expectation of the project.	• Make formal arrangement for continued communication and engagement with local stakeholders, in the form of a community engagement cell. • An independent monitoring team will conduct regular monitoring of various socio-enviromental parameters. • Disclosure of monitoring results with appropriate methods. • Ensure consistent communication with local communities, national stakeholders even if they are opponents of the Project.	BIFPCL	IMA
C5. Increase in coal vessel traffic	Coal would be transported in a covered vessel through the MPA designated route, which is 1.5 to 2.75 km away from the outer periphery of	• Shipping vessel would follow MPA and applicable IMO conventions when transporting coal. • Monitor and review of shipping impacts on a regular basis and work with stakeholders to help minimize impacts on protected areas.	IMA	MPA/EHSU-BIFPCL /FD

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
	the World Heritage Site. As such, no significant/quantifiable impact is apprehended on the WHS due to transportation of coal.	• Periodic audits for the compliance of IMO regulation of coal vessels.		
C6. Fish and Shrimp growth	Increase in shipping induced pollution by water quality deterioration, may impact fish and shrimp growth, on which livelihood of local communities depend on.	• Monitor and review of potential impacts of vessel movement on a regular basis and work with stakeholders to help minimize impacts. • Aware fisherman about the coal vessel movement and potential collision with vessels and consequences. • Ensure vigilance and monitoring of pollution due to vessel movement. • All vessels should comply with the applicable MARPOL and IMSBC conventions.	IMA	EHSU-BIFPCL/ MPA
C7. The Sundarbans and world heritage site ecosystem	Increase in shipping, coal transshipment, and coal transport can increase collision induced risk and subsequent spillage, which can affect the functionality of the Sundarbans ecosystem and affect the growth of forestry products (such as timber, honey, medicinal plants, Golpata and etc.) on which livelihood of local people depend on.	• Review of potential impacts of vessel movement on a regular basis and work with stakeholders to help minimize impacts. • Review and update the Sundarbans Forest Management Plan to mitigate potential impacts on livelihood. • Implement Emergency Response plan. A framework of the ERP is developed in the EMP for the MPA to develop a comprehensive ERP with appropriate resources, management structure, and effective communication in order to manage any emergency events associated with coal transportation. • There should be commitment of MPA and adequate budgetary provision to implement ERP with due diligence.	IMA	MPA/FD/ EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
		• There should be commitment of the Forest Department (FD) and adequate budgetary provision to implement the prescribed EMP with due diligence.		
Environmental Impacts				
Coal Transport and Transfer Operations C8. Complying with MARPOL and IMSBC codes	Proper documentation of suppliers/ shippers of coal complying with MARPOL and IMSBC Code	• Verify compliance documents of applicable MARPOL and IMSBC Code during cargo clearance from the Mongla Port Authority. • Verify documents indicating chemical properties of coal, including the identification of organic and inorganic compounds in coal, elements, and minerals. • Monitor whether liquid residues of coal vessel discharge into the marine environment. • Ensure dry residues and/or the wash water that contains residues from an HME discharged at adequate port reception facilities of the MPA.	Shippers	CPO/MPA/ BIFPCL
C9. Noise level	Generation of noise from vessels and trans-shipper will negatively affect surrounding environment and wildlife, including resident and migratory birds. Sudden and periodic noises may affect animals behaviorally and physiologically. In extreme cases, loss of hearing through inner ear damage	• Coal being unloaded from barges will have minimal drop heights. • Adhere to trans-shipper's environmental control measures recommended in this EIA. • Adherence to a comprehensive equipment maintenance program to maintain equipment, and to maximize efficiency and reliability, which will help limit noise levels associated with the operation. • System components will be maintained to operate below maximum operating noise levels wherever feasible. • Maintenance records will be maintained for review by IMA, BIFPCL's O/M and EHSU.	Ship Master	IMA, EHSU-BIFPCL/ /MPA

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
	has been observed in laboratory mammals. Furthermore, high levels of noise for fairly short durations have produced significant effects on sexual function, blood chemistry, auditory function and susceptibility to seizures. Neural and hormonal processes may be stressed. Since acoustic signals play a major role in survival, viable behavior and population dynamics may be disturbed if communication is obscured by background noise.[4]	• Noisy mobile equipment supporting the operation will be removed from service wherever practical and replaced with a less noisy alternative. • Noise Management plan for ships/barges will be implemented. • Restrict blowing of whistle within the Sundarbans territory. • Switch off / throttle down of all equipment when not in use • For the life of the operation, BIFPCL will evaluate noise levels and onsite activities to identify opportunities for using less noisy equipment and / or making changes to day to day operations that may reduce overall noise levels.		
C10.Increased lighting	Increased lighting from ships/barges and etc. will impact the surrounding wildlife, including resident and migratory birds, the Masked Finfoot, Spoon Billed Sandpiper, White	• Minimize night-time activity (where practical). • Use light on an “as and when needed” basis. • Eliminate upward directed light. • Use fittings on lamps to direct light and confine the spread of light. • Ensure lights are in good condition at all times.	Ship Master	MPA/ IMA, Forest Department, EHSU- BIFPCL

[4]Glover, T. O., Hinkley, M. E., and Riley, H. L. (1970); Unit Train Transportation of Coal: Technology and Description of Mine Representative Operations, US Bureau of Mines, Information Circular, 8444, pp. 109.

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
	Rumped Vulture, Slender-billed Vulture, White-headed Duck and Greater Spotted Eagle are considered to be endangered.	• Adoption of EMP Sub-plan 2: Biodiversity Management Plan.		
C11. Ship wastes	Contamination risk from effluents (residue of ballast water, bilge water, oil, lubricant, garbage, domestic waste, food and kitchen waste, coal leachate, sewage, etc.) from ships.	• Strictly follow MARPOL Convention, Annex V on the Prevention of Pollution by Garbage from Ships, the IMO introduced new classification criteria to enable identification of substances harmful to the marine environment (HME). • Coal transportation shall be carried out using existing navigational route of the MPA. • Responsible authorities will properly enforce rules and regulations of MPA and MARPOL in the management of bilge and ballast water, oily water discharge, waste and waste water. • MPA should ensure adequate port waste (solid and liquid) reception facilities. • Results of monitoring and enforcement should be disclosed through appropriate method and means.	Ship Master	IMA, /MPA/ EHSU-BIFPCL
C12. Pollution from ships	Pollution from ships can degrade aquatic habitats and reduce fish and crustacean production and recruitment. There will be risk to aquatic species, including endangered estuarine/coastal animals	• Ensure dry residues and/or the wash water that contains residues from an HME discharged at adequate port reception facilities (that has to be ensured by the MPA). • A facilityto be developed in the MPA designated area for receiving the bilge for lighterage that will be calling at the plant jetty. • Follow MARPOL Convention for all shipping activities, which is the main International convention covering	Ship Master	IMA, MPA, MoEF/ EHSU/ BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
	such as Batagur turtle and otter.	prevention of pollution of the marine environment by ships from operational or accidental causes. • Responsible authorities will properly enforce applicable rules and regulations of MPA and MARPOL in the management of bilge and ballast water, oily water discharge, waste and waste water. They will be discharged at adequate port reception facilities. • Use of class lighterage vessels for transporting coal from the anchorage points to the jetty. • Implement EMP Sub-plan 2: Biodiversity Management Plan • Impact of vessel movement on water, mangrove forest, riverine species, etc. are being monitored and is suggested to continue the monitoring activities till the end of the power plant project life. Based on the monitoring report, appropriate measures should be taken for mitigating impacts, if any.		
C13. Threat to aquatic mammals and other species	Enhanced maritime traffic will have impact on dolphins, fish, and crustaceans such as: vessels colliding with freshwater dolphins resulting in injuries.	• Implement EMP Sub-plan 2: Biodiversity Management Plan. • Vessel movement should be through a fixed alignment of the river (optimization of the lane and dimension of the fairways) designated by the MPA. • Encourage the use of bow thrusters for all coal vessels or use pingers for repelling aquatic animals.	Ship Master	MPA/IMA, FD, EHSU-BIFPCL
C14. Threat to Local river Traffic	Enhanced maritime traffic (presence of barges and associated vessels) may	• Provide navigation aids for the barges and associated vessels. • Provide proper navigational lighting.	Ship Master	MPA

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
	pose a risk to local river traffic.	• Check all navigational lights routinely to ensure that they are working properly.		
C15. Erosion due to coal vessel movement	Movement of bulk carriers and class lighterage carrying coal and limestone may generate wave on sea and inland water that might cause erosion along seashore and riverbank, including more than 1 km from route. It might also increase the rate of erosion at existing erosion prone areas.	• Erosion along the banks of the Passur River to be monitored routinely by the concerned authorities like the MPA, etc. • In general, restriction on vessel speed limits risk of erosion. Vessel speed in the route of the Mongla Port is guided by the MPA.	Ship Master	IMA, MPA/EHSU-BIFPCL
C16. Sedimentation from erosion	Erosion caused by vessel wakes results in excessive sedimentation in the deep pools where freshwater dolphins congregate for feeding and as refuge areas.	• Maintain speed limit of vessel sailing through the MPA route. • Take special precaution and maintain safe distance while passing close to the dolphin sanctuaries. • Erosion on both sides of the MPA route to be monitored routinely and accordingly measures to be taken.	Ship Master	IMA/ MPA/ FD, EHSU- BIFPCL
C17. Invasion of alien species	The transportation of imported coal may risk of invasion of alien species. Alien species might come through ballast water, hull-fouling, and by contract of vessel body, these species	• Quarantine inspection should be conducted. • Responsible authorities will regularly inspect shipping and barging activities to detect introduced species early. • Standard operational practice, including IMO Conventions and ECR 1997 shall be followed by the transportation agency.	Ship Master	IMA, MPA/ EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
	may compete with native species and therefore threaten biodiversity of the Sundarbans and their abundance.	• Prevent the introduction of species, especially from ballast water and hull-fouling. • The outcome of disclosure of inspection of vessels and enforcement records should be made through appropriate method and means.		
C18.Vessel movement and the Sundarbans ecosystem	Movement of coal and limestone vessels and transshipment process may have impacts on the surrounding the Sundarbans Ecosystem (including, terrestrial wildlife, aquatic fauna and nearby World Heritage Site of UNESCO at South Sanctuary).	• Ensure enforcement of ECA, 1995 (as amended in 2010) and ECR, 1997 (as amended in 2005), Forest Protection Act, and other rules, regulation and treaties for conserving the Sundarbans and Ecologically Critical Area (ECA). • Coal will be transported in covered class vessels. • Every kind of discharge from ship should follow applicable MARPOL Convention. • Restrict outside lighting of the water vessel during navigation across the Sundarbans. • Restrict the beaming of searchlight on Forest area/Sea Shores/Protected Beach/Protected Areas • Use low beam of searchlight during navigation across the Sundarbans/Bird Colony. • Restrict blowing of whistle within the Sundarbans • Introduce speed limitation for vessels in the Sundarbans • Anchorage of water vessel only in designated sites. • Implement Biodiversity Management Plan. • Results of monitoring and enforcement should be disclosed through appropriate method and means.	Ship Master	MPA/IMA, Forest Department, EHSU-BIFPCL
C19. Fuel combustion and emission	Impact of air emissions from vessels and transshiper on ambient air quality	• Air Quality modeling assessment for project case shows ambient air quality within the National Ambent Air Quality Standards.	Ship Master, BIFPCL	MPA/IMA, EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
		• Implementation of Air Quality Management Plan. • All vessels will comply with applicable international and national standards, e.g., IMO conventions, MARPOL, Hazardous and Noxious Substances (HNS), etc.		
C20. Accumulation of dust on riverbed	Accumulation of fugitive coal dust and coal spills on riverbed during loading and unloading by transshipper at the mooring area.	• Accumulation of coal dust in the transshipment point of coal will be periodically monitored. Based on the findings, mitigation measures (if required) will be carried out. • Add water mist to wet the coal to prevent dusting. • Specific design and material handling procedures will be used to minimize the loss of coal in the marine environment. • Maintenance of facilities, including daily cleaning, is proposed to reduce the build-up of dust that could become a source of sediment during rain events.	Ship Master	MPA/IMA, EHSU-BIFPCL
C21. Water Quality and Benthos	Impact of fugitive coal dust and coal spills on river water quality, particularly at Mazhar Point and plant jetty during lighterage load-out and load-in, transshipper mooring, and lighterage transport. Johnson and Bustin (2006) found that high concentration of coal dust oxidize and reduce	• Use recommended dust control measures for loading coal. Specific design and material handling procedures will be used to minimize the loss of coal in the marine environment during handling and transport activities. • Water/mist system used to spray coal during the unloading process. • Cover all receiving stackyard except for entry/exit points. • Grabs in floating transfer station (transshipper) will be equipped with dust cover plates. • The use of dust suppressants, in combination with proposed dust mitigation measures including but not limited to: covered dumping shed and conveyors, ongoing site cleaning and system maintenance, misting and	Ship Master	MPA/IMA, EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
	dissolved oxygen available for benthos.	sprinkling at coal transfer and handling areas, is expected to control dust throughout the transportation chain. • Maintenance of facilities, including daily cleaning, is proposed to reduce the build-up of dust that could become a source of sediment during rain events. • Minimize drop heights when using cranes. • Implement Air Quality Management Plan. • Results of air quality monitoring and enforcement actions should be disclosed through appropriate method and means.		
C22. Biodiversity of the Sundarbans	Impact of coal dust emissions from unloading and loading and lighterage transport on biodiversity of the Sundarbans. Fugitive coal dust can coat mangrove leaves and reduce photosynthesis in Sundarabans located more than 1km from the source. Study conducted by Naidoo and Naidoo (2005) [5] found that coal dust from the Richards Bay coal terminal in South Africa harms local	• As a secondary dust mitigation measure, water mist may be sprayed on the lighterage vessels in a controlled manner (i.e., approximately five minutes every 30 minutes), as deemed necessary by the operations superintendent or the Environmental Coordinator. • The use of dust suppressants, in combination with proposed dust mitigation measures including but not limited to: covered dumping shed and conveyors, ongoing site cleaning and system maintenance, misting and sprinkling at coal transfer and handling areas, is expected to control dust throughout the transportation chain. • Covered lighterage (class vessel) has been included in project design. • Grabs in floating transfer station (transshipper) will be equipped with dust cover plates.	Ship Master	MPA/IMA, EHSUBIFPCL

[5] Naidoo, G and Naidoo, Y (2005) Coal dust pollution effects on wetland tree species in Richards Bay, South Africa, Wetlands Ecology and Management, Springer, 13: 509–515.

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
	mangrove trees and related ecosystems by impairing the ability of the trees to photosynthesis. The study found that coal dust on the undersurface of leaves is not removed by wind, rain, or even physical washing. The undersurface of the leaves, as well as the rough surfaces of twigs, branches and trunk, tend to accumulate dust and appear black.	• Implement EMP Subplan 2: Biodiversity Management Plan • Implment water Quaility Management Plan (coal dust mitigation measures). • Results of water quality monitoring, sediment monitoring and enforcement actions should be disclosed through appropriate method and means.		
C23.Human Health	Impact of fugitive coal dust from transshipment and transfer processes on human health (operation staffs) as there is no settlements closeby.	• Use recommended dust control measures for loading and unloading coal. • Water/mist system used to spray coal during the unloading and transfer processes. • Cover all receiving pits/stckyard except for entry/exit points. • Grabs in floating transfer station (transshipper) will be equipped with dust cover plates. • The use of dust suppressants, in combination with proposed dust mitigation measures including but not limited to: covered dumping shed and conveyors, ongoing site cleaning and system maintenance, misting and sprinkling at coal transfer and handling areas, is expected to control dust throughout the transportation chain.	Ship Master	IMA, EHSU/BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
		• Minimize drop heights when using cranes and curved chutes at transfer points. • Use enclosed conveyor system equipped with water spraying nozzles. • Mandatory use of appropriate PPEs for all operation staffs. • Implement Air Quality Management Plan. • Results of air quality monitoring and enforcement actions should be disclosed through appropriate method and means.		
C24. Coal dust and fugitive emission	Spreading of coal dust and dispersion of fugitive dust from coal storage may affect surrounding environment.	• There will be fully covered coal storage except for entry/exit points.. • Use recommended dust control measures for loading coal • Water/mist system used to spray coal during the unloading process. • Cover all receiving pits/stackyard except for entry/exit points. • Minimize drop heights and curved chutes at transfer points. • Plant vegetation around storage area to prevent wind from dispersing fugitive dust emissions.	O & M/ BIFPCL	MPA/IMA and EHSU
C25. Discharged contaminants	Discharge of contaminants through spills; discharge of coal to water bodies will release Polycyclic Aromatic Hydrocarbons (PAH's) into aquatic environment.	• Implementation of management plans to mitigate effects of discharge from spills. • Numerous studies concluded that PAHs are not bioavailable because of the source of PAH in the sediments was from pitch globules and coal particles to which the PAHs were tightly bound. • The use of dust suppressants, in combination with proposed dust mitigation measures including but not	Shippers	MPA, O & M/ EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
		limited to: covered dumping shed and conveyors, ongoing site cleaning and system maintenance, misting and sprinkling at coal transfer and handling areas, is expected to control dust and spills throughout the transportation chain. • Periodical monitoring of deposition of coal and coal dust on the river/channel bed at transshipment area. In case of noticeable coal dust deposition, they will be removed for safe disposal on land.		
C26. Coal drainage runoff	Coal contaminated drainage run-off from coal storage will release PAH's into aquatic environment.	• Separately collect coal drainage wastewater (including leachate, collected water, and exposed water) in a gravity driven settlement pond and implement ECP 1: Waste Management and Run-off and collection and treatment to mitigate and to reduce the impacts of run-off into nearby waterways prior to it being recycled or discharged the same.	O & M/ BIFPCL	IMA and EHSU-BIFPCL
C27. Fire due to spontaneous combustion	Risk of fire from spontaneous combustion, oxygen depletion, and corrosion of metal from coal during barge and vessel transport.	• Transport coal following IMSBC Code in Cargo B, coal can create flammable atmospheres, may heat spontaneously, may deplete the oxygen concentration and may corrode metal structures. • When the master is concerned that the cargo is showing any signs of self-heating or spontaneous combustion, such as an increase in the concentration of methane or carbon monoxide or an increase in temperature, the following actions shall be taken: • Consult with the ship's agent at the loading port. The Company's designated person ashore shall be advised immediately.	Ship Master	MPA, IMA, EHSU-BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
		• Check the seal of the cargo space and re-seal the cargo space, as necessary. • Do not enter the cargo space and do not open the hatches, unless the master considers access is necessary for the safety of the ship or safety of life. When any ship's personnel have entered into a cargo space, re-seal the cargo space immediately after the personnel vacate the cargo space. Increase the frequency of monitoring the gas composition, and temperature when practicable, of the cargo.		
C28. Oil spill due to collision of barges/oil tankers	Risk of oil spill due to the collision between coal vessel and oil tanker	• Precautionary measures will be taken by the Ship Masters to follow IMO procedures to operate the vessels. • Use of piloting will reduce the risk of collision to minimim. • All coal vessels will be operated under the supervision of the MPA designated pilot. • Implement emergency response plan recommended under this EIA for the MPA. • Prevent the spread of oil spills and ensure the safety of onboard crew members • Report oil spills to the proposed Mongla Port ERG immediately and ask for assistance • ERG will involve local authorities (MPA, Navy, Coast Guard) in stopping oil spills as per the emergency response plan	Ship Master	MPA, IMA, EHSU-BIFPCL
C29. Coal vessel sinking	Risk of coal vessel sinking due to structural or mechanical failure and	• Avoid barge operation in such a high wind speed as suggested in the IMO rules and regulations. • Transport coal following IMSBC Code in Cargo B,	Shippers	MPA, O & M/ BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	Supervision
	spilling oil and fuel into River.	• Spill Response Containment plan to be implemented in case of accident. • The vessel route in the Passur River is considered sheltered and no significant wave height is anticipated. • Qualitative risk assessment shows minimal risk of sinking if coal transportation follow IMSBC Code in Cargo B.		
C30. Collision and grounding risk (low visibility and fog condition)	Risk of Collision, grounding, impact during low visibility and fog conditions.	• Night operations will follow lighting and personnel (pilot) requirements. • Navigation assistance through VHF communication based on radar information to adverse weather condition, restricted visibility, changes in pilot services, or any other dangerous situation for the vessel. • Appropriate equipment to be selected in accordance with specific weather conditions and vessel load characteristics.	Shippers	MPA, O & M/ BIFPCL
C31. Collision and grounding risk (tidal condition)	Risk of collision and grounding due to tidal conditions.	• Bathymetric survey of the transportation route to be carried out routinely by MPA. • Use of appropriate navigation assistance through VHF communication based on radar information to counter adverse weather condition, restricted visibility or any other dangerous situation for the vessel. • Coal barges are to be compartmentalized to reduce the potential severity of the impacts.	MPA	MPA, O & M/ BIFPCL
C32. Risk of fire	Risk of fire from spontaneous combustion of coal at stackyard.	• Stakeholder should be aware of incubation time to Spontaneous combustion. • Implement a Fire Safety Plan and train all employees in regards to this plan.	O&M/ BIFPCL	MPA, IMA and EHSU/BIFPCL

VECs/Issues	Environmental Impacts	Mitigation/Enhancement Measures	Institutional Responsibilities	
			Implementation	**Supervision**
		• Smoke detection and monitoring (as an indicator for the potential for fire). • Periodic spray of water to minimize spontaneous combustion at coal stackyard. • Emergency Response Plan (ERP) and Fire hazard management plan will be in place to handle such emergent situation..		
C33. Risk of fire	Risk of fire from spontaneous combustion of coal during conveyor transport.	• Implement a Fire Safety Plan and train all employees in regards to this plan. • Regular scheduled checks and maintenance of process area equipment (i.e., conveyor system). • No open flame/ignition source/hot work is permitted in the process areas without following proper procedural controls. • Emergency Response Plan (ERP) and Fire hazard management plan will be in place to handle such emergent situation.	O&M/ BIFPCL	IMA and EHSU/BIFPCL
D. ASSOCIATED COMPONENTS (CAPITAL AND MAINTENANCE DREDGING)				
Two separate EIA studies, i.e., one for the river reach from Mongla Port to the Project site and another for Outer Bar (not related to Maîtree STPP) for dredging have been conducted by the MPA and duly approved by DoE. They have identified the dredged spoil disposal area. Prior to the mobilization of dredging Contractors, MPA will ensure dredged spoil disposal sites those are identified in the mentioned studies whether for beneficial use or permanent land filling, in consultation with public representatives and concerned land owners. MPA should ensure all mitigation measures during all phases of dredging based on the approved EIA studies. They should prepare site-specific Dredged Material Management Plan with proper containment compartment and drainage provision. Notification to communities and river users prior to initiation of dredging. Erection of buoys in the area to alert river vessels passing the dredging site. The MPA and the Dredging contractor would be responsible for complying all the EMP measures prescribed in the approved EIAs for dredging.				

12. Environmental Monitoring

The environmental monitoring will consist of compliance monitoring and independent monitoring. Compliance monitoring will comprise surveillance to check whether the contractor is meeting the provisions of the contract during implementation and operation of the Project including the responsible agencies for monitoring and supervision. Independent monitoring– which can be implemented through professional independent agency, will ensure whether all key entities including contractors, and EHSU are effectively and adequately fulfilling their designated role for EMP implementation, and that all the EMP requirements are being implemented in a timely and effective manner or not.

In compliance with the terms of EIA approval letter, BIFPCL has appointed an independent agency for carrying out tow-tier comprehensive monitoring activities, such as compliance monitoring and environmental (physical and biological) monitoring including social parameters. The independent agency has been appointed for monitoring the implementation of environmental management plan (EMP) during pre-construction/design phase and implementation/construction phases. The independent monitoring mission shall continue up to operation phase. Detail environmental monitoring plan has been delineated in Chapter 12.

EMP Budget: The estimated total cost of implementing the EMP including monitoring is about USD 8.03 million. For environmental monitoring, the estimated cost is USD 2.02 million. Detailed costs of the EMP and monitoring plan costs are given in **Table 11-4** and **Table 12-2** respectively. Please note that the above budget is prepared based on 2016 market price. The estimated budget of proposed Emergency Response Plan (ERP) is about USD 5.72 million (Detailed in Annex 11-4). The major implementing agency of ERP is the MPA.

13. Public Consultation and Information Disclosure

Public consultation was conducted as part of the regulatory requirement of DoE to incorporate the public's/stakeholder's opinion on matters affecting their communities due to the project activities. When conducting interviews, stakeholders were divided into primary and secondary stakeholders. Three types of consultation approaches were taken: i) informal discussion; ii) expert consultation/key informant interview and; iii) focus group discussion (FGD).

Informal consultations: During the informal discussion, points raised by the people included contamination of surface water due to coal dust and untreated bilge water from ships; spread of waterborne diseases due to drinking these contaminated water; disturbance in fishing activities; erosion of river banks and hampering fisheries growth and habitat due to increased ship movement; increased traffic, noise, lighting and waste disposal affecting dolphins and other marine species, including their habitat; affecting soil quality due to the toxic materials released during transportation; impaired navigability due to wrecked vessels; navigational aids for safe movement of ships; accidental oil and other wastes spillage hampering fish habitats and human health. Action points proposed included using Floating Transfer Station (FTS); bilge water containment facilities, special care to avoid damaging fishing nets; prohibiting contaminating to water bodies; regulating speed of vessels; maintaining IMO and MPA regulations, procuring salvage and oil sweeping vessels; installing navigational aids; demarcating safe fishing zone; fishing in the rivers/canals/ creeks connected with the Passur River; emergency preparedness for combating oil spillage; engaging an independent monitor/auditor; checking soil quality; coordinating with Forest department, underwater noise study etc.

Expert/Institution Consultation: Various experts from the concerned institutions expressed their opinion in favour of installing a Mega Power Plant in Greater Khulna area. They recalled that in last 45 years many industries of Khulna area were gradually closed due to shortage of uninterrupted and quality electricity. They opined that with the installation of Rampal Coal Fired Power Plant the exising and temporarily closed industries could resume their productions. Many new industries will come up in this area. Economy of the area will thrive again. They also opined that with the implementation of the EMP measures there may not be any quantifiable impact on the Sundarbans and surronding area due use of MPA route for coal transportation with the environment friendly transhippingequipments. However, some experts have expressed doubt on the intention of the proponent in implementing the suggested EMP. Considering the perception of some experts and location of the MPA route, experts have stressed the need of close monitoing of the implementaion of EMP suggested in the EIA study report by an independent monitoring agency. They have also stressed on the implementation of the conditions imposed by the DoE on the construction of Maitree STPP. Experts have also strongly suggested for the formation and operation of an Independent Monitoring Team at the earliest and online dessimination of monitoring reports. The monitoring team will not only ensure the implementation of the suggested EMP and condition laid down by the DoE but also relieve concern of some quarter of the society.

Focus Group Discussion: Various farmers, fishermen, employees, businessmen and the Sundarbans dependent occupational groups were interviewed during focus group discussion. The majority of the stakeholders claimed that the project (coal transportation activities) won't have any significant impact on their livelihood unless if there is an accidental event due to the

coal transporting process. On the contrary, they believe that the construction and operation of the Rampal Power Plant will ensure uninterrupted and quality electricity supply in the southwest region of the country. As a result, the oil industries will get new life and many new industries will develop in the region which will create plenty of employment opportunity for the people of the area.

Public Disclosure: All documents, mitigation measures, consulting process along with the EIA have been made available for public review in both English and Bengali at three places, i.e., Mongla, Bagerhat and Khulna. The Executive Summary of the EIA was published on the BIFPCL website. Queries made by the participants of the public disclosure meetings (PDMs) at Mongla, Bagerhat and Khulna have been responded in Table 13-5 in Volume II: Comments and responses of Public Disclosure Meeting in Chapter 13. Feedback from the PDMs has been icorportaed at the relevant sections of the report. Further, the EIA study report would be published on the BIFPCL website.

14. Conclusions and Recommendations

14.1 Conclusions

The Environmental Impact Assessment (EIA) of the coal transportation study Project has identified that, the Project is unlikely to cause any significant adverse impact in the study area which comprises part of Sundarbans Reserve Forest. Many of the impacts are localized and short term or temporary in nature. Most of the identified impacts have already been addressed by appropriate embedded control measures in the Feasibility and Design Phase of the Project as well as additional mitigation measures and environmental management plan(EMP)suggested in this EIA Study Report. Moreover, the Project will also have several benefits to the study (Project) area through supporting economic growth in this region by opening avenues for future development, direct and indirect employment opportunities and improving local infrastructure facilities.

During the Feasibility and Design Phase, selection of coal logistics and transportation route has been selected through satisfactory consultation with relevant and responsible Authority as well as considering least adverse impacts on ambient environment, the Sundarbans Ecosystem; Dolphins and other aquatic organisms; Fisheries habitat and species of conservation significance.

During the Implementation Phase of the Project, the key adverse environmental issuesto be considered are impacts on terrestrial breeding pools and pans, soil, air and water quality of nearby jetty construction site, lighting, ambient noise, underwater noise level, dust generation, aquatic wildlife, fisheries habitatand species of conservation significance(Dolphin).

During the Operation and Maintenance phase, there may be marginal impact on marine environment and safe transportation of coal; ambient environment; aquatic habitat; wildlife and other aquatic animals; the Sundarbans and the World Heritage Site (WHS) ecosystem and Mangrove forest, but localized and short term or temporary in nature. Identified environmental impacts will be induced from shipping and transportation of coal; transshipment; discharge from ships; movement of bulk carriers and lighterage; spillage of coal; accidental spills and leakage of hazardous materials including coal and oil to the Sundarbans river system during handling, transportation and storage at the Power Plant site and other associated activities, which were analyzed. The impact assessment and prescribed EMP along with embedded control suggests that these impact will have minimal effect on the sensitive receptors. In contrary, increased vessel movement during Operation and Maintenance Phase will positively impact on Fishery productivity as vessel movement activities may restrict Post Larvae (PL) catching which may facilitate wild shrimp production, mixing of oxygen into water and increase in dissolved oxygen.

Socio-economic environment of the study area will be benefited by creation of new employment opportunities and project induced economic activities throughout Implementation, Operation and Maintenance phase of the Project. Moreover, there will also be adverse socio-economic impacts on local community, existing livelihood, health and safety. The range of impact identified include conflicts with the local community and worker's culture, health and safety issues at workplace, social facilities and utilities, risk of spreading communicable and sexually transmitted diseases and unhygienic conditions from migration of labor into the Project area, jetty construction activities and increased vessel movement in the Project areas..

The magnitude and significance of most of these impacts would be limited to only construction period and minimal in nature. Furthermore, considering the embedded control measures and the proposed mitigation measures the adverse impact of the project will be largely minimized.

The Implementation Phase of the Project will have an important role in the socio-economic development of the study area whereas the Operation and Maintenance Phase of the Project will play an important role for Power generation and supply to the national grid by ensuring uninterrupted supply of primary fuel to the Maitree Super Thermal Power Plant to be constructed at Rampal, Bagerhat. A reliable and enhanced electricity supply to the national power grid will support future economic development of various depended sectors of the South–West region of Bangladeshincluding agriculture and other manufacturing industry.

14.2 Recommendations

The EIA Report prepared for the Coal Transportation of Maitree Super Thermal Power Project recommended for approval from the DoE. It is expected that DoE while giving approval put conditions to strictly comply with the EMP requirements stipulated in the EIA report.

It is also recommended that IMA will monitor and audit the parameters suggested in the EMP in relation to the power plant and coal transportation. The monitoring and auditing outcome should be reported quarterly and annually and make available to the public in the public domain. As such, it will ensure the implementation of EMP suggested in the EIA.