

The First Engineering Bureau of Henan Water Conservancy (CHWE)



Coastal Embankment Improvement Project, Phase-I (CEIP-I)



Environmental Action Plan (EAP) for Polder 35/1 *Version-4.0*

April 2019

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1. Introduction

1.1. The Project

The overall objective of the Coastal Embankment Improvement Project -Phase 1(CEIP-1) is to increase the resilience of coastal population to natural disasters and climate change. More specifically, the project aims at (a) reducing the loss of life, assets, crops and livestock during natural disasters; (b) reducing the time of recovery after natural disaster such as cyclone; and (c) improving agricultural production by reducing saline water intrusion which is expected to worsen due to climate change. This objective will be achieved by rehabilitating and improving the existing polder system in the coastal area.

Based on a multi criteria analysis for strategic polder assessment, a first priority group of 17 polders was selected. Among the 17 polders, 4 have been considered for Coastal Embankment Improvement Project -Phase 1(CEIP-1)/W-01, which are 32, 33, 35-1 & 35-3 in the following referred to as 'the Project'.

The EIAs and the connecting EMPs relevant for Polder-35/1 of Coastal Embankment Improvement Project, Phase-I (CEIP-I) have been prepared. This EMP set-up has been translated in this Environmental Action Plan (EAP) for site operational use and purposes. The FIDIC-inspired Contract (CEIP-1)/W-01 is complete as to the Environmental, Health, Safety (EHS) compliances which are fully compatible the IFC/EHS Guidelines, as outlined in the following WB/IFC website:

<http://www.ifc.org/wps/wcm/connect/3aa0bc8048855992837cd36a6515bb18/4%2BConstruction%2Band%2BDecommissioning.pdf?MOD=AJPERES>

These guidelines had been disseminated and instilled among all key site managers of the four Polders. As the IFC guidelines are conforming to the said Contract, it is not appended to this EAP Document. Contractor is frequently doing rehearsal and drilling sessions with the site managers to enhance the overall awareness.

1.2. Project Activities

The proposed interventions in the four Polders are almost of similar types. The interventions of polder-35/1 include the following rehabilitation and improvement activities:

Table 1-1: Project activities for rehabilitation and improvement

Sl. No	Project Activities of Polder 35/1	Quantity
1	Re-sectioning of embankment	49.70 km
2	Construction of retired embankment	7.30 km
3	Construction of Forward embankment	5.00 km
4	Forwarding of embankment with slope protection	1.5 km
5	Construction of drainage sluices	15
6	Construction of drainage sluices under Aila	
7	Repairing of drainage sluice	2

Sl. No	Project Activities of Polder 35/1	Quantity
8	Construction of flushing inlets	17
9	Repairing of flushing inlets	3
10	Demolishing of drainage sluices	-
11	Demolishing of flushing inlets	3
12	Re-excavation of drainage channels	70.50 km
13	Bank revetment/protection works	1.0 km
14	Slope protection of embankment	17.25 km
15	Closure	-

1.3. Relevant Environmental Impact Assessment (EIA)

The Environmental Impact Assessment (EIA) report has been prepared for the Polder-35/1, which also contains an Environmental Management Plan (EMP) to be carried out during the pre-construction, construction and operation phases of the project.

1.4. Purpose of the Environmental Action Plan (EAP)

This EAP has been drafted for Polder No. 35/1. For a complete overview of the environmental and social issues connected with this Environmental Action Plan (EAP) reference is made to the EIA for Polder No. 35/1.

The specific Works to be executed in Polder No. 35/1 including their chainage are shown on the map in Annex 1 (Overview Works Polder 35/1). The table in Annex 2 (Updated Work Programme - Oct-2016) gives an overview of their implementation in time.

EAP summarizes the actions required to implement the project components and related activities in an environmentally sound manner. Further, it sets out the actions to be taken in combination with the necessary compliance monitoring.

This document should be seen as a "living document"; subject to changes over time. During the execution of the Works, based on monitoring results or changes in working conditions or aspects of the Works, the necessary mitigation measures and monitoring activities could alter as well. Therefore, this document is subject for review as and when required.

1.5. Scope of the Environmental Action Plan

Particular areas for action are the avoidance of pollution of any land or water (coastal, transitional, surface or groundwater), the preservation of flora and fauna and the avoidance of disruption from noise, vibrations or dust and compliance of Occupational Health and Safety and Public Health and Safety during the course of the works. We are aware of and will be compliant with the recommendations of the Department of Environment (DoE), Bangladesh and the Environmental Safeguard Policies of World Bank. Moreover, with this EAP we intend to comply with the following contract clauses:

General Conditions	Specifications
4.8 Safety Procedures	1.07 Disruption of Local Communities
4.9 Quality Assurance	1.18 Signboards
4.14 Avoidance of Interference	1.20 Contractor's Offices, Workshops, Accommodation, Inspection shed, etc.
4.15 Access routes	1.21 Quality Assurance Plan
4.21 Progress reports	1.23 Sanitation
4.22 Security on site	1.24 Medical Arrangements and First Aid Facilities
6.6 Facilities for Staff and Labor	1.25 Construction and Maintenance of Temporarily Access Road
6.7 Health and Safety	1.26 Environmental Mitigation Works
6.13 Supply of Foodstuff	1.30 Contractor's Sites Facilities (2)
6.14 Supply of water	
7.2 Samples	

2. Environmental Actions per Project Component

In the following sections specific Environmental Actions are described for the major project components, as there are: Temporary Facilities (Section 2.1) and Construction Works (Section 2.2). The Environmental Actions are defined following assessment of the potential environmental and social issues related to the activities performed under these components. It must be noted that these sections should be read in conjunction with Section 3 in which the generic Environmental Actions as per environmental or social aspect are described. Appendix-1 provides a table containing a checklist for Environmental Actions while Appendix 2 summarises the Monitoring Activities.

2.1 Temporary Facilities

In order to mitigate and prevent potential impacts associated with the temporary facilities, the following measures will be taken as a minimum:

2.1.1 Construction Camp

- Before the commencement of the development of the construction camp, the contractor shall submit to the Engineer for approval a detailed layout plan for the construction camp showing the relative locations of all temporary buildings and facilities that are to be constructed together with the location of site roads, fuel storage areas (for use in power supply generators), solid waste management and dumping locations, drainage facilities, sanitary toilets, materials storage room; PPE store room; sites for industrial wastes, welding area/workshop for repairing vehicles and machinery, hazardous material storage shed, etc.
- For the location of construction camps, access roads, etc. a suitable area, away from local habitation ecological sensitive sites, cultural heritage sites and avoid filling the natural water bodies in cooperation with the local authorities will be selected.
- Minimum area will be required, which will be compatible with operational safety and environmental requirements.
- Before its construction, stripping will be carried out and if necessary, the field will be levelled. The removed material will be stored for use in restoring the area occupied by the camp at the end of the construction phase.
- Drainage channels and ditches in areas with slopes of less than 5% will be installed. These systems will discharge in a controlled way in natural field, and if considered necessary, grease or sediment traps will be installed.
- The drainage works like ditches, perimeter canals and storm water treatment systems will be permanently surveyed to prevent them from clogging by debris, especially the settlers.
- Operational areas will have a perimeter fence to have better control and avoid the entry of outsiders to work. They will also have the corresponding signalling information, restrictive and preventive aiming to perform all activities safely.
- All personnel working in these areas will be provided with personal protective equipment and be trained to perform the various tasks assigned.
- Workers' camp and associated facilities are connected to septic tank or other wastewater systems which are appropriate and of sufficient capacity for the number of workers and local conditions.
- Wastes generated from the camp should be reduced as much as possible, segregated and properly treated and disposed according to the law and regulations in Bangladesh.

- Water conservation and recycling of water; consideration of use of rainwater where feasible; avoiding contamination of fresh water sources.
- Reduced and safe use of dangerous chemical substances. Chemicals need to be properly stored, handled and disposed according to local regulations.
- Minimized land use change and use of other natural resources; avoidance of deforestation around camp area; prompt and effective response to environmental and social issues raised by supervision engineer.

2.1.2 Labour Influx

There is no migrant labour influx, local labourers are employed for the construction works. Labours are screened for any contagious diseases prior to their engagement.

2.1.3 Fuel supplies for cooking and heating purposes

- In order to discourage workforce to use fuel wood or other biomass, supplies of gas cylinder for domestic purpose will be ensured. Use of wood for fuel is prohibited.

2.1.4 Solid Waste Management

The activities of human generally generate waste materials that are often discarded because they are considered useless. These wastes are normally solid, and the word *waste* suggests that the materials are useless and unwanted. However, many of these waste materials can be reused, and thus they can become a resource of industrial production or energy generation, if managed properly.

Solid Waste Management (SWM) may be defined as that discipline associated with the control of generation, storage, collection, transfer and transport, processing and disposal of solid wastes in a manner that is accord with the best principles of public health, economics, engineering, conservation, aesthetics and other environmental considerations and that is also responsive to public attitudes.

2.1.5 Key objective of Solid Waste Management(SWM)

To minimize the adverse effect on environment caused by the indiscriminate disposal of solid waste.

2.1.6 Sources and types of Solid Waste (SW)

Under the CEIP Package-1, there are four polders. The work category and contractor's work and official arrangement is same for four polders. As a result, the source and type of SW almost same like domestic waste. Every polder has camp site area, Automatic CC block manufacturing plant area, Drainage/Flushing Sluice area and Embankment section.

Solid Waste (SW) is mainly generated at camp site and Automatic CC block manufacturing plant area. A portion of the plant area is used for residential purpose of contractor's personnel. Also, in Drainage/Flushing Sluice and Embankment section area local workers stay during working hours and act as potential sources of industrial and domestic waste generation.

2.1.7 Collection and Disposal of Solid Waste (SW)

Collection of SW at work sites (Main camp site, Automatic CC block manufacturing yard, DS/FS construction site and Embankment sections) is maintained on a daily basis. Sufficient sets of covered waste collection bin of 30L (separate for organic and inorganic wastes) will be arranged near the source of waste generation like kitchen, office room, living room, local worker shed, temporary worker shed, etc. It should also be monitored by the officer-in-charge so that the wastes are properly disposed in the bins.

For organic waste an earthen ditch should be excavated within the project premises with indication signboard. A trained person will be assigned for collection, separation, transfer, transport and disposal of waste to the excavated ditch.

Inorganic waste and recyclable wastes are also collected in a separate bins. Recyclable wastes such as packaging materials, paper, and one-time plastic products are sold to the recycle vendors. Finally, the wastes are transferred and transported to the local authorized dumping sites. Waste management flow plan for the two sites – Rayenda, 5-Rastar Moor, Tafalbari CC Block Plant and Tafalbari Bus Stand are shown in the schematic diagrams below (Fig. 2.1 and Fig. 2.2) respectively. Moreover, a summary of the estimated amount of per capita waste generation, waste collection/disposal frequency and numbers of people residing in the area is also given in the Table 2.1 below.

Industrial wastes generated from CC block plants are mainly used oil and chemicals, waste plastics, waste parts, etc. These are collected by workers and temporarily stored at the temporary storage area established at each CC block plant and they will be treated, disposed or recycled by the contractor or waste vendors. The detail of the waste stream is provided in Table 2.1 below.

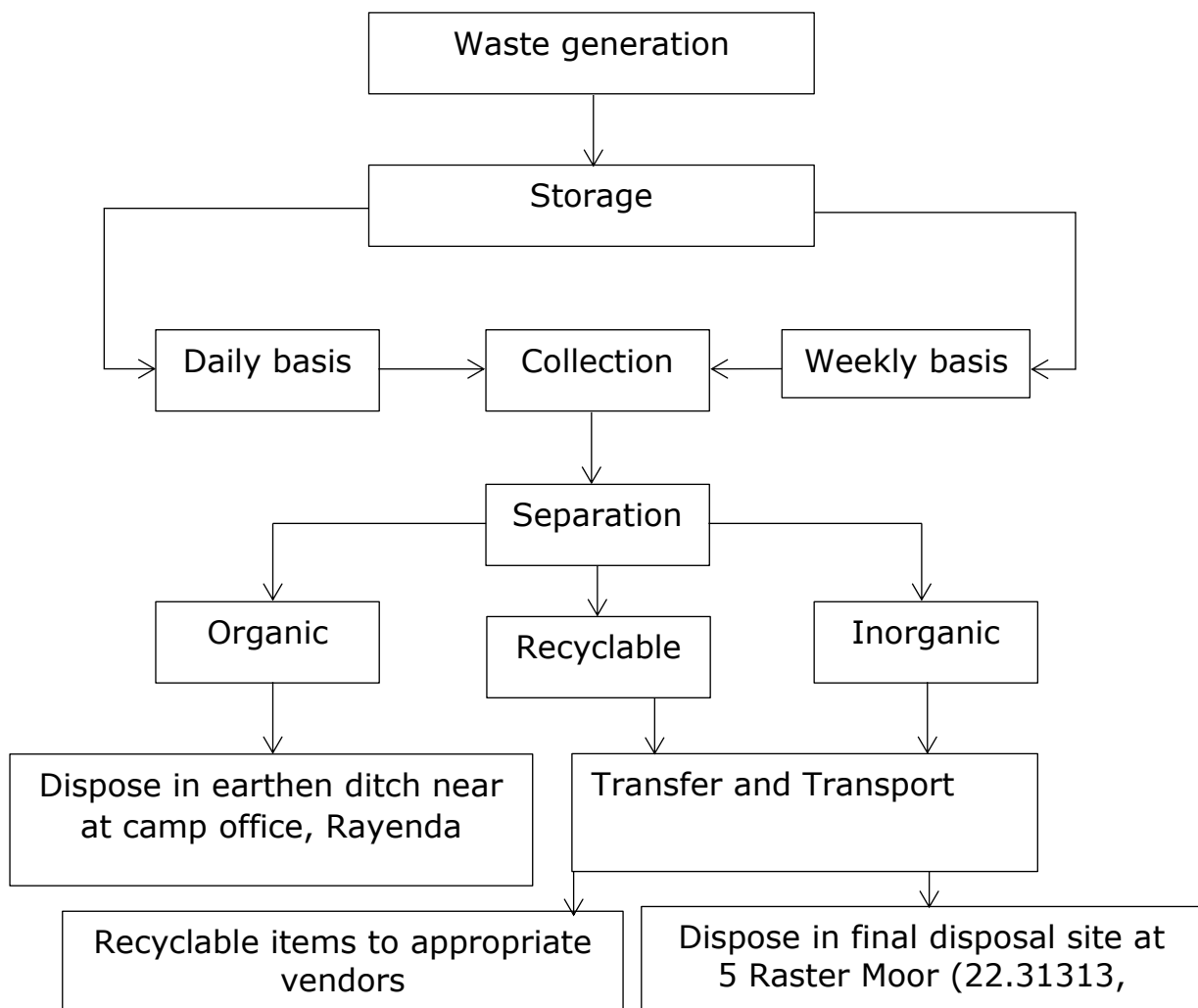


Figure 2-1: Waste Management Plan for Polder-35/1, Main Camp, Rayenda

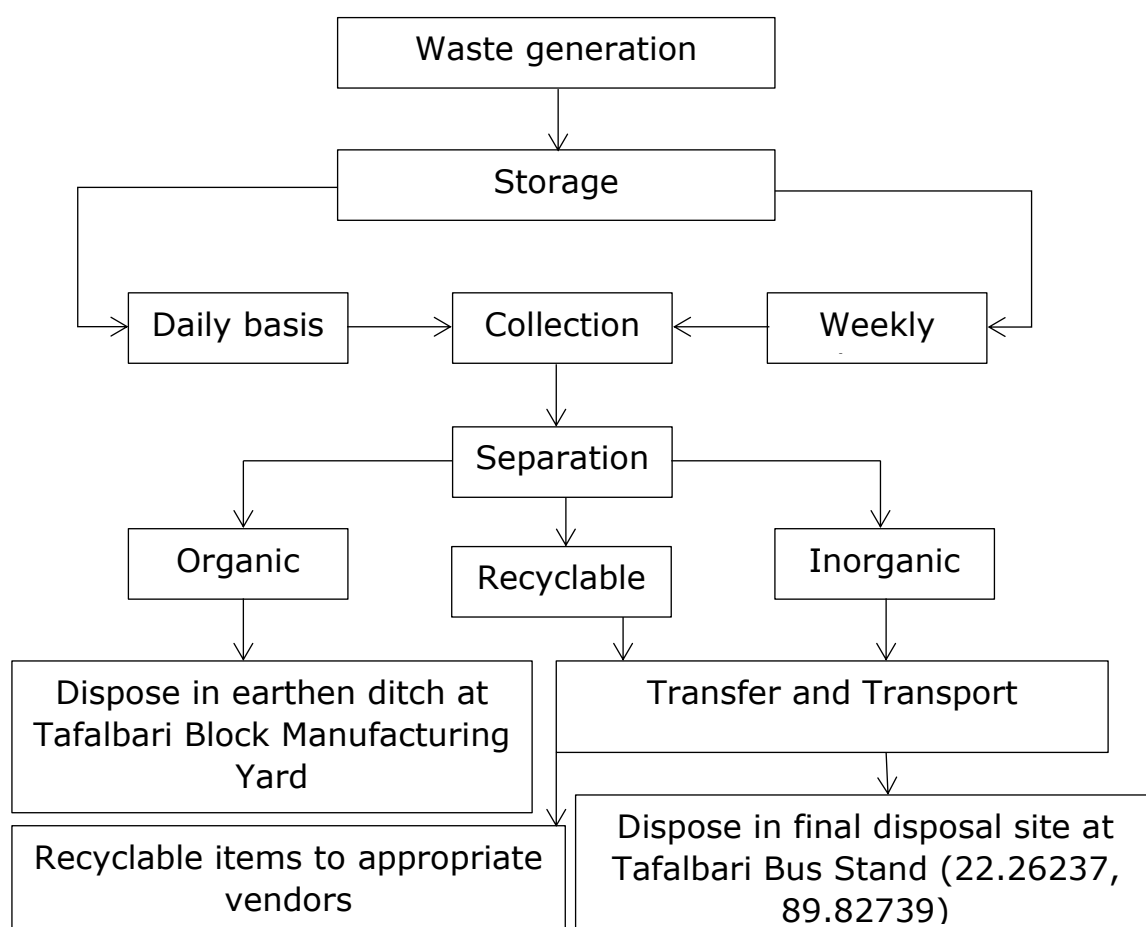


Figure 2-2: Waste Management Plan for Polder-35/1, Tafalbari block manufacturing yard.

Table 2-1: Waste generation summary for Polder-35/1

Source location and type	No. of workers	Frequency of collection		Frequency of disposal		Type of generated waste	Avg. Waste generation per capita (kg/capita/day)
		organic	inorganic	organic	inorganic		
Main camp, Residential site	15	Daily	Daily	Daily	Weekly	Domestic	0.050
CC plant, Residential site+ temporary work	55	Daily	Daily	Daily	Weekly	Domestic	0.050
DS/FS, temporary work (3 nos. site)	15	Daily	Daily	Daily	Weekly	Domestic	0.020

2.1.8 Fuel Storage Areas

- All fuel stored on site will be confined to specific, secured, and bunded areas with an impervious surface. Fuel storage areas will have an adequate secondary storage capacity (at least 110% of the total volume stored in the tanks) and be protected from the direct sun light and rain.
- The physical condition of the tanks and the inlet and outlet of the fuel will be checked to prevent spills by deficiencies in them.
- A control valve will be installed for drainage of rain water in the fuel storage area. The valve will remain padlocked at all times. For drainage of rain water a grease trap will be incorporated prior to discharge on the storm water channel to control oil discharges into the environment.
- Fuel storage areas will be clearly marked indicating the dangers of explosion.
- Points will be marked with the location of fire extinguishers, sand storage with bucket and shovel at nearby distance of fuel storage area. Fire extinguishers will be placed under the shade, free from rain and sunshine and will contain date of expiry.
- Fuel storage area will be installed in an elevated place to protect from the tidal effect, especially for automatic CC block manufacturing plant as it will be located close to the river.
- The refuelling area will be impervious, approachable and facilitated with sufficient drainage system to prevent water logging.
- Protection measures in case of any accidental spillage will be ensured.
- All information of fuel storage area will be marked including container capacity, fuel type and dimension of secondary container, name and mobile number of responsible person.
- The Material Safety Data Sheet (MSDS) from supplier of hazardous substances (diesel, oil, lubricant) will be collected and placed besides containers/storage.
- Spill kit/absorbent mat will be in place to catch any spilled fuels at the location where potential spillage may occur.
- Sufficient hydrants to address potential fire should be equipped at fuel storage area as well as the areas where chemicals/fuels are used.

(Please see the Annex-12 for layout plan of Fuel storage area)

2.1.9 Access Roads Construction

- The existing Embankment is now being intensively used by the locals, therefore the contractor will also use the same as access road for the construction of embankment.
- The Cofferdam for DS/FS excavation will be used as common access road for both public and construction activities. The typical drawing of cofferdam is attached for reference (Annex 6).
- The fences and other elements that define and provide access to farms will be moved and put back in the state they were found in.
- Box culverts will be constructed when required for crossing water bodies.

2.1.10 Sanitation

- The construction camps and all work sites will be provided with hygienic sanitation facilities (with proper water seal) for the workforce.
- The location of the latrines will be at least 50 meter away from the accommodation facility and will be located at a safe distance from any water body

- Latrine will be installed in an elevated place to avoid the contact of tidal water or getting inundated during tidal surge or flooding.
- All latrines both at work sites and camp sites will be facilitated with proper door, roof, hand washing arrangement near the toilet (i.e. bucket with adequate water supply, hand washing liquid or soap, tissue, etc.)
- Separate latrines will be reserved for use by women.
- Treatment facilities (i.e., septic tank, soak pits, etc.) will be installed for sewerage of toilet and camp site wastes
- Emptying facility of septic tank will be ensured within the specific design period of time.
- All discharges from toilets will be piped to a proper designed sewage treatment facility prior to discharge to a natural watercourse.
- Wastewater from washrooms, kitchens, etc., will be disposed via the camp area's drainage system.
- Toilet blocks will be properly cleaned and disinfected on a daily basis.

(Please see the Annex-13 for the approved Layout Plan for Polder-35/1)

2.1.11 Water Supply

- The construction camps will be provided with potable water either through installing tube wells (hand pump, shallow and deep tubewell), Pond Sand Filter (PSF) or supplying safe bottled water. To ensure supply of safe drinking water, the quality of the water will be tested in laboratory for the required parameters.
- The location plan of tube wells (used for supplying potable water) will take into account that these are not sited near any sanitation facilities as to avoid water contamination.
- The distance of a tube well / surface water resource from a soak pit will be at minimum 15m.
- Drainage from the tube well will be diverted into the drainage system of the camp area.
- Separate tube wells are kept reserved for the use of women.
- Storm water drainage facilities at camp site will be provided.

2.1.12 Temporary Facilities Decommissioning

- During decommissioning of the camps, all natural areas will be reinstated, for which stripping material were removed and stored prior to the construction of camp will be used.
- The camp area, roads etc. will be recovered by dismantling if not needed for other purposes; to be decided upon in consultation with local authorities.
- Before the dismantling or handing over of the area, a review of it will be carried out in order to establish whether there are any environmental liabilities generated during the operation of the camp.
- Focus will be on removing any and all temporary structures, hardstands, etc.
- The intervened structures (roads, services, etc.) that have been damaged during activities will be reconstructed.
- Vegetation rehabilitation will take place in areas where there will be no further construction.
- The collection of wastewater and solid wastes in the area will be carried out properly, cleaning the grease and sand traps and disposing of these wastes

properly.

- In case of soil contamination by mineral oil, it will be removed and will arrange an agreement with a local industry that has treatment processes for contaminated soils and its proper disposal will be carried out.
- Checks will be carried out that the areas used by the camp and associated facilities are fully restored at the end of the work.

2.1.13 Electrical Safety

- Safety protocols, measures to be notified in a clearly visible place at the work place and other areas where there are electrical appliances/equipment.
- Proper PPEs to be used when using/operating any electrical machine/ equipment
- Electrical wires to be checked regularly for proper insulation to prevent any accident or fire due to short circuit.
- Some of the staffs to be trained to handle emergency situation and liaison to be maintained with nearby hospitals for emergencies.

2.1.14 Forklift Operation

- Forklift Operators to have valid licence to drive forklifts
- Forklifts to move on designated routes while transferring loads, CC Blocks, etc.
- Warning lights, beeps to be 'ON' when operating
- No overloading to avoid any accident due to unbalancing or stumbling
- Forklift operators to use proper PPEs

2.1.15 Safety at barge

- Safety protocols, measures to be notified and maintained while loading/ unloading at the barge.
- Anchoring the barge securely
- Overloading to be strictly prohibited.
- Loading with balance.

2.1.16 Construction Works

Construction Works in Polder No. 35/1 comprises the construction and re-sectioning of embankments, construction of sluices and inlets, the bank and slope protection works, the re-excavation of drainage channels.

2.1.17 Construction and re-sectioning of embankments

- Pavement (if present) will be removed and disposed of at the premises of BWDB.
- Top soil from areas of earth works will not be used for construction works. The top soil (from surface to 15 cm depth) will be removed and preserved for later use of replacing after construction and during rehabilitation.
- Disposal of excess soil will be done at site with no objection from DoE and local authority.
- All works will be demarcated clearly.
- Signals will be installed to indicate the entry and exit points of vehicles and movement of construction equipment in the work area.
- Borrow material (earth) will preferably be collected from outside the polder areas in order to protect the fertile agricultural land (country side) and control of

river erosion (river side).

- Borrow materials will be tested for any contamination/toxicity and will only be used when free of any toxic or harmful pollutants. If the borrow material is found contaminated it will be properly treated prior to any use.
- Earth will not be borrowed from close to the toe line on any part of the embankment.
- Borrowing will be avoided from the following areas:
 - Lands close to toe line and within 50m from toe line.
 - Irrigated agricultural lands (In case of necessity for borrowing from such lands, the topsoil shall be preserved in stockpiles, although borrowing of agricultural land is discouraging).
 - Grazing land.
 - Lands within 1 km of settlements.
 - Environmentally sensitive areas such as reserve forests, protected forests, sanctuary and wetlands. A distance of at least 500 m will be maintained from such areas.
 - Water-bodies (only if permitted by the local authority and with specific pre-approved re-development plans by the concerned authority and engineer-in-charge).
 - Streams and seepage areas.
 - Areas supporting rare plant/ animal species.
- Following data will be documented for each identified borrowing area before commencing the borrowing activity that provides the basis of the re-development plan:
 - Chainage along with offset distance.
 - Area (Sq.m).
 - Photograph and plan of the borrowing area from all sides.
 - Type of access/width/surface from the roadway.
 - Soil type, Slope/drainage characteristics.
 - Existing land use, for example barren / agricultural /grazing land.
 - Location/name/population of the nearest settlement from borrow area.
 - Quantity excavated (likely and actual) and its use.
 - Copy of agreement with owner/government.
 - Community facility in the vicinity of borrow pit; and
 - Rehabilitation certificate from the land owner along with at least four photographs of the rehabilitated site from different angles.
 - To minimize adverse impacts during excavation and transport of material the following measures will be undertaken:
 - At the stockpiling locations barriers will be constructed to prevent the removal of excavated material due to runoff.
 - During transportation of the material, measures will be taken to minimize the generation of dust and to prevent accidents.
 - EHS manager to check site plan and equipment used at each construction site prior to start of civil works and review if necessary EHS tools are provided and if any special attention/ mitigations required. e.g. noise monitoring at community areas.

- Oil & Chemicals – provide secondary containment, bund, ditch and spill kits where oils/chemicals are used. Oil & chemical storage areas should be established at a work site. Display signs.
- Noise- (1) monitor noise level at settlements when they are close to construction site and (2) provide quality ear plug/muff to workers, noise barrier if necessary.
- Traffic management at construction site where any works outside the demarcated areas are involved. E.g. temporary closure of a part of road, deployment of guard, etc.
- Wastes generated from construction activities will be segregated and re-used/recycled when possible. The remaining wastes will be treated and disposed following the local regulations.
- To reduce dust and air pollution, regular watering at the construction sites will be conducted. The appropriate cover will be provided on the construction materials stored at sites and on the trucks to be transported. In addition, Inspection and maintenance of construction vehicles will be regularly carried out.
- Vegetation/tree clearance will be carried out only when the necessary permits are obtained.
- Sufficient EHS precautionary signage should be provided.

2.1.18 Demolishing and Construction of drainage sluices, flushing sluices and inlets

- Demolishing debris of sluices and inlets will be disposed of at a site approved by the Engineer.
- Before starting the construction activities of drainage sluices, ring bundh and diversion channel will be constructed and a dewatering system (ensuring that dewatering operations do not result water turbidity > 30 NTU entering natural waterways) will be installed in order to work in dry conditions.
- Disposal of excess soil will be done with no objection from DoE and local authority.
- No waste water from concrete mixing will be disposed of directly to the surface water.
- Steel sheet pile driving will not be done at night.
- The work area will be demarcated clearly.
- Signals will be installed to indicate the entry and exits of vehicles and movement of construction equipment in the work area.
- Prior to every monsoon season all the temporary and permanent drainage structures under construction will be made free from debris.
- EHS manager to check site plan and equipment used at each construction site prior to start of civil works and review if necessary EHS tools are provided and if any special attention/ mitigations required. e.g. noise monitoring at community and adoption of proper measure, if necessary
- Noise- (1) monitor noise level at settlements when they are close to construction site and (2) provide noise barrier if necessary.
- Traffic management at construction site where any works outside the demarcated areas are involved. e.g. temporary closure of a part of road, deployment of guard, etc.
- Wastes generated from construction activities will be segregated and re-used/recycled when possible. The remaining wastes will be treated and disposed following the local regulations. Special care will be taken for the hazardous waste.

- To reduce dust and air pollution, regular watering at the construction sites will be conducted. The appropriate cover will be provided on the construction materials stored at sites and on the trucks to be transported. In addition, Inspection and maintenance of construction vehicles will be regularly carried out.
- Sufficient EHS precautionary signage should be provided.

2.1.19 The bank and slope protection works

- Spilling of earth material in surface water will be avoided.
- Turfing of the slopes with indigenous plant/grass species will be applied to prevent erosion.
- Proper drainage provision will be kept to avoid formation of rain cuts due to surface run off.
- Use of required PPE will be ensured for the workers,
- Proper demarcation, signage and signalling system will be in place.
- EHS manager to check site plan and equipment used at each site prior to start of civil works and review if necessary, and if any special attention/ mitigations required. e.g., noise monitoring.
- Noise- (1) monitor noise level at settlements when they are close to construction site and (2) provide noise barrier if necessary.
- Traffic management at construction site where any works outside the demarcated areas are involved. e.g., temporary closure of a part of road, deployment of guard, etc.
- Wastes generated from construction activities will be segregated and re-used/recycled when possible. The remaining wastes will be treated and disposed following the local regulations.
- To reduce dust and air pollution, regular watering at the construction sites will be conducted. The appropriate cover will be provided on the construction materials stored at sites and on the trucks to be transported. In addition, Inspection and maintenance of construction vehicles will be regularly carried out.
- Vegetation/tree clearance will be carried out only when the necessary permits are obtained.
- Sufficient EHS precautionary signage should be provided.

2.1.20 Re-excavation of drainage channels

- Unnecessary re-suspension will be avoided by selection of suitable dredging equipment.
- Re-excavated material may be used as embankment material (if necessary and applicable; and if uncontaminated) or will be placed at suitable places, subject to approval of the Engineer.
- Temporary deposition of dredged material will be far from the channel edge to limit damage to streamside and stream habitats.
- Return water will be conveyed through siltation chambers to avoid high loads of fine silt to be discharged in surface water.
- Where applicable biotechnical engineering, for example geo textiles, may be used to help stabilize the material.
- Smothering of important flora and habitats will be avoided (e.g. section wise excavation works, use of quality equipment to avoid vibration and noise).
- EHS manager to check site plan and equipment used at each excavation site

prior to start of civil works and review if necessary EHS tools are provided and if any special attention/ mitigation is required. e.g., noise monitoring.

- Noise- (1) monitor noise level at settlements when they are close to excavation site and (2) provide noise barrier if necessary.
- Traffic management at excavation site where any works outside the demarcated areas are involved. e.g., temporary closure of a part of road, deployment of guard, etc.
- To reduce dust and air pollution, regular watering at the excavation sites will be conducted. The appropriate cover will be provided on the construction materials stored at sites and on the trucks to be transported. In addition, inspection and maintenance of construction vehicles will be regularly carried out.
- Vegetation/tree clearance will be carried out only when the necessary permits are obtained.
- Sufficient EHS precautionary signage should be provided.

2.1.21 Manufacture of pre-cast CC blocks

The mitigation of the followings will be implemented fulfilling other environmental obligations during the Project which rests with the Project Director (PD). All the mitigation measures proposed in EHS Risk Assessment will be implemented under the institutional arrangement proposed in EAP that include - the Contractor will implement the EHS Risk assessment and it would be monitored by the Environmental Specialists of PMU, DDCS&PMSC and third party M&E Consultants as proposed in EAP.

- Workers will be equipped with proper PPE.
- Signals will be installed to indicate the entry and exits and movement of vehicles in the work area.
- A flagman should be appointed to regulate movement of vehicles, workers and visitors along with their safety.
- Forklift Operation Safety manual will be ensured in the site
- Separate operators' room within the CC plant will be ensured to minimize the noise exposure to the operator
- Generally, the manufacturing will take place at day time; it can only take place at night with proper environmental protective measurement.
- Stacks with sand will be covered or wetted
- Water spraying will be ensured in the yard and its surrounding areas to control dusts.
- Stacking to be done sensibly so that the stacked CC blocks do not collapse causing accident
- Worksite hazard assessment form/register to be kept updated
- Noise meter to be installed to monitor noise
- Checking and maintenance of the electrical wires, other electrical connections, components to avoid any fire or accident.
- Firefighting facility will be available and workers will have demo practices
- Use proper PPEs while welding, emergency kits to be handy, if needed.

2.1.22 Protection of Sundarbans

- Contractor will prohibit all employees from entering Sundarban.
- Contractor will organize training for all employees for awareness on the envi-

ronmental importance of Sundarban.

- Contractor will prohibit all employees from doing any activities which will have an adverse impact to the environment of Sundarban, such as making high noise, dumping wastewater into the river, hunting, capturing animals, cutting trees, etc.
- Contractor will monitor the noise level when construction activities near Sundarban is carried out during construction period.

Hard Rock Revetment to be assessed when the detailed design is completed

Hard rocks are not used, as the rock size proposed is not available. Instead CC Blocks are being used for revetment.

3. Environmental Actions per Environmental and Social Aspects

3.1 Occupational Health and Safety

A Health and Safety Plan has been developed and will be implemented that will include, but not be limited to:

- National and World Bank Occupational Health and Safety Standards in force and applicable to project activities.
- Environmental and security policies of the company.
- Worker responsibilities regarding the use and care of clothing and other personal protective equipment.
- Emergency procedures.
- Specific job hazards.
- Safety precautions.
- Job responsibilities.
- Training programme for all construction workers in basic sanitation and health care issues and safety matters and on the specific hazards of their work.
- Provision of HIV testing, including STI (sexually transmitted infections) information, education and communication.

The following services will be enabled at the construction sites:

- Fire extinguishers clearly signposted.
- First aid facility clearly signposted.
- Stock of medicines at site.
- Personal Protective Equipment.

3.2 Public Health and Safety

- Members of the public adjacent to the construction area will be notified of construction activities in order to limit unnecessary disturbance or interference.
- At all times, safe and convenient passage for vehicles, pedestrians and livestock will be provided.
- All necessary measures for the safety of traffic during construction will be taken, including signs, markings, flags, lights and flagmen as may be required.
- The temporary traffic detours in settlement areas will be kept free of dust by frequent application of water.
- Construction activities will be undertaken according to during daylight working hours between the hours of 07:00 – 17:00 on weekdays.
- Construction vehicles will avoid public roads during peak hours.
- Special consideration will be given to the safety of pedestrians and workers at night.
- Liaison with the communities will be maintained and Grievances Redress Mechanism to be established immediately

3.3 Cultural Properties

- Necessary and adequate care will be taken to minimize impact on cultural properties which includes cultural sites and remains, places of worship including temples, mosques, churches and shrines, etc., graveyards, monuments and any other important structures as identified during design and all properties / sites / remains notified.
- No work will spill over to these properties and premises. If needed, design options for cultural property relocation and enhancement will be prepared.
- All conservation and protection measures will be taken up as per design. Access to such properties from the road will be maintained clear.

3.4 Waste

3.4.1 Non-hazardous Solid Waste

The following measures for the handling and management of non-hazardous solid waste will be implemented:

- Installing containers/bins to store non-hazardous solid waste. Containers must have sufficient capacity for the frequency of collection established at the work sites.
- Containers used for storage of waste should be provided with lids that prevent rainwater from entering the trash and overflow them. This will also prevent the sun to accelerate waste decomposition, generate odours or help the proliferation of flies or spilled/scattered by the scavengers like stray dogs, crows, or monitor lizards.
- The term collection includes not only the collection of solid wastes from the various sources, but also the hauling of these wastes to the location where the contents of the collection vehicles are emptied.
- The term collection includes not only the collection of solid wastes from the various sources, but also the hauling of these wastes to the location where the contents of the collection vehicles are emptied.
- Waste produced will be collected for disposal at an appropriate waste dump site.
- No burning of solid waste out on the open or in the containers will be done.

3.4.2 Hazardous Waste

The following measures for the handling and management of hazardous solid waste will be implemented:

- Stored in properly labelled containers for easy identification
- Separated from low lying, flood-prone areas.
- Secondary spill and leak containment will be installed.
- Extra fire hydrants will be provided near the storage area.
- Explosion-suppressing electrical fixtures and wiring will be used for electrical purpose, if needed.
- Adequate number of Fire extinguishers will be ensured.
- Explosion blow-out (pressure relief) panels will be provided in storage room.
- Will be located on an impervious surface.
- Will be protected from the rain and direct sunlight.
- Disposal in an appropriate way as soon as possible.
- Encourage proper treatment to recycle/reuse of waste.

3.5 Waste water

The following activities will be adhered to waste water at construction sites:

- Installation of decanter boxes for washing buckets and balloon mixers
- Installation of proper filtering elements.
- Carrying out periodic checks and clean-ups for the decanter box.
- Prioritize reuse of aggregates and water from the decanter box.

3.6 Air Emissions

The following activities will be adhered to:

- Fit vehicles with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition.
- Service all vehicles regularly in accordance with manufactures maintenance procedures to minimize emissions.
- Operate the vehicles in a fuel efficient manner.
- Cover haul vehicles carrying dusty materials (cement, borrow, etc.) moving between outside and the construction site or water construction material if suitable.
- Impose speed limits on all vehicle movement at the worksite to reduce dust emissions.
- Control the movement of construction traffic.
- Cover the construction materials to check erosion and dust/air and other pollution.
- Watering the material stockpiles, access roads and bare soils as and when required to minimize dust emissions.
- Increase the watering frequency during periods of high risk (e.g. high winds, hot and dry weather).
- Minimize the extent and period of exposure of the bare surfaces.
- Reschedule earthwork activities or vegetation clearing activities, where practical, if necessary to avoid during periods of high wind and if visible dust is blowing off-site
- Restore disturbed areas/side of the embankment as soon as practicable by plantation/vegetation/grass-turfing.
- Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust dispersion is prevented because of such operations.
- Performance of monitoring.

3.7 Noise Management

The following activities will be adhered to:

- Construction Vehicular Traffic
 - Maintenance of all vehicles in order to keep them in good working order in accordance with manufacturer's maintenance procedures.
 - Organizing the loading and unloading of trucks, and handling operations for the purpose of minimizing construction noise at the work site.
- Construction Machinery
 - Appropriately site all noise generating activities to avoid noise pollution to local residents
 - Maintain all equipment in order to keep it in good working order in accordance

with manufactures maintenance procedures.

- Construction Activity
 - Location of all noise generating activities to be avoided that will cause noise pollution to local residents.
 - Adjacent landholders, educational institution etc. will be notified prior to any typical noise events.
 - Temporary noise control barriers will be installed where appropriate.
 - Activities on site and deliveries to and from site will be organized such as to minimize impact.
 - Working during 09:00pm to 06:00 am will be avoided within 500m from the existing residences.
 - Monitor and analyse noise and vibration results and adjust construction practices as required.

3.8 Water Management

Measures will be taken in order to prevent pollution, erosion and sedimentation in water courses by:

- Refuelling will not take place within 50m from surface water.
- Installing temporary sediment basins, where appropriate, to capture sediment-laden run-off.
- Preventing all solid and liquid wastes entering waterways by collecting solid waste, oils, lubricants, chemicals, fertilizer waste and transport to an approved waste disposal site.
- All temporarily working sites will be reinstated ASAP to its initial conditions (relief, topsoil, vegetation cover).
- Excess water coming from filling up land with riverbed material will be discharged to the river directly.
- Preventing discharge of cement and water used for curing cement concrete into water courses and drainage inlets.
- Monitoring the water quality in the runoff from the site or areas affected by dredge spoil plumes and improving work practices as necessary.
- Use of plastic sheet or gravel in the workshop and equipment yard to prevent soil and water contamination.

3.9 Flora and Fauna Management

- Flora
 - Only designated sites allocated for construction works will be used.
 - Tree felling will be performed upon preliminary notification to the relevant authority (Divisional Forest Office, DoE).
 - All trees to be removed should be counted and marked to avoid excessive numbers of trees to be felled and provision of proper treatment of the remaining trees.
 - Adequate knowledge to the workers regarding natural protection and the need of avoiding felling/damaging trees during construction will be provided.

Trees will neither be cut nor felled if birds are nesting on the trees and will stand there till the fledglings leave the nest.

- Tree cutting and clearing will be avoided around streams, restricted areas e.g.

native vegetation, protected riparian strips, historic and heritage sites, re-search areas.

- For site re-vegetation, local species will be selected as planting materials.
- Proper turfing should be implemented at embankment slopes with local grasses (i.e. Durba (*Cynodon dactylon*), Mutha (*Cyperus* sp.) and ensure regular monitoring of turf grasses till they are matured.
- Fruit and timber trees owned by local population will be compensated at their replacement cost according to market prices (Compensation guidelines to be followed).
- Fauna
 - No animals will be disturbed unnecessarily and no animals to be shot, trapped or caught for any reason whatsoever.
 - Critical breeding areas of major commercially important and threatened (if any) fish species will be identified, left undisturbed and declared as sanctuaries in consultation with the Department of Fisheries.
 - Creation of small lagoons and pools that may trap fish will be avoided.
 - Sufficient free flow will be guaranteed in the construction works to ensure free passage of migrating fishes.

Endangered animals like dolphins, turtles move in the peripheral rivers. Pinnars will be used to drive away the dolphins prior to initiation of dredging activities in the peripheral rivers.

- Dredging during spawning periods of commercially important fishes (like hilsa, pangas, sea bass, etc.) periods will be avoided.
- Dredging activities will create minimum sediment load in the water.

3.10 Soil Management

- Preferably soils from fallow lands / non-agricultural lands will be used in earth-works.
- To minimize the adverse impact during excavation, storage and transport of material the following measures will be undertaken:
 - Adequate drainage system will be provided at the excavated area if applicable.
 - At the stockpiling locations, sediment barriers to prevent the erosion of excavated material due to runoff will be constructed.
 - During transportation of the material, measures will be taken to minimize the generation of dust.
- Top soil will be striped before earth filling and stored for reuse at final surfacing of embankment top and tree plantation/afforestation.
- Top soil will be striped to a depth of 15 cm and store in stock piles of height not exceeding 2m to maintain the physico-chemical and biological activity of the soil.
- Unwanted materials like grass, roots of trees and similar others will be removed from top soil.
- Slopes of stockpiles will not exceed 2:1 to reduce surface runoff and enhance percolation through the mass of stored soil.
- Stockpiles will be located in areas outside drainage lines and will be protect from erosion.
- Topsoil stockpiles will be monitored and should any adverse conditions like erosion be identified, corrective actions will be taken.

3.11 Management of work site near Sundarban

Bangladesh has been divided into 25 bio-ecological zones considering the ecosystem features and species diversity (Nishat et al, 2002). The Polder 35/1 falls in three bio-ecological zones:

- The saline tidal floodplain
- The Sundarban and
- The Ganges flood plain

The Sundarban mangrove forest is situated in the southwest of Bangladesh, and extends from the international boundary with India along the Harinbanga -Raimangal-Kalindi river system in the west and Baleshwar River in the east. Also, Sundarban is located in the west side of the polder-35/1. This Polder is located close to the Sundarban forest area stretching from chainage km 25 to chainage km 35 along the perimeter.

About 62 per cent of the forest lies in the administrative districts of Bagerhat, Khulna and Satkhira in Bangladesh. This mangrove tract constitutes 44 per cent of the total forest area in Bangladesh and contributes about 50 per cent of the total revenue derived from the forestry sector (Tamang, 1982). But the most important value of the Sundarban stems from the protection it affords to millions of people against the ravages of cyclonic storms and tidal waves, which frequent the area from the Bay of Bengal.

As a result, during the construction of Embankment Section, Drainage Sluice (DS) or Flushing Sluice (FS) along the chainage of km 25+000 to km 35+000 special measurement must be taken.

3.12 Noise Monitoring

- Regular maintenance of all vehicles in order to keep them in good working order in accordance with manufacturer's maintenance procedures
- Loading and unloading of trucks and handling operation of different types of materials should be such ways that reduce the operation of noise.
- The construction activities that will produce noise such as generator, sheet piling operation should operate in a proper way to reduce the noise intensity.
- Temporary noise barrier will be provided in appropriate places to reduce the impact of noise towards the Sundarban.

3.13 Discouraging staff travel to the Sundarban

- All personnel of the contractors both local and Chinese will be informed about the important and significance of Sundarban.
- A special awareness growing training program will be arranged within every month to discourage the staff travel to the Sundarbans.

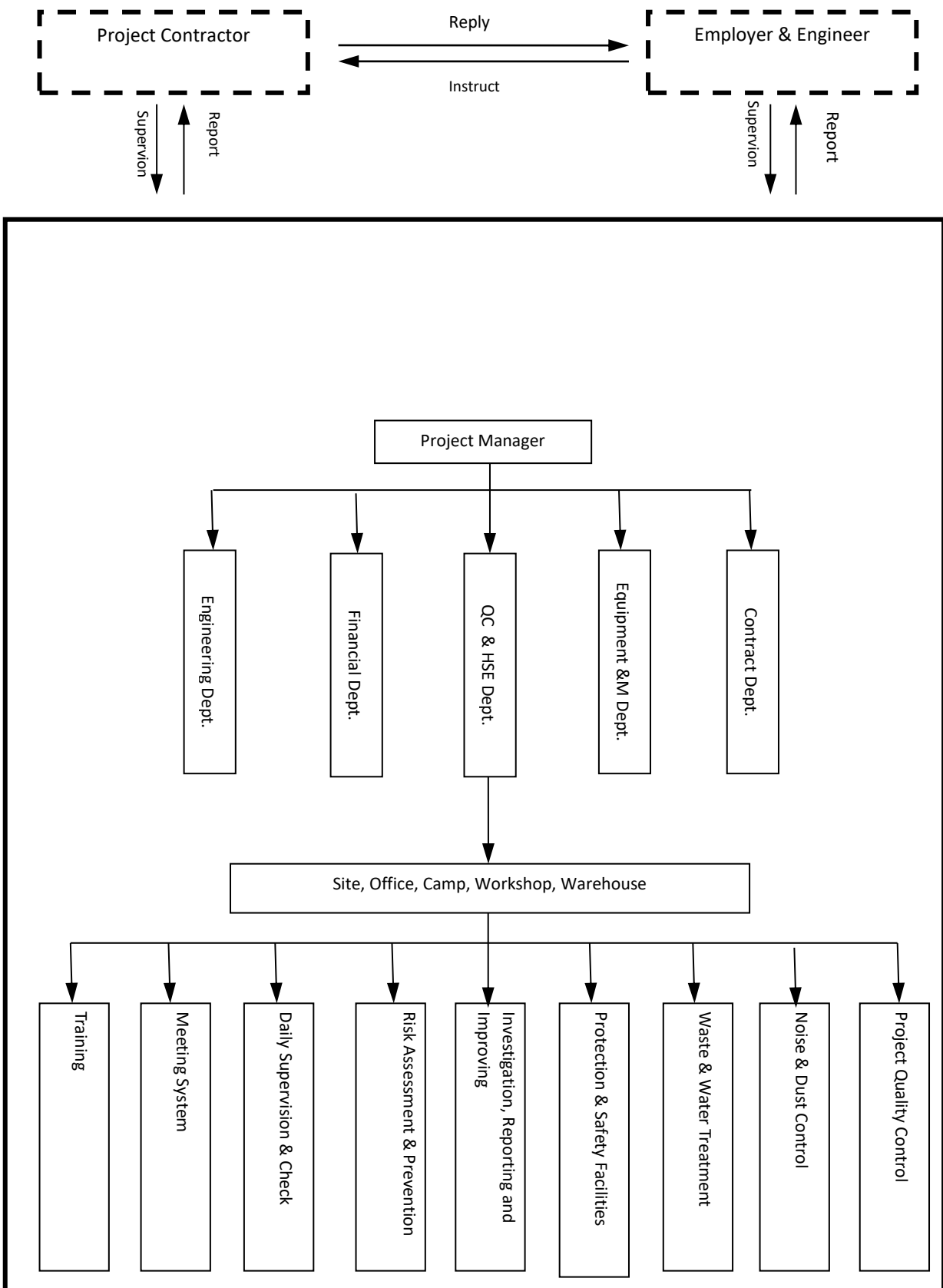
4. Environmental Management Organization

The Contractors Project Manager will be the first person in charge for work quality, safety and environmental protection. The Environment & Safety Officer will on behalf of the Contractor be responsible for the specific works, inspection and supervision and reporting to the Engineer periodically. The Khulna based Environmental & Safety Officer will be in charge of environmental compliance for all the 4 Polders of Package-1. An overview of the responsible staff is given in the following table along with the names and contact details (Table 4.1) and a flow diagram of the Environment Management Organization (Fig. 4.1).

Table 4-1: List of Environment and Safety Officers responsible for Environment Management

Polder No.	Name	Designation	Contact No.	E-Mail Address
Khulna Office	Jia Kai	QC & HSE Dept in charge	01876298227	Jiakai_ceip@163.com
35-1	Meng Qing-hua	QC & HSE Engineer	01753353897	3172850352@qq.com
35-1	Fang Shen-zhen	Assistant Environment & Safety Officer	01768585975	Fangshen-zhen_0529@163.com

Figure 4-1: Environmental Management Organization



5. Institutional Arrangement

5.1 Overall Responsibility

The overall responsibility of EMP implementation and fulfilling other environmental obligations during the Project rests with the Project Director (PD). For this purpose, the PD will be supported by environmental and social staff of the PMU, Design and Construction Supervision Consultants (DCSC), Third Party M&E Consultants and Contractors.

5.2 Construction Phase

- **Environment and Social Staff in PMU**

The BWDB will set up the PMU to manage the Project implementation. The PMU will be led by the Project Director (PD). To manage and oversee the environmental and social aspects of the Project, the PMU will have an Environment, Social, and Communication Unit (ESCU). The Unit will supervise compliance with and implementation of the EMPs for all the polders under all packages. The Unit will include a Senior Environmental Specialist. One environment specialist will be posted at the field level to support all three divisions. The ESCU will maintain liaison with WB safeguards team, regulatory agencies, and other stakeholders during the Project implementation. The ESCU will also coordinate with the environmental staff of the Construction Supervision (CS) Consultants. In order to effectively manage the EA process and EMP implementation, the ESCU will be established and made operational before awarding the contract to contractor. ESCU will be responsible for updating the EIA after receiving the pending information.

- **Environment and Social Staff with Construction Supervision (CS) Consultants**

The CS consultants will be responsible for overall supervision of polder rehabilitation related activities. The CS consultants will ensure quality control and report to PD. The CS will also assist the ESCU for ensuring environmental compliance and monitoring of progress including EMP and/or ECP implementation. The CS consultants will supervise the contractors, ensuring design compliance and quality of works. For supervising the EMP implementation, CS will have dedicated and adequately qualified and experienced environmental staff including field-based environmental monitors (EMs). The EMs will supervise and monitor contractors to ensure compliance with the EMP. The CS consultants' environmental staff will maintain coordination with the ESCU for the effective implementation of EMP and other environmental commitments and obligations of the Project.

- **Contractor's Environment Supervisors**

The construction contractors will deploy four dedicated, properly qualified and experienced, site-based Environment Supervisors (ESs), one ES for each polder. The ESs will be responsible to implement various aspects of the EMP particularly the mitigation measures to ensure that the environmental impacts of the construction works remain within acceptable limits. The ESs will maintain coordination with the CS (EMs) at the site level and will report to the EHS In-charge. The ESs will also be responsible to develop a training module, training plan and conduct environmental trainings for the construction crew.

The respective ESs with support from the CS and EHS In-charge will carry out the works mentioned in the EMP for the conservation and management of the environment at each polder. As a part of the monitoring, the ESs will conduct the tool box talk every day prior to starting the day's work or at a convenient time determined in consultation with the staffs.

Biological parameters vary with the season. Hence, seasonal aspects of monitoring the biological/environmental parameters will be determined in consultation with the CS.

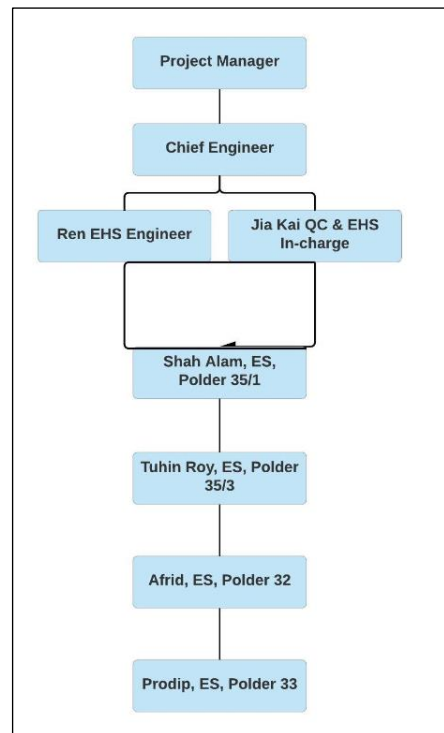


Figure 5-1: Environmental Supervisors (ES) appointed by the Contractor.

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*Chief Engineer will be responsible for the overall monitoring. In absence of Chief Engineer, Project Manager (Mr. Yang Dong) supervises the EHS activities/works.

Responsibilities of Environmental Supervisors:

- On-Site supervision, compliance monitoring
- Develop monitoring schedule and monitoring,
- Developing reporting format and weekly reporting,
- Design sampling protocols and schedule,

Prepare training module, annual training plan, training materials and conduct training.

5.3 Post-construction Phase

BWDB core unit has posts of 4 Assistant Chief and 2 Deputy Chief to oversee the overall environmental compliance of BWDB implemented projects. Under CEIP, the ESCU will provide training to the BWDB people responsible for monitoring of environmental compliance. Thus smooth transition to BWDB will happen to ensure environmental compliance during the O&M after the project completion. These staff will be responsible to manage the environmental aspects of the operation and maintenance of Polder, its water control structures, and other relevant issues such as protection of key environmental resources of the Polder and fish migration. In addition, movement of the endangered species like dolphins, migratory birds also needs to be monitored, documented and reported. Water Management organizations (WMO) will be formed under the Bangladesh Guidelines for Participatory Water Management (Nov 2000) and involve the beneficiary communities. WMOs will be trained by BWDB to ensure environmental management during project operation. Environmental Management Unit of BWDB will ensure and oversee the environmental management during project implementation and operation. The Water Management Organization will also be trained by the ESs and involved in EMP implementation during the operation phase.

6. Environmental Action Implementation Planning

Environmental and social components likely to be impacted by the project interventions are termed by as Important Environmental and Social Component (IESCs) during pre-construction, construction and post-construction phase. The impacted IESCs have to be managed by the contractor along with the DDCS&PMS Consultant according to the mitigation measures of EMP in Chapter -03.

To manage the EHS issues contractors will provide polder wise specific Environmental personnel and inspections also conducted with external consultants to maintain the monitoring frequency that is assigned in EMP. It is noted that for the year of January, 2016 to January, 2017 contractor has conducted the Monitoring of all parameters suggested by the Environmental Specialist of DDCS&PMS in accordance of EMP with the help of external consultant. (see Annex-15 for Specified Provisional Sums)

Comparing to the bidding document, it is not enough to ensure the sound implementation of all Environmental Actions.

The Contractor, Package-1 procured adequate numbers of (total 8 nos.) sound/noise monitoring equipment to measure sound/noise level of work sites. Generally sound recorders are maintained at each of functional CC plant and the rest are maintained at other noise producing sites like sluice construction areas (with generator) etc. for measuring noise level.

Four (4) out of six (6) CC Block manufacturing plants are active- Doratana CC Block plant has fulfilled the requirement and will be discontinued, and in Polder 35/1 Boroitala CC plant has already been discontinued. Noise is measured at the site as well as in the vicinity using the recorder and documented at the site register. Noise data was shared on a yearly basis with the consultants; from now on noise data is shared on a monthly basis with the consultants/PMU and incorporated in monthly report.

According to the Specification of the Contract, the total numbers of tests to be carried out on the items is shown in the Table 6.1 below.

Table 6-1: Numbers of tests for monitoring of environmental parameters

SI	Environmental Issues	Inspection Items	Quantity	Remarks
1	Monitoring of Air Quality	Performance of air quality tests at selected sensitive sites for parameters SPM 2.5/10, SOx, NOx and CO during working hours	18	Field
2	Monitoring of Noise Quality	Monitoring of noise level (dB) at selected sensitive sites during working hours	18	Field
3	Monitoring of Soil Quality	Performance of soil quality tests at selected sites (borrow areas, spill sites) for parameters as organic matter, N, P, K, pH, Salinity, etc., Zn and S.	26	Laboratory
4	Monitoring of Surface Water Quality	Performance of analyses on surface water (river, khal, beel and pond) for: pH, TDS, DO, BOD, EC/Salinity and Turbidity.	26	Laboratory
5	Monitoring of Drinking Water Quality	Performance of analyses on drinking water (not bottled) for: arsenic, iron, chloride, total and faecal bacteria contents.	4	Laboratory

Following are the locations of the sampling sites for the various tests conducted during the operational period.

CHECK EHS REPORT FOR SAMPLING LOCATIONS

7. Monitoring, Reporting and Record Keeping

Monitoring will help to evaluate the performance of the environmental protection measures as specified in this EAP and with that, the overall effectiveness of environmental management.

Monitoring consists of the following:

- Environmental Inspections (undertaken once a week.)
- Assessment of the inspections (monthly)
- Follow-up inspections on corrective actions (when needed)

The Environmental Inspections will generate the primary set of monitoring data that will be used to evaluate the effectiveness of environmental management and to demonstrate compliance with the Contract Specifications and implementation of EAP.

Monitoring Reports / Records will to be kept in an orderly manner and easily accessible to all concerned parties for the full period of construction. Documents (or copy of these) like workers' register, design drawings, etc. will be kept at worksite.

The following documents will be kept in contractor's local offices (per Polder):

- Results of Environmental Inspections.
- Noise monitoring data/register
- Compliance/non-compliance register
- Environmental Incident/accident Register
- Register of complaints.

The following records regarding environmental management issues will be kept at Contractors premises in Khulna as well as at active work sites:

- All necessary permits, including borrow area approvals, private landowners' permission for activities on their land, etc.
- Training Records (attendance lists).
- Register of non-compliance and corrective actions proposed.
- Monthly environmental evaluation reports.
- GRM records
- Correspondences.

Environment/social related complaints received from the public or other stakeholders will be registered and recorded by the Environmental Officer and brought to the attention of the Site Engineer. The following information will be recorded in the case of any complaint:

- Time, date and nature of complaint.
- Response and investigation undertaken.
- Actions taken and by whom.

All complaints will be investigated and a response is to be given to the complaint within 7 days of complaint receipt.

All environmental incidents occurring on the site will be recorded in an Environmental Incident Register. The following information will be provided:

- Time, date and nature of incident.
- Response and investigation undertaken.
- Corrective and preventative actions taken and by whom.

All environmental incidences will be immediately reported to the Engineer such as damage to land/structures, spills of hazardous materials, or other incidents which are likely to cause pollution and other detrimental environmental effects or loss or damage to private resources.

Environmental Inspections will be reported to the Engineer providing details of environmental problems (spills, dust, noise, etc.), non-conformities, safety incidents, etc., on a bi-weekly basis.

8. Contingency Planning

The objective of a Contingency (Emergency Preparedness and Response) Plan is to establish and define the actions to control/mitigate the occasional accidents and natural or human threats during project construction. It must provide efficient and immediate response for any emergency and it must guarantee the safety of all personnel of the project and third parties. It is recommended to conduct a detailed and quantitative risk analysis to inform the Contingency Plan. The plan must cover the following:

- An Approved Emergency Plan is shown as attached.
- Planning Coordination: This should include procedures for:
 - Informing the public and emergency response agencies
 - Documenting first aid and emergency medical treatment
 - Taking emergency response actions
 - Reviewing and updating the emergency response plan to reflect changes and ensuring that the employees are informed of such changes
- Emergency Equipment: The plan should include procedures for using, inspecting, testing, and maintaining emergency response equipment.
- Training: Employees should be trained in any relevant procedures

Basic elements are:

- Administration (policy, purpose, distribution, definitions, etc.)
- Organisation of emergency areas (command centres, medical stations, etc.)
- Roles and responsibilities
- Communication systems
- Emergency response procedures
- Emergency resources
- Training and updating
- Checklists (role and action list and equipment checklist)
- Business Continuity and Contingency

Areas of attention among others:

- Preparedness for natural disasters (eg., floods, storms leading to breach of embankment, etc.)
- Preparedness for fire prevention and control, road accidents, fuel spills, etc.
- Accidents involving labourers at the automated CC Plants or elsewhere within the polder

Accident /Injury register at all the construction sites and reported to DDCCS&PMS Consultants in the monthly reports in detail.

Maintain liaison with the nearest hospital and doctors. Contact numbers are posted in clearly visible sites within the polder area/construction area. Each polder has a vehicle which can carry the victim to the nearest hospital within the shortest possible time. In case the project vehicle is busy somewhere else, an ambulance or other vehicle can be hired to tend the victim.

Accident / Injury form (as in Annex) to document the incident and future reporting.

Weather updates, forecasts are regularly provided to the site offices. If any forecast detrimental to the on-going activity, the sites offices are informed at the earliest and work-staffs are moved to a safe place. Each polder has cyclone shelter.

Local workers are employed after passing the proper health screening.

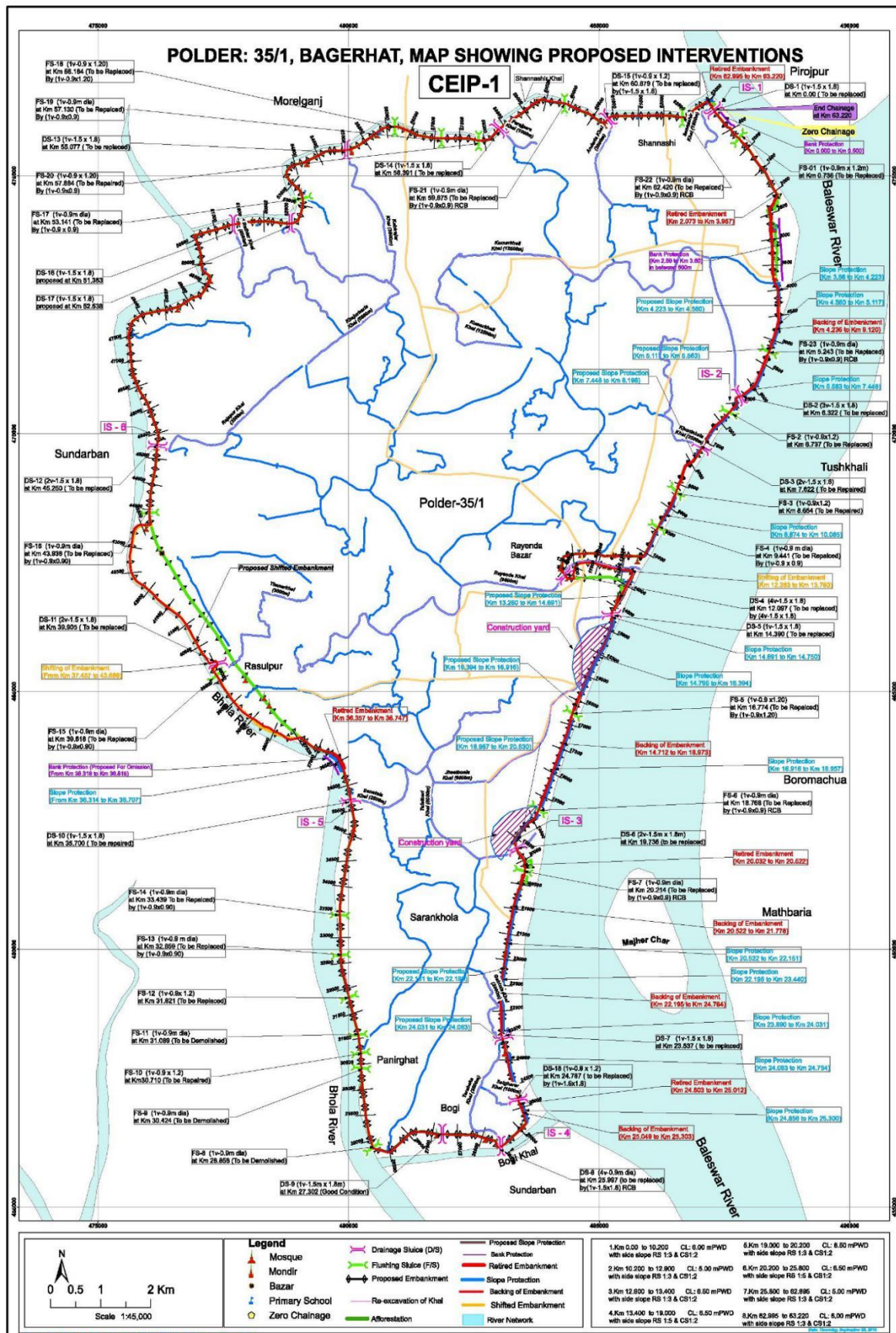
9. Site Specific Environmental Action Plan

Annex 3; 'Site Specific Environmental Action Plan' will be updated each quarter based on actual works executed, monitoring results, monthly environmental evaluation, etc. This Site-Specific Environmental Action Plan should be used in combination with Annex 1 and Annex 2; respectively 'Overview Works' and Updated 'Work Programme'.

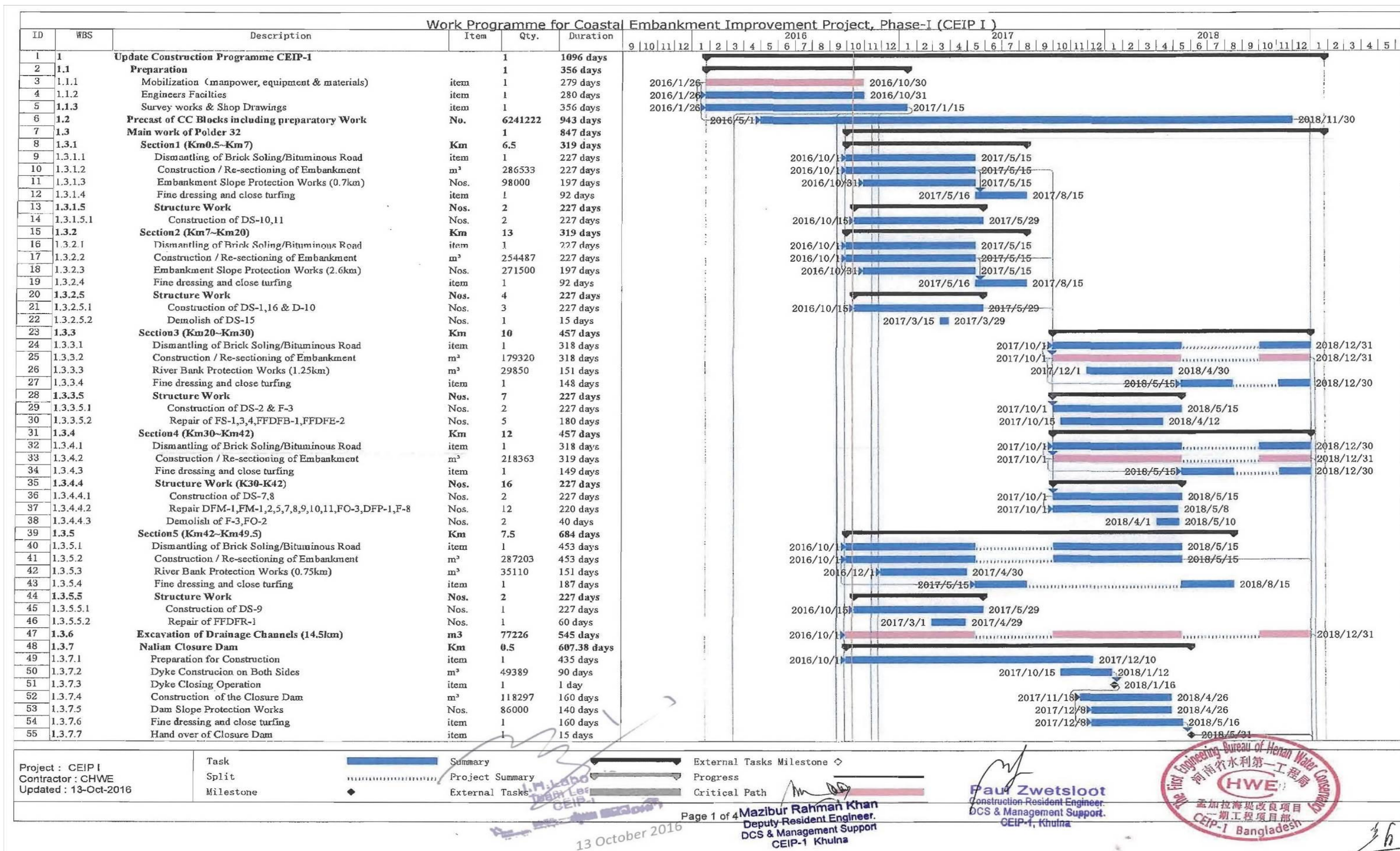
10. Environmental Monitoring

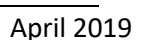
Extensive monitoring of the environmental concerns of the CEIP-1 project is required as per World Bank EHS-guidelines. The monitoring program will help to evaluate: (i) the extent and severity of the environmental impacts against the predicted impacts and baseline; (ii) the performance of the environmental protection measures or compliance with pertinent rules and regulations; (iii) trends in impacts; and (iv) overall effectiveness of the project environmental protection measures. The monitoring details are included in the 'Monitoring Plan' in Annex 4.

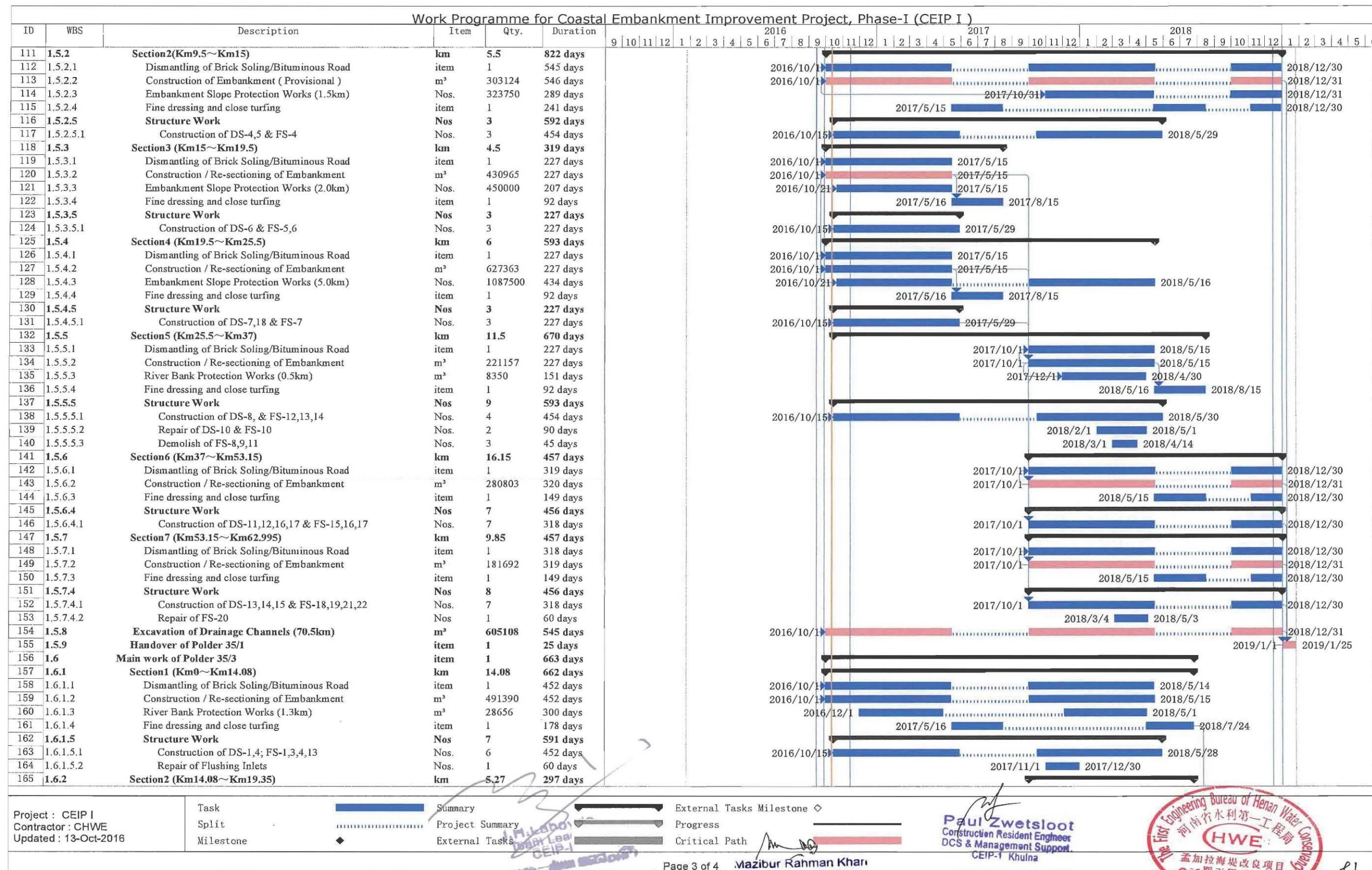
Annex-1: Overview Works Polder-35/1

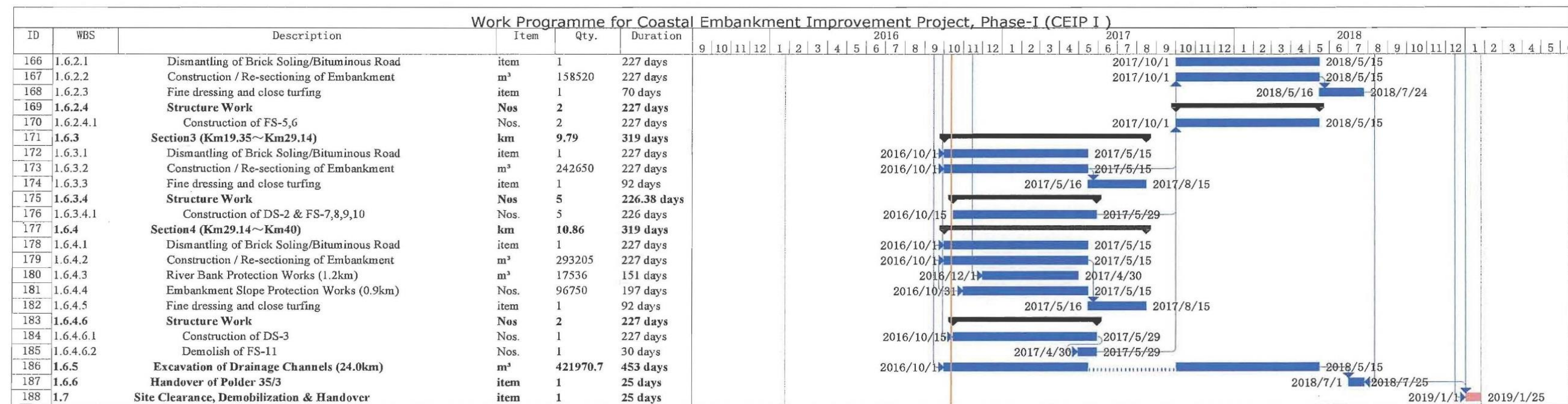


Annex-2: Update progress CEIP-1 Contract W-01









Project : CEIP I
Contractor : CHWE
Updated : 13-Oct-2016

Task
Split
Milestone

Summary
Project Summary
External Tasks

External Tasks Milestone
Progress
Critical Path

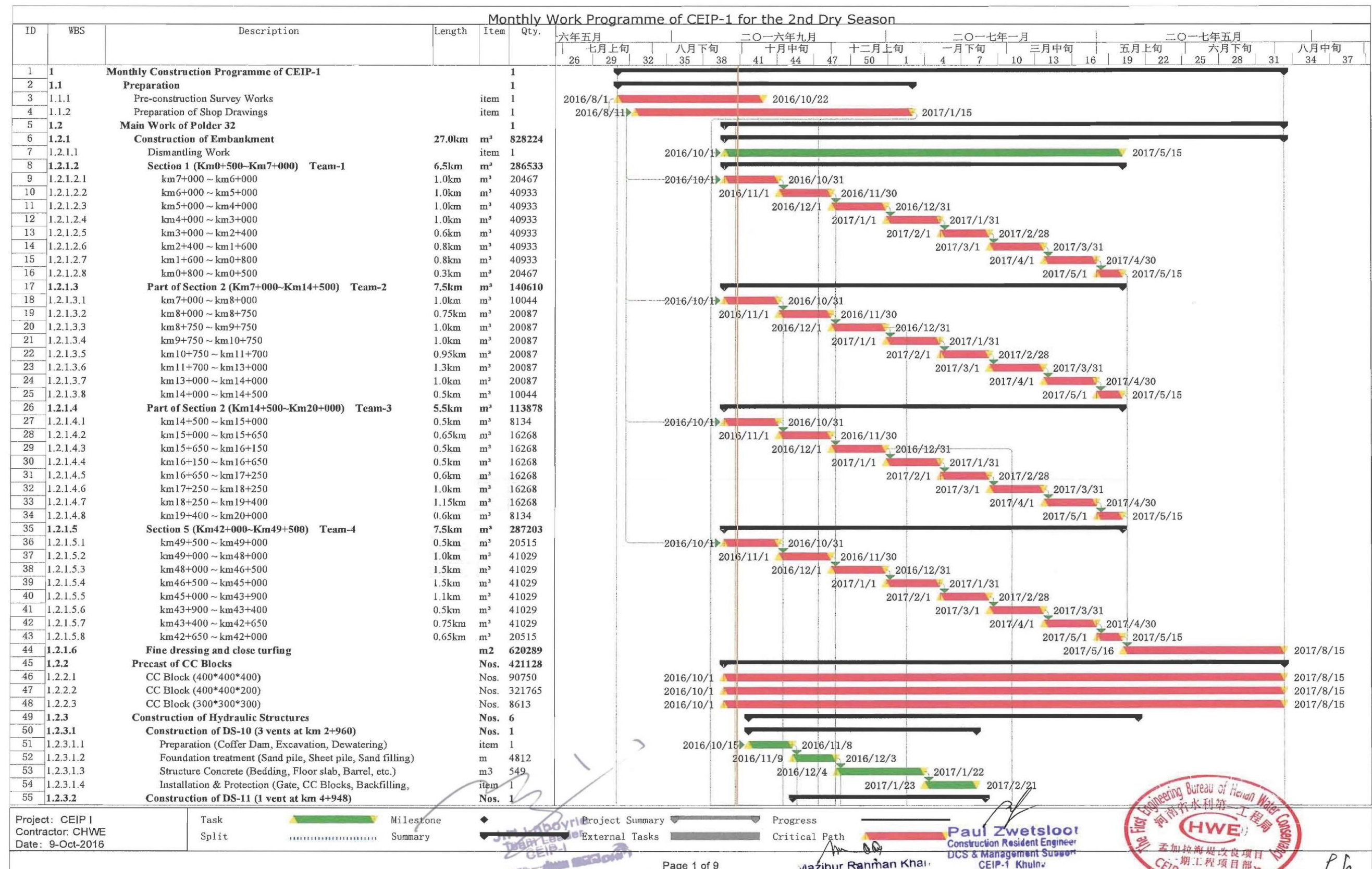
Paul Zwetsloot
Construction Resident Engineer
DCS & Management Support
CEIP-1 Khulna

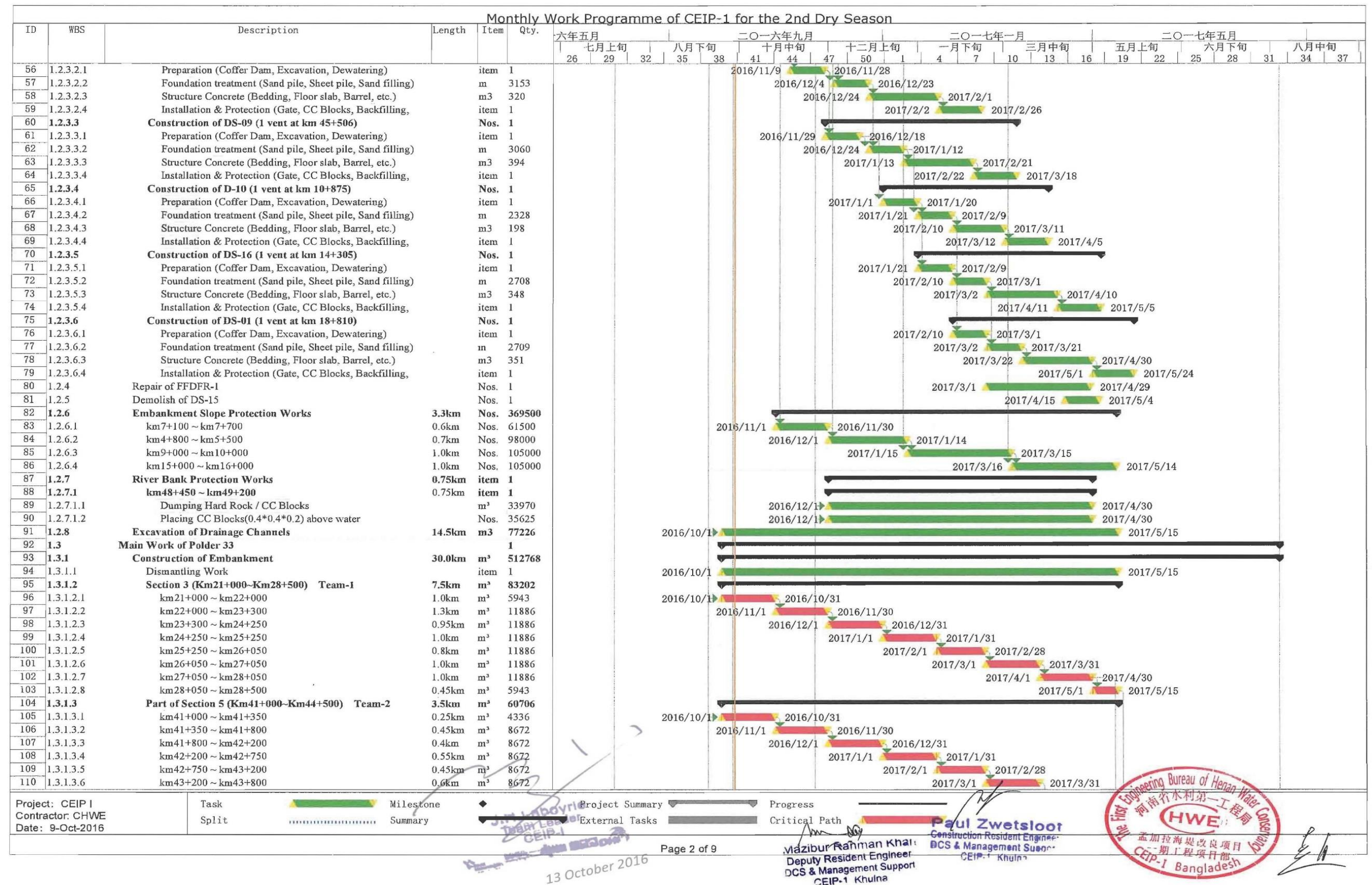
13 October 2016

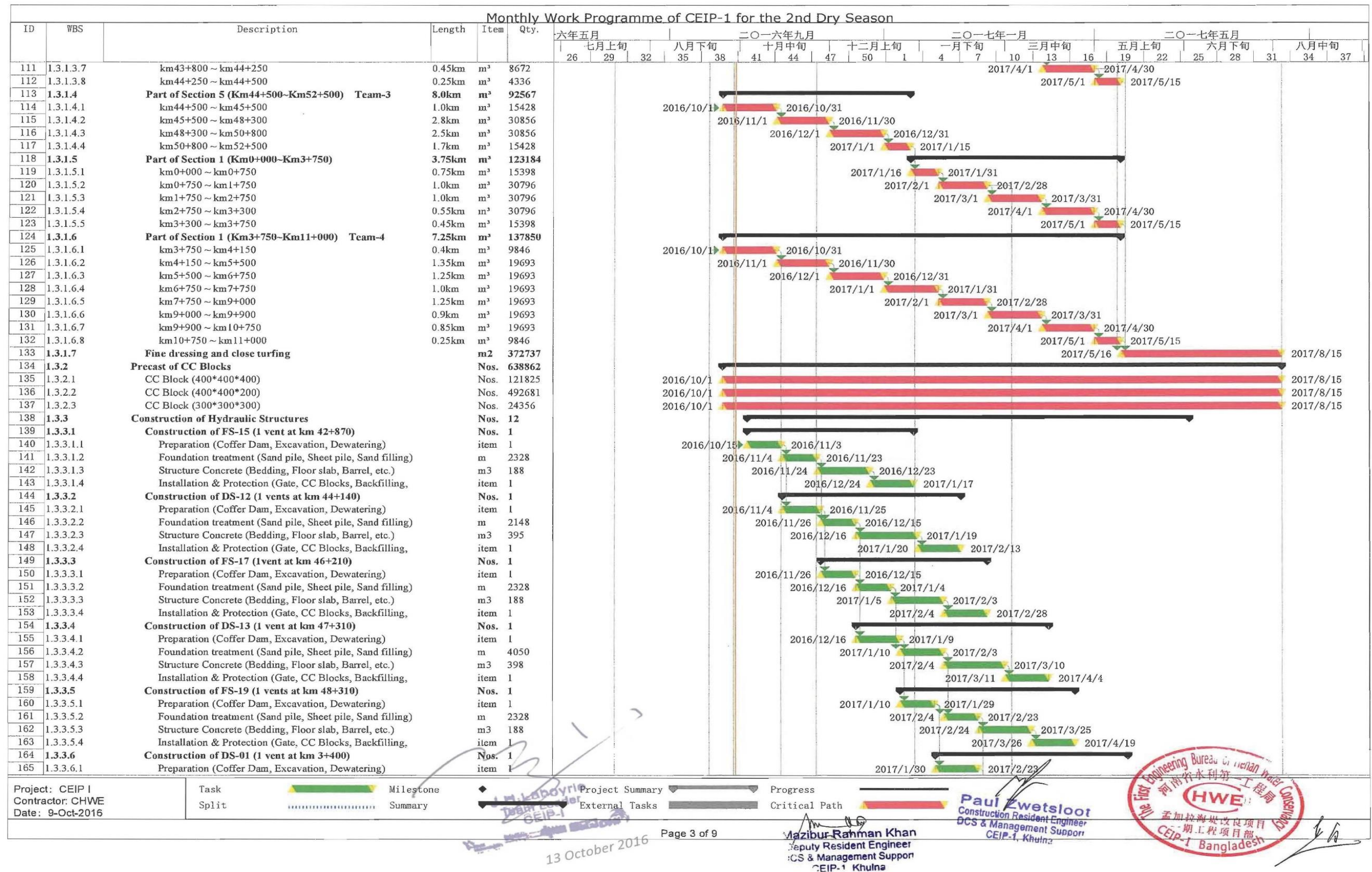
Page 4 of 4

Mazibur Ranman Khan
Deputy Resident Engineer
DCS & Management Support
CEIP-1 Khulna

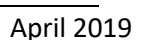
First Engineering Bureau of Henan Water Conservancy
河南省水利第一工程局
HWE
孟加拉海堤改良项目
一期工程项目部
CEIP-1 Bangladesh

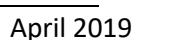


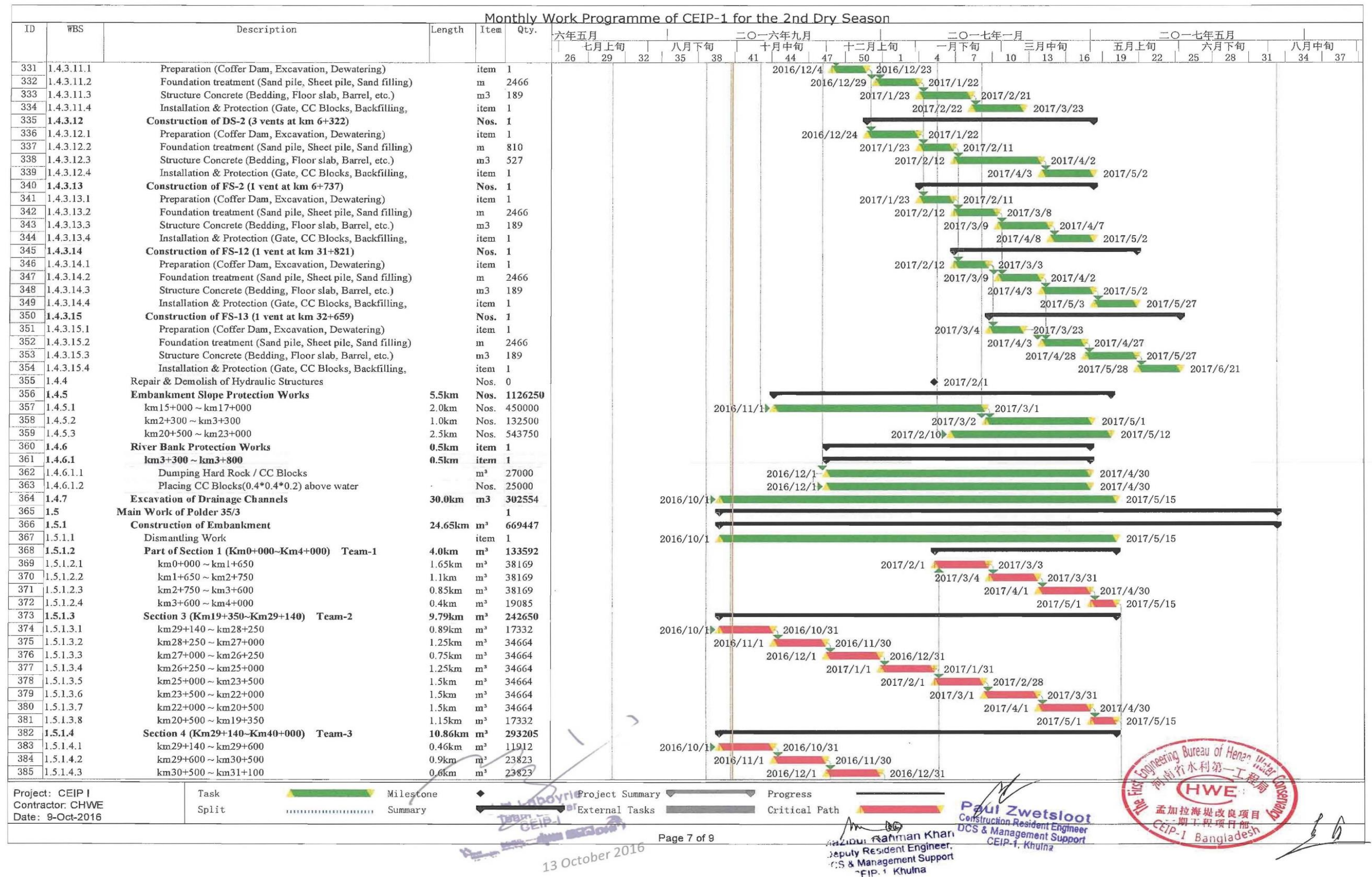


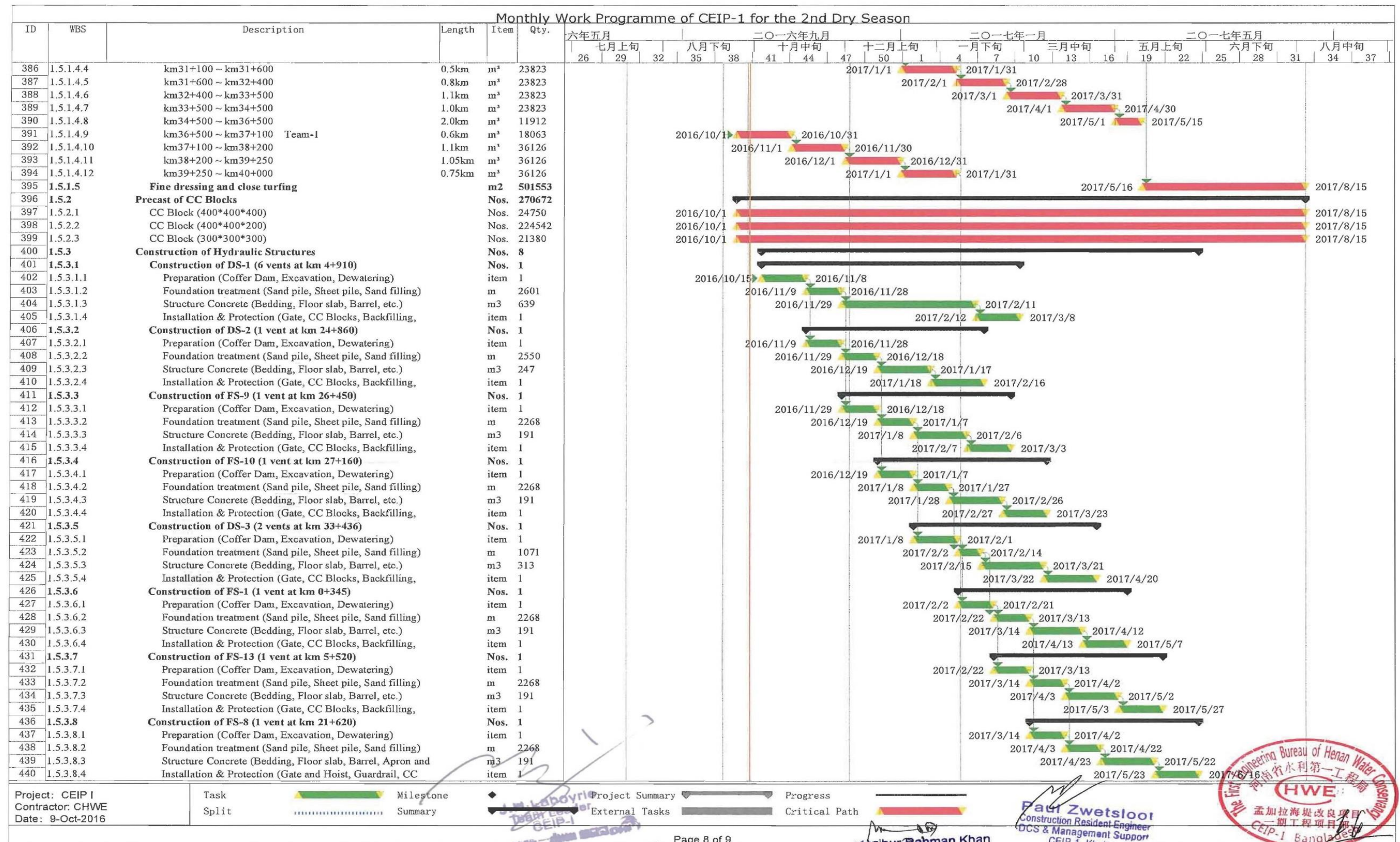


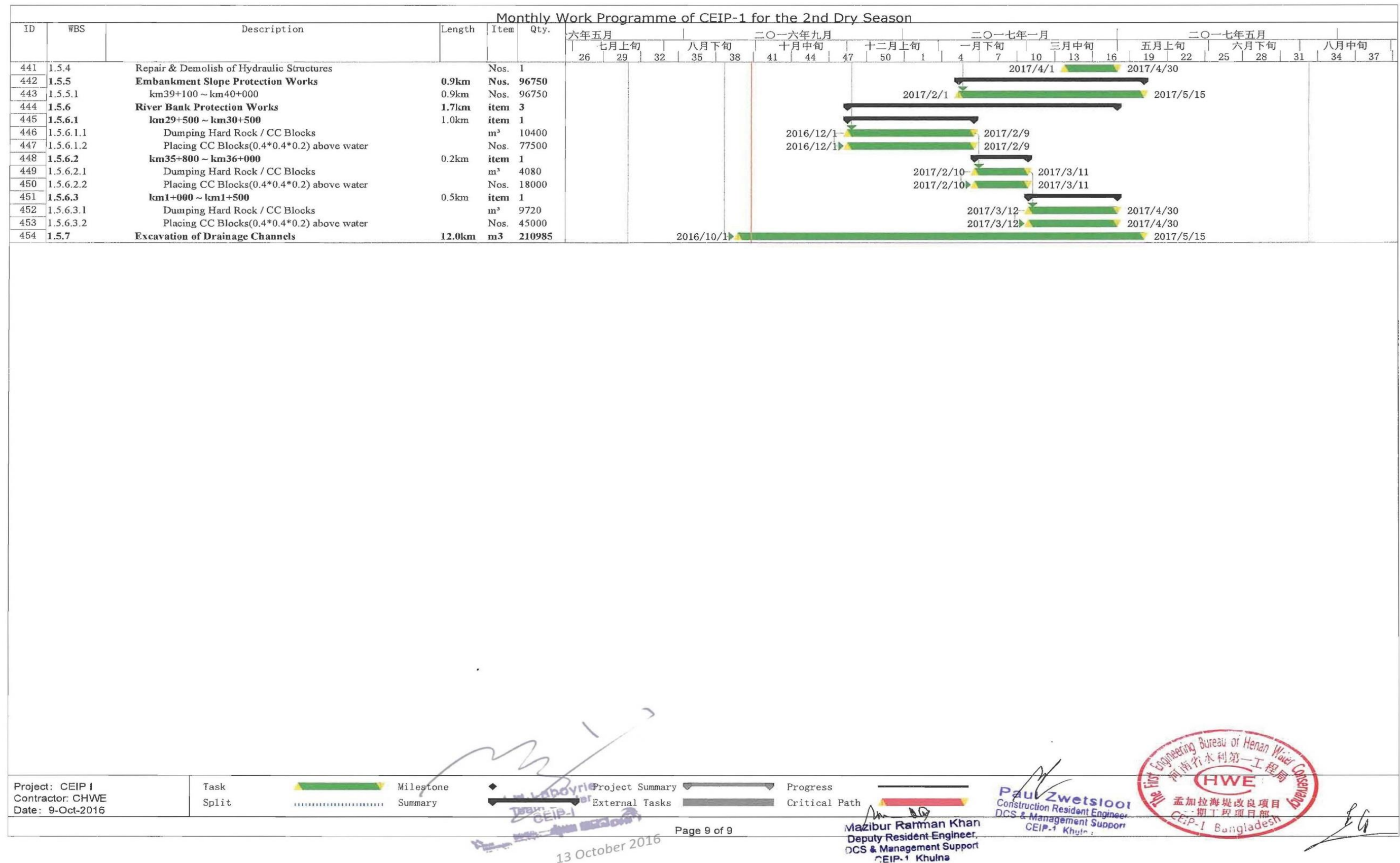
April 2019











Annex-3: Site Specific Environmental Action Plan

Polder: 35/1 Coastal Embankment Improvement Project, Phase-1 Responsible for implementation: QC & HSE Engineer Song Kunpeng	Please refer for compliance dates to Contractor Planning as attached
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SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
1.	Construction camps	<ul style="list-style-type: none"> Obtaining approval Erection of signboard in Bangla and English with project details Install accommodation facilities for workers Safety protocols and measures for using electrical appliances Drainage channels installation Supply of safe drinking water Supply of adequate sanitation Solid fencing and demarcation to prevent villagers from entering the premises 	<ul style="list-style-type: none"> Before start Works Start of the Works <p style="text-align: center;">Ditto</p>	<ul style="list-style-type: none"> Once Continuously <p style="text-align: center;">Ditto</p>	
2.	Fuel storage areas	<ul style="list-style-type: none"> Establish fuel storage shed at each work site and CC block plant Install hardstand and secondary containment for oils and chemicals stored/used Fire fighting equipment installation and check expiration dates of hydrants Place sand and shovel close-by Inflammable substances should be placed away from source of heat and fire The Material Safety Data Sheet (MSDS) from supplier of hazardous substances (diesel, oil, lubricant) to be 	<ul style="list-style-type: none"> Start of the Works 	<ul style="list-style-type: none"> Continuously Quarterly 	

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
		<ul style="list-style-type: none"> placed besides containers/storage. Keep Spill kit/absorbent mat to catch any spilled fuels at the location where potential spillage may occur. Sufficient hydrants to address potential fire should be equipped at fuel storage area as well as the areas where chemicals/fuels are used. Regular checks on physical condition Maintain minimum distance during fuelling and fuelling Provide eye protective glass Provide hand gloves 			
3.	Access road construction	<ul style="list-style-type: none"> Obtaining approval Construction of culverts if needed 	<ul style="list-style-type: none"> Start of the Works 	<ul style="list-style-type: none"> Once 	
4.	Electrical safety	<ul style="list-style-type: none"> Clearly visible notification on the safe use of electrical appliances Check all wirings to prevent any accident, fire due to short circuit Rise the wire system up or underground conduit system should be established Regular check the switch board and wire system Close all the switch board properly. Only responsible will check at regular intervals Cover the joint by tape or other insulating materials 	<ul style="list-style-type: none"> Prior to start of works 	<ul style="list-style-type: none"> Quarterly Daily 	
5.	Temporary Facilities Decommissioning	<ul style="list-style-type: none"> Agreeing with local authorities on demolition Review of environmental liabilities Waste removal General re-instatement of site Revegetation implementation Close-out check 	<ul style="list-style-type: none"> Before end Works 	<ul style="list-style-type: none"> Once Ditto 	
6.	Construction and Demolishing of drainage sluices, flushing sluices and inlets	<ul style="list-style-type: none"> Check properties of soil as per the guideline of DDSC&PMS consultant of cofferdam/ring bundh Make arrangement for emergency work or some immediate action in case of cofferdam failure Make diversion road or dedicated path way for local pedestrian Provide PPE to workers Separate the worker's standing area during hammer- 	<ul style="list-style-type: none"> When applicable 	<ul style="list-style-type: none"> When applicable 	

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
		<ul style="list-style-type: none"> ing • Check the U-clamp and all joint regularly • Maintain the uniform velocity of hammer • Avoid the certain falling of hammer • Avoid hammering during pouring of sand • Separate the other workers during removing the casing • Check the all joint regularly at start and end of the work • Replace the joint at regular intervals • Check the all weir regularly at start and end of the work • Replace the weir at regular intervals • Regular check of all parts of piling system • Provide ear plug and ear muff during pilling • Periodic hearing check of labours engaged in pilling • Use the wet sand as per required amount during pilling • Toolbox talk conduct at the beginning of pilling work • Use paved workshop for rod cutting • Collect the residual materials in a specified place rod cutting • Provide gas musk to the rod cutting workers • Set the cutting area away from the receptor as possible • Provide ear plug/muff to the operator and the surroundings • Conduct toolbox talk at the beginning of the rod cutting work • Check the circuit system before starting the welding • Turn off the main switch, then use the fire extinguisher • Use the protective cover of the rod cutting machine • Conduct toolbox talk at the beginning of the rod cutting work • Conduct toolbox talk at the beginning of the rod bending work • Provide the gas mask properly during welding • Provide special cloth for welding 			

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
		<ul style="list-style-type: none"> • Provide the eye protective welding glass • Provide the protective cloth to workers for welding works • Maintain a minimum welding area distance (6.1 m) from the fuel gas cylinder • Check the pipe system of welding regularly • Conduct toolbox talk at the beginning of the RCC work • Provide PPE to all workers • Spray water at material stack pilling area at regular intervals • Wet/cover the sand or aggregate storage • Make a wall around the storage area. The height will be related to the height of stockpiling • Make the stack pilling area as no entry zone • Provide all cautionary signals and signboard/signage • Maintain the shuttering space as per design • Support should be placed in level ground for shuttering • Periodic check of generator • Closing by noise protective board of generator • Set the generator away from the sensitive receptors • Use filter media to suck the emitted gas from generator • Rise the outlet of generator above the breathing zone • Provide fire-extinguisher nearby the generator area • Make a stable platform with ladder • No workers will be allowed to walk over pipe • Provide safety belt to the workers who work above 2 m height • Put a net system with sufficient capacity to catch the fallen object • Only the pile to be driven in day time • Before starting the pile driving, notify the adjacent receptors about the noisy activity • Check the strength and load bearing capacity before driving of sheet pile • Gradually increase the load value, not suddenly for sheet piling 			

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
		<ul style="list-style-type: none"> • Check the equipment for sheet piling work before use • Follow the manual from manufacturer of sheet piling equipment • Conduct toolbox talk before starting the painting work • For work in height, make a stable platform with railing and ladder for painting work • Provide solid demarcation around the excavation • Establish sufficient sign/signalling that can be visible in night around excavation area • Erect light reflective signboard around excavation area • Set and check the stability of excavator after certain interval during work • Make the demarcation around the excavation • Erect the cautionary signs and signals around excavation • Conduct the toolbox talk to grow the awareness about hazard of excavation • Conduct regular toolbox talk before starting the concrete casting work • Workers engaged in concrete work should use PPE • Ensure safe pathway of workers for concrete casting • Demolishing debris of sluices and inlets will be disposed of at a site approved by the Engineer. • Before starting the construction activities of drainage sluices, ring bundh and diversion channel will be constructed and a dewatering system will be installed in order to work in dry conditions. • Disposal of excess soil will be done with no objection from local authority. • No waste water from concrete mixing will be disposed of directly to the surface water. • Prior to every monsoon season all the temporary and permanent drainage structures under construction will be made free from debris. • Remove all materials and equipment from work site 			

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
		after completion of works.			
7.	Construction and re-sectioning of embankments	<ul style="list-style-type: none"> Pavement (if present) will be removed and disposed of at the premises of BWDB. Top soil from areas of earth works will not be used for construction works. The top soil (from surface to 15 cm depth) will be removed and preserved for later use of replacing after construction in rehabilitation. Disposal of excess soil will be done at site with no objection from local authority. All works will be demarcated clearly. Signals will be installed to indicate the entry and exits of vehicles and movement of construction equipment in the work area. Check the physical condition of excavator regularly Conduct the toolbox talk before starting the work Training on driving safety at regular interval Rise the wire up to enough height before starting the work Check the physical condition of compaction vehicle Check the physical condition of truck regularly Conduct the toolbox talk before starting the work Training on driving safety at regular interval Check the physical condition of truck regularly Conduct the toolbox talk before starting the work Training on driving safety at regular interval 	<ul style="list-style-type: none"> When applicable 	<ul style="list-style-type: none"> When applicable 	
8.	The bank and slope protection works	<ul style="list-style-type: none"> Spilling of earth material in surface water will be avoided. Turfing will be applied to prevent erosion. Proper drainage provision will be kept to avoid formation of rain cuts due to surface run off. 	<ul style="list-style-type: none"> When applicable 	<ul style="list-style-type: none"> When applicable 	
9.	Re-excavation works	<ul style="list-style-type: none"> Spoil plan (volume to be dredged; disposal site to be used; quality of dredged material; applicability of the dredged material) to be developed for approval by Engineer Unnecessary resuspension will be avoided by selection 	<ul style="list-style-type: none"> When applicable 	<ul style="list-style-type: none"> When applicable 	

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
		<p>of suitable dredging equipment.</p> <ul style="list-style-type: none"> Temporarily deposition of dredged material will be away from the channel edge to limit damage to streamside and stream habitats. Return water will be conveyed through siltation chambers to avoid high loads of fines to be discharged on surface water. Where applicable biotechnical engineering, for example geo textiles, may be used to help stabilize the material. Smothering of important flora and habitats will be avoided Provide solid demarcation around the excavation Establish sufficient sign /signalling that can be visible at night Erect light reflective signboard Set and check the stability of excavator after certain interval during work <p>Conduct the toolbox talk before starting the work</p>			
10.	Manufacture of pre-cast CC blocks	<ul style="list-style-type: none"> Provide noise control barrier around the plant area as possible Make a closed chamber for plant operator Periodic hearing check for the exposed workers Shifting duty for the noise exposed areas Spray water at certain intervals in the plant area Wet and clean the aggregate before using Cover/wet dusty parts or materials No operation without the screen or barrier provided with the machine Conduct toolbox talk regularly Establish and practice the safe operation procedure Regular checking of Automatic CC plant Check electric switch, fuel and all types connection line during off and on the plant. Reserve the key with the designated person only Conduct proper repair, whenever required 	<ul style="list-style-type: none"> At start operation 	<ul style="list-style-type: none"> When applicable 	

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
		<ul style="list-style-type: none"> • Properly cover the conveyer system • Check the roller system before and after the work every day or at regular intervals • Regular check on the belt systems • Regular check on conveyer systems • Make protective fence or moveable barrier around the hopper hole • Regular check on weir system • Proper maintenance of hopper • Change the weir immediate when need • Check the lock before use • Regular check and maintenance of hopper before loading • Use ear plug and ear muff before starting the work • Set the equipment at one open site away from the plant area, curing area, living area • Use ear plug and ear muff before starting the concrete core cutting • Set the core cutting equipment at one open site away from the plant area, curing area, living area • Provide continuous water flow during cutting operation by pipe • Spray water at during intervals at stockpile areas • Wet/cover the sand or aggregate storage at stockpile areas • Make a wall around the storage area. The height will be related to the height of stockpiling • Make stockpile area as no entry zone • Provide cautionary signboard at stockpile areas • Demarcate the CC block stacking area • Provide cautionary signboard at CC block stacking areas • Make CC block stacking area as no entry zone • Regular check the switch board and weir system • Turn off the main switch board 			

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
		<ul style="list-style-type: none"> • Use the fire-extinguisher and sand as required • Regular check the switch board and weir system • Turn off the main switch board • Use the fire-extinguisher and sand as required • Rise the wire system up or underground conduit system should be established • All joint will be insulated • Closed all the switch board properly. Only responsible person will check at regular intervals • Provide the gas mask properly during welding • Provide special cloth for welding • Provide the eye protective welding glass • Maintain a minimum distance (6.1 m) from the fuel gas cylinder • Check the hose pipe system regularly • Workers will be equipped with proper PPE. • Signals will be installed to indicate the entry and exits and movement of vehicles in the work area. • Care during use of forklifts to transfer CC Blocks • Manufacturing only can take place at night within proper environmental protective measurement. • Stacks with sand will be covered or wetted. • Use hand gloves during operation • Check the plate joint regularly, about its stability • Spray water during intervals • Wet the sand or aggregate • Worker's standing area should maintain certain distance from the loading and unloading area • Checking silo surface for avoidance leakage • Avoid excess load in silo 			

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
11.	Forklift Operation	<ul style="list-style-type: none"> Designate movement routes for forklifts No overloading Warning lights/sound during movement of forklifts Maintain the speed limit Prepare the safe operation manual Conduct regular toolbox talk Provide forklift safety training Separate lane for pedestrian and forklift Make a forklift safety procedure and erect to forklift moving area Regular check and maintenance of the scraper 	<ul style="list-style-type: none"> Prior to works During movement 	<ul style="list-style-type: none"> Before operation During operation 	
12.	Borrow material	<ul style="list-style-type: none"> Agreeing on borrow area Document borrow area Perform soil analyses on borrow materials when contamination is expected Prevention of erosion/dust forming Borrow area excavation complying with distance from the embankment as per the Technical Specifications No Tress-pass line fixed with bamboo poles Check the physical condition of excavator regularly Conduct toolbox talk before starting the work Training on driving safety at regular interval Check the physical condition of truck regularly 	<ul style="list-style-type: none"> Prior to open borrow pit During Works 	<ul style="list-style-type: none"> When applicable When applicable 	
13.	Hard Rock Revetment	<ul style="list-style-type: none"> Alignment to be pre-determined CC Blocks/hard rocks to be stacked/stored at appropriate/designated place/distance Maintain and follow work safety protocols/measures 	<ul style="list-style-type: none"> Prior to works Prior to works During works 	To be assessed when the detailed design is completed	
14.	Safety at Barge	<ul style="list-style-type: none"> Occupational safety measures to be maintained Proper anchorage Balanced loading Workers to use PPE Maintain speed limit of forklift Prepare the safe operation manual for forklift and erect at forking moving site Regular toolbox talk 	<ul style="list-style-type: none"> During works 	During operation	

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
		<ul style="list-style-type: none"> • Separate lane for pedestrian and forklift • Regular check and maintenance of the scraper • Provide forklift safety training to workers • Regular checking and maintenance of scraper • Demarcate the CC block stacking area at barge • Provide cautionary signboard at CC block staking area at barge • Make CC block staking yard at barge as no entry zone • Make indication mark by visible paint from 0.5-1.0 m from the end of the Barge • Provide life jacket to every workers at barge • Regular check the anchorage system of barge • Appoint responsible person to check the line of CC block during loading at barge • Conduct toolbox talk during dumping • Establish the forklift safety procedure during dumping • Conduct training facilities to workers engaged in dumping 			
15.	Occupational Health and safety	<ul style="list-style-type: none"> • Development of Health and Safety Plan including emergency procedures • Train all staff in health and safety • Provision of HIV, including STI (sexually transmitted infections) information, education and communication. • Provision of PPE and ensuring their use • Provision and use of life jacket during visiting campsite/worksites by boat • Installation of first aid facilities at work site and camps with adequate stock • Provide sanitation facilities where needed • Provision of safe drinking water to work force (tube-well water, bottled water or pond water) • Proper signalling of work areas 	<ul style="list-style-type: none"> • Before start Works • During Works 	<ul style="list-style-type: none"> • Continuously • Ditto 	
16.	Public Health and Safety	<ul style="list-style-type: none"> • Notification of the public adjacent to the construction areas • Installation of dedicated pathways for pedestrians • Proper signalling of work areas • Limitation of construction vehicles at public roads dur- 	<ul style="list-style-type: none"> • Start of the Works • During the Works 	<ul style="list-style-type: none"> • Continuously • Ditto 	

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
		<p>ing peak hours.</p> <ul style="list-style-type: none"> The temporary traffic detours in settlement areas will be kept free of dust by frequent application of water. Construction activities will be undertaken according to during daylight working hours between the hours of 07:00 – 17:00 on weekdays. 			
17.	Water Supply	<ul style="list-style-type: none"> Providing construction camps with potable water either through installing tube wells (hand pump, shallow and deep tube well), Pond Sand Filter (PSF) or supplying safe bottled water. Ensuring the location plan of tube wells (used for supplying potable water) that these are not sited near any sanitation facilities as to avoid water pollution. Maintaining the distance of a tube well / surface water resource from a soak pit at minimum 15m. Maintaining the drainage from the tube well diverting into the drainage system of the camp area. Providing separate tube wells for the use of women. 	<ul style="list-style-type: none"> Start of the Works 	<ul style="list-style-type: none"> Continuously Ditto 	
18.	Sanitation	<ul style="list-style-type: none"> Providing suitable sanitation facilities for the work-force. Ensuring the location plan of the latrine at least 50 meter away from the accommodation facility. Providing separate latrines for the use of women. Installing treatment facilities (i.e. septic tank, soak pits etc.) for sewerage of toilet and camp site wastes. Arranging disposal of wastewater from washrooms, kitchens, s, etc. via the camp area's drainage system 	<ul style="list-style-type: none"> Start of the Works 	<ul style="list-style-type: none"> Continuously Ditto 	
19.	Solid Waste Management	<ul style="list-style-type: none"> Ensuring collection, segregation and disposal of solid wastes within the construction camps and work areas Taking measure to collect and store inorganic wastes in a safe place within the household and organic wastes cleared on daily basis to waste collector. Establish systems for waste collection, transportation and disposal systems at approved disposal sites. Proper collection, reuse/recycle and disposal of construction and demolition waste. Collect and store industrial wastes such as waste oils 	<ul style="list-style-type: none"> During the Works 	<ul style="list-style-type: none"> Continuously Continuously 	

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
		and chemicals, waste parts and waste materials at the designated temporally waste storage established at each work site and CC block plant, and treat and dispose regularly through external waste vendors.	<ul style="list-style-type: none"> During the works 	<ul style="list-style-type: none"> Collection continuously, removal weekly 	
20.	Waste water	<ul style="list-style-type: none"> Installation of decanter boxes for washing buckets and cement mixers Installation of proper filtering elements. Carrying out periodic checks and clean-ups for the decanter box. Prioritize reuse of aggregates and water from the decanter box. Ensure safe disposal of liquid wastes generated at camp site. 	<ul style="list-style-type: none"> Start of the Works During the Works 	<ul style="list-style-type: none"> Continuously Ditto 	
21.	Air	<ul style="list-style-type: none"> Regular maintenance of vehicles Covering or wetting of dusty materials Dust suppression by wetting surfaces Impose speed limits Re-vegetate bare surfaces soonest 	<ul style="list-style-type: none"> During the Works 	<ul style="list-style-type: none"> Continuously Ditto 	
22.	Noise	<ul style="list-style-type: none"> Notify nearby population prior to any typical noise events Ensure construction activities do not generate unacceptably high level of noise Restrict working to daylight hours Locate noisy equipment / facilities away from sensitive receptors Provide noise barriers around CC block casting machine. Provide ear plugs and muffs to workers at high noise area Regularly monitor noise level at CC block plants and surrounding communities. Regular hearing test for workers at high noise area (once in six months) 	<ul style="list-style-type: none"> Before start of the Works During the Works 	<ul style="list-style-type: none"> Continuously Ditto 	
23.	Motorcycle	<ul style="list-style-type: none"> Segregate the pedestrian and motor vehicle movement area 	<ul style="list-style-type: none"> During the works 	<ul style="list-style-type: none"> Continuously 	

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
24.	Water and Hydrology	<ul style="list-style-type: none"> Preventing waste, soil, etc. entering in the water system by waste collection, re-vegetation and dust suppression etc. Insure proper drainage of working areas e.g. perimeters lines must be provided with open shallow drains 	<ul style="list-style-type: none"> During the Works 	<ul style="list-style-type: none"> Continuously Ditto 	
25.	Flora and Fauna	<ul style="list-style-type: none"> Agreeing with local authorities on tree felling. Document trees / area of trees. Avoid/prevent un-necessary tree vegetation cutting and clearing. Re-vegetate disturbed construction and ancillary site surfaces. Prevent disturbance of animals Ensuring sufficient free flow in the construction work for fish migration 	<ul style="list-style-type: none"> Prior to tree felling During the Works After the Works During the Works 	<ul style="list-style-type: none"> When applicable Continuously Once Continuous 	
26.	Monitoring of Air Quality	<ul style="list-style-type: none"> Performance of air quality tests at selected sensitive sites for parameters SPM 2.5/10, SO_x, NO_x and CO during working hours 	<ul style="list-style-type: none"> Start of the Works and annually 	<ul style="list-style-type: none"> Annually 	
27.	Monitoring of Noise Quality	<ul style="list-style-type: none"> Monitoring of noise level (dB) at selected sensitive sites during working hours 	<ul style="list-style-type: none"> Start of the Works and annually 	<ul style="list-style-type: none"> Annually 	
28.	Monitoring of Soil Quality	<ul style="list-style-type: none"> Performance of soil quality tests at selected sites (borrow areas, spill sites) for parameters as organic matter, N, P, K, pH, Salinity, S and Zn. 	<ul style="list-style-type: none"> Start of the Works and annually 	<ul style="list-style-type: none"> Annually 	
29.	Monitoring of Surface Water Quality	<ul style="list-style-type: none"> Performance of analyses on surface water (river, khal, beel and pond) for: pH, TDS, DO, BOD, EC/Salinity and Turbidity. 	<ul style="list-style-type: none"> Start of the Works and annually 	<ul style="list-style-type: none"> Annually 	
30.	Monitoring of Drinking Water Quality	<ul style="list-style-type: none"> Performance of analyses on drinking water for: arsenic, iron, chloride and total faecal coliform bacteria. 	<ul style="list-style-type: none"> Start of the Works and annually 	<ul style="list-style-type: none"> Annually 	
31.	Deployment of Environment and Safety Supervisor	<ul style="list-style-type: none"> Employ one full-time Environment and Safety Supervisor for compliance monitoring of EMP 	<ul style="list-style-type: none"> During the Works 	<ul style="list-style-type: none"> Continuously 	

SI No.	Works / Aspects	Management Actions to be taken	Implementation	Frequency	Compliance (date)
32.	Complaints and Environmental Incidents	<ul style="list-style-type: none"> Grievance Redress Mechanism will be established. Complaints received from the public or other stakeholders will be registered and recorded and be brought to the attention of the Site Engineer. All environmental incidents occurring on the site will be recorded and be brought to the attention of the Site Engineer. Action will be taken within 7 working days. 	<ul style="list-style-type: none"> During the Works 	<ul style="list-style-type: none"> Continuously 	
33.	Reporting and Documentation	<ul style="list-style-type: none"> The following records will be kept at site: <ul style="list-style-type: none"> Environmental Monitoring Results Contractors self-assessment record/results Register of non-compliance Register of corrective actions Monthly Environmental Reports 	<ul style="list-style-type: none"> During the Works 	<ul style="list-style-type: none"> Continuously 	
34.	Training	<ul style="list-style-type: none"> Environmental training on EMP will be arranged for Construction Field supervisors and Environment & Safety Supervisors. 	<ul style="list-style-type: none"> During the Works 	<ul style="list-style-type: none"> According to Training Plan 	

Annex 4: Labour influx risks, requirements and implication for work package W-01 under CEIP-1

1. PROJECT DATA		
1.1	Name of Project	Coastal Embankment Improvement Project - Phase I (P128276)
1.2	Contract Package	Package-1
1.3	Date of Commencement	January 2016
1.4	Date of Completion	January 2019
1.5	Location	Polder-32 and Polder-33 under Khulna district; & Polder-35/1; Polder-35/3 under Bagerhat District
1.6	Name and Contact Information (email/phone) of Contractor	CHWE, mainland China
1.7	Name and Contact Information (email/phone) of all sub-Contractors	Project Manager Mr. Yang Dong; No sub-contractors; about 148 Chinese labour and skilled workers; 01 Indian worker; local labour and foremen about 600 persons;
1.8	Type of Works (single site, linear, clustered and construction duration)	Civil engineering/hydraulic works: earthen embankment; water control sluices; river bank protection works; embankment slope protection works; closure dam; offices and site buildings; excavation of sedimented internal channels (khals); social re-afforestation; single and localized sites, stand-alone site for construction of one structure or one stretch of embankment, etc; These are the standard engineering interventions in a typical coastal polder in Bangladesh, since 'time immemorial'; no rocket science; a lot of manual labour work activities, for men and women both;

1. INITIAL SCREENING LABOR INFLUX REQUIREMENTS AND IMPLICATIONS		
2.1	Will the project potentially involve an influx of migrant workers? If yes, are there also foreign laborers mobilized on site?	Yes, there are Migrant workers influx at Project area, relatively small numbers and scattered all over the many construction sites; foreign laborers yes, only Chinese, around 200 persons including middle technicians and Master of Science level engineers; The mobilization of foreign worker started in November 2015 and on ward.
2.2	Is the influx of non-local workforce significant for the local community?	Not significant because there are many stand-alone construction sites and the number of Chinese/foreign workers per stand-alone site is about 3 to 5 Chinese men; this is not disruptive for the social cohesion of the local site; local stand-alone construction sites are mostly far away from community centres (rural setting, remote sites; sluices are not located inside a community); At the camp site, there have a separate place for their living, dining. Also police from local Thana/authority provide the security for the safety of Chinese workers. There are two or three local translators; if any problem arises they arrange communication with local people. Even now there is no complain from local people, mentioned that at camp site also have a register to note down to take proper action within appropriate time. At least certain percentage of local people would have been mobilized in civil work that would be beneficial for the local people.

1. INITIAL SCREENING LABOR INFLUX REQUIREMENTS AND IMPLICATIONS		
2.3	What are the opportunities for local laborers?	Of course there were opportunities for local worker in civil work. Local residents are poor people with virtually no mobility or transport facilities and are employed in agriculture, aquaculture and civil construction works such as road, buildings etc in 'urban' areas, mostly intermittent job contracts. There is some small business such as small shops, chicken and duck breeding/farm, aquaculture, and motorbike repair workshops etc which do not employ many people; e.g. Polder-35/1 is located 100 km away from the city of Khulna, hence not much influx from Khulna to Polder-35/1; due to few numbers of small rudimentary road tracks, there is hardly any economic traffic to the 4 Polders; one needs to cross many rivers with (small) ferries; labour market is non-existent for local laborers; Recently for polder-32, 248 local workers engaged for construction workers; P-33, 214 local workers; P-35/1, 591 local workers and P-35/3; 187 local workers. There are no women because, for heavy civil work women are not suitable. By negotiating we fixed the salary, so there is no unsatisfactory and no complain.
2.4	Frequency of outsider's visit	Chinese labourers are generally permanently stationed and working; they live together inside a fenced compound, with professional security guards; Non-local labours are regular, but they have the seasonal vacation during rainy season.
2.5	Environmental sensitivity of the project site	Refer to the four approved EIA Reports of the 4 Polders; in general, the close location of the border lines of the Sundarbans mangrove forest prompt the Chinese Contractor to take care/be alerted of the possible negative impacts on the water, noise, environment, biodiversity of the Sundarbans;
2.6	Community experience with similar projects?	Much community experience yes as all 139 coastal polders were built back in the 1970s and 1980s and had undergone many subsequent small and big interventions, emergency works, repair and recovery after huge flood disaster events etc; local labourers are fully familiar with similar types of civil engineering works; And also familiar with the similar movement of non-local labour because in coast region in different time different improvement work have done throughout the specific period.

1. SOCIO-ECONOMIC CONSIDERATIONS		
3.1	How similar are local and migrant labour backgrounds? (cultural, religious and demographic considerations)	<p>The background particularly cultural, religious and demographic point of view is dissimilar in many ways and similar in some ways. They have different language, ethnicity, belief system even political system but it does not create any problem to perform the job or pose any risk for the project. The migrant is few in number that does not make any imbalance in local social coherence. The main similarities imply that both groups come from same profession;</p> <p>There is no issue at all, because the non-local workers are busy in day time for work. Also the work site is located in different place from their residence.</p> <p>No negative impact on job market because this project makes the more opportunity of job for local people.</p> <p>Group means not like two separate parts. Both local and non-local workers are working as a part of the project as like a team work.</p>
3.2	Are there increased competitions for resources (e.g. accommodation, water, food, fuel) with the local community?	Absolutely not;

3.3	Given local community characteristics any specific adverse impacts anticipated?	No adverse impact is anticipated at the moment;
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1. LOCAL COMMUNITY (Please provide Polder wise description of Facilities)				
4.1	Size of Local Population	Bangladesh is highly densely populated country but the project area has lesser density. It is found from the RAP document that inside the Polder-32, 33, 35/1 and 35/3 the total population amounts to 38397, 62305, 99182 and 33075 respectively.		
4.2	Working age population and capacity (education, skills, experience)	The labour force (age between 15 and 59 year), the actual number of people available for work is 61%. The labour force includes both the employed and the unemployed. According to BBS, 30% of the people fall in the age group 1-15 year. The literacy rate in the project area roams around 58% whereas the national figure is 51.8%. The livelihood of 66.1% of people depends on agriculture activities;		
4.3	Working age population capacity	<i>Education</i>	<i>Skill</i>	<i>Experience</i>
		No information is available	No information	No information
4.4	Local capacity for infrastructure, services, utilities, health (please provide a short brief)	Inside the 4 Polders, both earthen and pucca roads are available and there are waterways also. There are academic institution, market, religious institution, local government offices, providing necessary public services to the local people. Motor bikes play important role to communicate in project areas. Auto rickshaw is main transportation vehicle; No there is no impact of these facility due to the inflow of chines people.		
4.5	Availability of accommodation, food, water (please provide a short brief)	Contractor provides adequate accommodation, water and food, protective sheds, etc to their workers; Yes these facilities are easily available for rent and consumption		
4.6	Are there any security considerations?	Not from the local governments; Contractor is now paying for the security force (members of Bangladesh Police, on monthly shifts) mainly atwork site (CC Block) cum permanent residential sites; night guards hired locally at sites deemed necessary		
4.7	Are there any marginalized, vulnerable, ethnic, indigenous- communities?	Some marginalized and vulnerable people are in the project site like other places of the country but there are no ethnic and indigenous groups.		

1. MAINTENANCE OF OTHER LABOR RECORDS		
5.1	Is a copy of photo ID of each labourer kept with the Contractor/ Sub-contractor?	Yes. NID for local workers and visa copy for Chinese workers; no sub-contractors;
5.2	Is contact information of labour's next-of-kin kept for each labourer?	Yes. Family members are mostly close-by. Chinese contractor recruits mainly from the locality;

1. LABOR PROFILE (Please provide Polder wise information)					
<i>This data is to be collected for each Polder where civil works has commenced, and cover the regular labour, temporary labour, labour hired through sub-contractors or labour contractors / groups.</i>					
6.1	Number of laborers by sex	Male	Female		Total
		1376	12		1388
6.2	Number of laborers by skill	Skilled	Semi-skilled	Unskilled	Total
		240	210	938	1388
6.3	Number of laborers by origin	Local (same or adjoining district)	Other districts	Other Country	Total
		1088	152	148	1388
6.4	Number of laborers by age	18-25	25-50	Above 50	Total
		850	528	10	1388
6.5	Source of labour	Contractor	Subcontractor	Independent	Total
		1300	88	0	1388

1. FACILITIES (Please provide Polder wise description of Facilities)				
7.1	Details of labour camps	Number	Permanent/Temp.	Location
		8	Permanent	Every CC blocks
		12	Temporary	yard and every work site
7.2	Type of housing in labour camp on leased land (temporary shelters / kuchha /pukka)	Work site have temporary shelter but cc block yard has pukka house		
7.3	Is there any housing on public land like roadsides, open fields and other spaces?	No. Only housing exist inside the constructional premises.		
7.4	Is there any housing in rented accommodation in residential areas? If so, who is it rented by?	Yes, for the Chinese and Bangladeshi senior staff. Contractor rents the buildings themselves		
7.5	How many laborers have families on/near worksite?	The migrant workers do not live with their family. Sometime their family member visit here for very short time. The local worker mostly live with their family		
7.6	Likelihood of family members accompanying (visiting)	They hardly visit the project side. Labourers have family homes close by; daily transport is done by motorbikes or by vehicles of Contractor		
7.7	Is drinking water available on site and at the campsite?	Yes		
7.8	Are latrines and urinals provided on site and at the campsite?	Yes		
7.9	Are First Aid facilities provided on site?	Yes		
7.10	Does a doctor visit the worksite / campsite regularly?	Yes		

7.11	Is there a tie-up with a hospital or dispensary near the worksite / campsite	Yes
7.12	Is there a facility for cooking / canteen facility for all labour?	Yes
7.13	Are leisure activities / facilities available for all labour	Yes
7.14	Is transport to and from the worksite provided to labour?	Yes for migrant labourer but no provision for unskilled local labourer.

1. SUPERVISION BY LABOR OFFICIALS		
8.1	Has the worksite / campsite been inspected by a labour official?	In 20-22 November, 2017 and 04-06 February, 2018 WB team visited the work area of CEIP-1, NO VISITS BY ANY GOVERNMENT LABOR OFFICIAL YET
8.2	How many times has the worksite / campsite been inspected by a labour official since commencement of work?	Six times since commencement from WB. From the part of PMU and BWDB, visited the work sites frequently, as per the need basis.
8.3	What documents were inspected by labour officials?	Accident /injury register, salary sheet/record
8.4	What documents were maintained and which ones were not?	Safety training record, accident register, safety guideline document, compliance register, GRM system notice. Nothing missing, if anything required please give us the valuable suggestions. We will ensure it at work site. EIA, EAP, Risk Assessment, EMF, Noise monitoring (at CC Blocks)
8.5	What directions were given by labour officials?	About personal health and safety, tool box talk
8.6	What is the mode of compliance with such directions?	Action taken in field level as soon as possible
8.7	Are you facing any legal proceedings on labour issues in Labour Court/ Other?	None;

1. ACCIDENTS, EMERGENCIES AND INCIDENTS (Please provide Polder wise description of Facilities)		
9.1	What is the nature of accidents / emergencies usually occurring at a worksite like yours?	No accident so far has been taken place; small cuts while working, accidental fall/slip,
9.2	Is a functioning First Aid available at the campsite / worksite?	Yes, but needs management
9.3	Is functioning fire-fighting equipment available at the campsite / worksite?	Yes
9.4	Which is the nearest doctor / clinic / dispensary?	Within some kilometres, alert by mobile hand-phone of which the number is known to all Chinese people (Chinese medical doctor available); doctor covers the four Polders
9.5	Which is the nearest hospital?	The nearest hospital is situated at Upazila head quarter. But there some clinic or satellite clinic inside the polder. If any worker required critical services then he/she refers to Khulna or Dhaka. The contractor have own car for every camp site and CC block manufacturing site to transport he/she to Khulna or Dhaka.
9.6	Which is the nearest Police Station?	In any Polder, there is Police office close-by, within 10 km range. On the other hand a team of 2-3 nos. police present at work camp site and cc block manufacturing site cum residential

1. ACCIDENTS, EMERGENCIES AND INCIDENTS (Please provide Polder wise description of Facilities)		
		site. If required they will help us. But even no situation has aroused yet to do this.
9.7	Are details of nearest doctor / clinic / dispensary / hospital / Police station available and prominently displayed at worksite / campsite?	Yes
9.8	What is the system of informing next of kin?	For the migrant worker, there is focal person to deal with the issue. The contact numbers of all workers are well documented. For the local worker, the system is same; moreover, the local workers are from nearby villages so if anything happens the next of kins come to know by word of mouth as well. Bangladeshi senior staff employed by the Chinese contractor for communication.
9.9	What is your familiarity with accident reporting procedures?	Chinese Contractor holds regular drills on procedures and protocols to enact in case of accidents. Usually the foreman is informed and he then informs his superiors.
9.10	What is your familiarity with police reporting procedures?	We are well familiar to local police reporting system and we have their contact number and relation. So far, no such incident happened where Police has to be called upon. It is worthy to mention that Contractor site camps are secured by police protection permanently.
9.11	Is there any mechanism to address the work place Sexual Harassment of Women at the project sites?	Yes (sanctions are known to Chinese workers and their bosses). Mechanism is there. We have gender policy. There is complaint system to mitigate sexual harassment. Finally, legal step can be applied where necessary

Annex-5: Monitoring Plan

Polder: 35/1 Coastal Embankment Improvement Project, Phase-1	Site inspected (incl. chainage): Inspection date: Inspected by:
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SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
1.	Construction Camps	<ul style="list-style-type: none"> Obtaining approval Erection of signboard in Bangla and English with project details Install accommodation facilities for workers Safety protocols and measures for using electrical appliances Drainage channels installation Supply of safe drinking water Supply of adequate sanitation Solid fencing and demarcation to prevent villagers from entering the premises 	1 M M M M W W M	Official information Field visit ditto				
2.	Fuel storage areas	<ul style="list-style-type: none"> Establish fuel storage shed at each work site and CC block plant Install hardstand and secondary containment Fire fighting equipment installation and check expiration date and hydrants Place Sand and shovel close-by. Inflammable substances should be placed away from the source of heat and fire Regular checks on physical condition The Material Safety Data Sheet (MSDS) 	1 M M M M	Field visit Ditto				

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
		from supplier of hazardous substances (diesel, oil, lubricant) to be collected and placed besides containers/storage. • Keep Spill kit/absorbent mat to catch any spilled fuels at the location where potential spillage may occur. • Sufficient hydrants to address potential fire should be equipped at fuel storage area as well as the areas where chemicals/fuels are used. • Maintain minimum distance during fuelling and re- fuelling • Provide eye protective glass • Provide hand gloves						
3.	Access road construction	• Obtaining approval • Construction of culverts if needed	1 1	Document Field visit				
4.	Electrical Safety	• Clearly visible notification on the safe use of electrical appliances • Check all wirings to prevent any accident, fire due to short circuit • Rise the wire system up or underground conduit system should be established • Regular check the switch board and wire system • Close all the switch board properly. Only responsible will check at regular intervals • Cover the joint by tape or other insulating materials	W W W M M M	Field visit				
5.	Temporary Facilities Decommissioning	• Agreeing with local authorities on demolition • Review of environmental liabilities • Waste removal • General re-instatement of site • Re-vegetation implementation • Close-out check	1 1 1 1 1 1	Document Field visit Ditto				
6.	Construction and demolishing of drainage sluices and flushing sluices	• Check properties of soil as per the guideline of DDSC&PMS consultant of cofferdam/ring bundh • Make arrangement for emergency work	M M					

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SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
		<div>the rod cutting work</div> <ul style="list-style-type: none">• Check the circuit system before starting the welding• Turn off the main switch, then use the fire extinguisher• Use the protective cover of the rod cutting machine• Conduct toolbox talk at the beginning of the rod cutting work• Conduct toolbox talk at the beginning of the rod bending work• Provide the gas mask properly during welding• Provide special cloth for welding• Provide the eye protective welding glass• Provide the protective cloth to workers for welding works• Maintain a minimum welding area distance (6.1 m) from the fuel gas cylinder• Check the pipe system of welding regularly• Conduct toolbox talk at the beginning of the RCC work• Provide PPE to all workers• Spray water at material stack pilling area at regular intervals• Wet/cover the sand or aggregate storage• Make a wall around the storage area. The height will be related to the height of stockpiling• Make the stack pilling area as no entry zone• Provide all cautionary signals and sign-board/signage• Maintain the shuttering space as per design• Support should be placed in level ground for shuttering• Periodic check of generator• Closing by noise protective board of generator	<div>M</div> <div>M</div> <div>M</div> <div>M</div> <div>W</div> <div>W</div> <div>M</div> <div>M</div> <div>M</div> <div>M</div> <div>W</div> <div>M</div> <div>M</div> <div>M</div> <div>M</div> <div>M</div> <div>M</div> <div>M</div> <div>M</div> <div>M</div>					

April 2019

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
		<ul style="list-style-type: none"> vation Erect the cautionary signs and signals around excavation Conduct the toolbox talk to grow the awareness about hazard of excavation Conduct regular toolbox talk before starting the concrete casting work Workers engaged in concrete work should use PPE Ensure safe pathway of workers for concrete casting Demolishing debris of sluices and inlets will be disposed of at a site approved by the Engineer. Before starting the construction activities of drainage sluices, ring bundh and diversion channel will be constructed and a dewatering system will be installed in order to work in dry conditions. Disposal of excess soil will be done with no objection from local authority. No waste water from concrete mixing will be disposed of directly to the surface water. Prior to every monsoon season all the temporary and permanent drainage structures under construction will be made free from debris. Remove all materials and equipment from work site after completion of works. 	<p>M</p> <p>M</p> <p>M</p> <p>M</p> <p>M</p> <p>M</p> <p>M</p> <p>M</p> <p>M</p> <p>M</p> <p>M</p>					
7.	Construction and re-sectioning of embankments	<ul style="list-style-type: none"> Pavement (if present) will be removed and disposed of at the premises of BWDB. Top soil from areas of earth works will not be used for construction works. The top soil (from surface to 15 cm depth) will be removed and preserved for later use of replacing after construction in rehabilitation. Disposal of excess soil will be done at site with no objection from DoE and local au- 	<p>1</p> <p>W</p>	<p>Field visit</p> <p>Ditto</p>				

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
		thorty. • All works will be demarcated clearly. • Signals will be installed to indicate the entry and exits of vehicles and movement of construction equipment in the work area. • The contractor shall manage the top fertile soil (15 cm) during earth work activities • Check the physical condition of excavator regularly • Conduct the toolbox talk before starting the work • Training on driving safety at regular interval • Rise the wire up to enough height before starting the work • Check the physical condition of compaction vehicle • Check the physical condition of truck regularly	W W W W					
8.	The bank and slope protection works	• Spilling of earth material in surface water will be avoided. • Turfing will be applied to prevent erosion. • Proper drainage provision will be kept to avoid formation of rain cuts due to surface run off.	W W M	Field visit				
9.	Re-excavation works	• Spoil plan (volume to be dredged; disposal site to be used; quality of dredged material; applicability of the dredged material) to be developed for approval by Engineer • Unnecessary re-suspension will be avoided by selection of suitable dredging equipment. • Temporarily deposition of dredged material will be away from the channel edge to limit damage to streamside and stream habitats. • Return water will be conveyed through siltation chambers to avoid high loads of fines to be discharged on surface water. • Where applicable biotechnical engineering, for example geo textiles, may be used to	1 W W W	Document Field visit				

April 2019

April 2019

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
		<div>of stockpiling</div> <ul style="list-style-type: none">• Make stockpile area as no entry zone• Provide cautionary signboard at stock-pile areas• Demarcate the CC block stacking area• Provide cautionary signboard at CC block stacking areas• Make CC block stacking area as no entry zone• Regular check the switch board and weir system• Turn off the main switch board• Use the fire-extinguisher and sand as required• Regular check the switch board and weir system• Turn off the main switch board• Use the fire-extinguisher and sand as required• Rise the wire system up or underground conduit system should be established• All joint will be insulated• Closed all the switch board properly. Only responsible person will check at regular intervals• Provide the gas mask properly during welding• Provide special cloth for welding• Provide the eye protective welding glass• Maintain a minimum distance (6.1 m) from the fuel gas cylinder• Check the hose pipe system regularly	<div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div>					

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
		<ul style="list-style-type: none"> Workers will be equipped with proper PPE. Signals will be installed to indicate the entry and exits and movement of vehicles in the work area. Care during use of forklifts to transfer CC Blocks Manufacturing only can take place at night within proper environmental protective measurement. Stacks with sand will be covered or wetted. Use hand gloves during operation Check the plate joint regularly, about its stability Spray water during intervals Wet the sand or aggregate Worker's standing area should maintain certain distance from the loading and unloading area Checking silo surface for avoidance leakage Avoid excess load in silo 	<p>W</p> <p>W</p> <p>W</p> <p>W</p> <p>W</p> <p>W</p> <p>W</p> <p>W</p> <p>W</p> <p>W</p> <p>W</p>					
11.	Forklift Operation	<ul style="list-style-type: none"> Designate movement routes for forklifts No overloading Warning lights/sound during movement of forklifts Maintain the speed limit Prepare the safe operation manual Conduct regular toolbox talk Provide forklift safety training Separate lane for pedestrian and 	<p>W</p> <p>W</p> <p>W</p> <p>W</p> <p>W</p> <p>W</p> <p>W</p> <p>W</p>					

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
		<ul style="list-style-type: none"> forklift Make a forklift safety procedure and erect to forklift moving area Regular check and maintenance of the scraper 	W W W					
12.	Borrow material	<ul style="list-style-type: none"> Agreeing on borrow area Document borrow area Perform soil analyses on borrow materials when contamination is expected Prevention of erosion/dust forming Borrow area excavation complying with distance from the embankment as per the Technical Specifications No-Tress pass line fixed with bamboo poles Check the physical condition of excavator regularly Conduct toolbox talk before starting the work Training on driving safety at regular interval Check the physical condition of truck regularly 	1 1 1 W 1 1	Document Field visit				
13.	Hard Rock Revetment	<ul style="list-style-type: none"> Alignment to be pre-determined CC Blocks/hard rocks to be stacked/stored at appropriate/designated place/distance Maintain and follow work safety protocols/measures 						
14.	Safety at Barge	<ul style="list-style-type: none"> Occupational safety measures to be maintained Proper anchorage Balanced loading Workers to use PPE Maintain speed limit of forklift Prepare the safe operation manual for forklift and erect at forking moving site Regular toolbox talk Separate lane for pedestrian and forklift Regular check and maintenance of the scraper 	M M M M M M M M M					

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
		<ul style="list-style-type: none"> Provide forklift safety training to workers Regular checking and maintenance of scraper Demarcate the CC block stacking area at barge Provide cautionary signboard at CC block staking area at barge Make CC block staking yard at barge as no entry zone Make indication mark by visible paint from 0.5-1.0 m from the end of the Barge Provide life jacket to every workers at barge Regular check the anchorage system of barge Appoint responsible person to check the line of CC block during loading at barge Conduct toolbox talk during dumping Establish the forklift safety procedure during dumping Conduct training facilities to workers engaged in 	M M M M M M M M M M M M M					
15.	Occupational Health and safety	<ul style="list-style-type: none"> Development of Health and Safety Plan including emergency procedures Train all staff in health and safety Provision of HIV, including STI (sexually transmitted infections) information, education and communication. Provision of PPE and ensuring their use Provision and use of life jacket during visiting campsite/worksites by boat Installation of first aid facilities at work site and camps with adequate stock Provide sanitation facilities where needed Provision of safe drinking water to work force (tube-well water, bottled water or pond water) Proper signalling of work areas 	1 M 1 W W M 1 W W	Document Document Field visit Ditto				

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
16.	Public Health and Safety	<ul style="list-style-type: none"> Notification of the public adjacent to the construction areas Installation of diversion signboard with warning for dedicated pathways for pedestrians Proper signalling of work areas Limitation of construction vehicles at public roads during peak hours. The temporary traffic detours in settlement areas will be kept free of dust by frequent application of water. Construction activities will be undertaken according to during daylight working hours between the hours of 07:00 – 17:00 on weekdays. 	<p>M</p> <p>W</p> <p>W</p> <p>W</p> <p>W</p> <p>W</p>	Field visit				
17.	Water Supply	<ul style="list-style-type: none"> Providing construction camps with potable water either through installing tube wells (hand pump, shallow and deep tube well), Pond Sand Filter (PSF) or supplying safe bottled water. Ensuring the location plan of tube wells (used for supplying potable water) that these are not sited near any sanitation facilities as to avoid water pollution. Maintaining the distance of a tube well / surface water resource from a soak pit at minimum 15m. Maintaining the drainage from the tube well diverting into the drainage system of the camp area. Providing separate tube wells for the use of women. 	<p>1</p> <p>1</p> <p>1</p> <p>Y</p> <p>1</p>	Field visit				
18.	Sanitation	<ul style="list-style-type: none"> Providing suitable sanitation facilities for the workforce. Ensuring the location plan of the latrine at least 50 meters away from the accommodation facility. Providing separate latrines for the use of women. Installing treatment facilities (i.e. septic tank, soak pits etc.) for sewerage of toilet 	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	Field visit				

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
		and camp site wastes. <ul style="list-style-type: none"> Arranging disposal of wastewater from washrooms, kitchens, s, etc. via the camp area's drainage system 	1					
19	Solid Waste Management	<ul style="list-style-type: none"> Ensuring collection, segregation and disposal of solid wastes within the construction camps and work areas Taking measure to collect and store inorganic wastes in a safe place within the household and organic wastes cleared on daily basis to waste collector. Establish systems for waste collection, transportation and disposal systems at approved disposal sites. Proper collection, reuse/recycle and disposal of construction and demolition waste. Collect and store industrial wastes such as waste oils and chemicals, waste parts and waste materials at the designated temporally waste storage established at each work site and CC block plant, and treat and dispose regularly through external waste vendors. 	M M	Field visit				
20.	Waste water	<ul style="list-style-type: none"> Installation of decanter boxes for washing buckets and cement mixers Installation of proper filtering elements. Carrying out periodic checks and clean-ups for the decanter box. Prioritize reuse of aggregates and water from the decanter box. Ensure safe disposal of liquid wastes generated at camp site. 	1 1 M M M	Field visit				
21.	Air	<ul style="list-style-type: none"> Regular maintenance of vehicles Covering or wetting of dusty materials Dust suppression by wetting surfaces 	M M W	Field visit				

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
		<ul style="list-style-type: none"> Impose speed limits Re-vegetate bare surfaces soonest 	W M					
22.	Noise	<ul style="list-style-type: none"> Notify nearby population prior to any typical noise events Ensure construction activities do not generate unacceptably high level of noise Restrict working to daylight hours Locate noisy equipment / facilities away from sensitive receptors Provide noise barriers around CC block casting machine. Provide ear plugs and muffs to workers at high noise area Regularly monitor noise level at CC block plants and surrounding communities. Regular hearing test for workers at high noise area (once in six months) 						
23	Motorcycle	<ul style="list-style-type: none"> Segregate the pedestrian and motor vehicle movement area 	M	Field visit				
24.	Water and Hydrology	<ul style="list-style-type: none"> Preventing waste, soil, etc. entering in the water system by waste collection, re-vegetation and dust suppression etc. Insure proper drainage of working areas, e.g., perimeters lines must be provided with open shallow drains 						
		•						
		•						
		•						
11.		•						
		•						
		•						
14		•						
15.		•						

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
		•						
		•						
		•						
25.	Flora and Fauna	<ul style="list-style-type: none"> • Agreeing with local authorities on tree felling. • Document trees / area of trees. • Avoid/prevent un-necessary tree vegetation cutting and clearing. • Revegetate disturbed construction and ancillary site surfaces. • Prevent disturbance of animals • Ensuring sufficient free flow in the construction work for fish migration 	1 1 M 1 M	Document Ditto Field visit				
26.	Monitoring of Air Quality	<ul style="list-style-type: none"> • Performance of air quality tests at selected sensitive sites for parameters SPM 2.5/10, SO_x, NO_x and CO during working hours 	M	Chemical analyses				
27.	Monitoring of Noise Quality	<ul style="list-style-type: none"> • Monitoring of noise level (dB) at selected sensitive sites during working hours 	D	Noise meter at work site				
28.	Monitoring of Soil Quality	<ul style="list-style-type: none"> • Performance of soil quality tests at selected sites (borrow areas, spill sites) for parameters as organic matter, N, P, K, pH, Salinity, S and Zn. 	Y	Chemical analyses				
29.	Monitoring of Surface Water Quality	<ul style="list-style-type: none"> • Performance of analyses on surface water (river, khal, beel and pond) for: pH, TDS, DO, BOD, EC/Salinity and Turbidity. 	M	Chemical analyses				
30.	Monitoring of Drinking Water Quality	<ul style="list-style-type: none"> • Performance of analyses on drinking water for: arsenic, iron, chloride and total faecal coliform bacteria. 	M	Chemical analyses				
31.	Deployment of Environment and Safety Supervisor	<ul style="list-style-type: none"> • Employ one full-time Environment and Safety Supervisor for compliance monitoring of EMP 	1	Document				
32.	Complaints and Environmental Incidents	<ul style="list-style-type: none"> • Grievance Redress Mechanism will be established. • Complaints received from the public or other stakeholders will be registered and recorded and be brought to the attention of the Site Engineer. 	1 W	Document Ditto				

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)			Remarks
					Y	N	R	
		<ul style="list-style-type: none"> All environmental incidents occurring on the site will be recorded and be brought to the attention of the Site Engineer. Action will be taken within 7 working days. 	W M					
33.	Reporting and Documentation	<ul style="list-style-type: none"> The following records will be kept at site: <ul style="list-style-type: none"> Environmental Monitoring Results Contractors self-assessment record/results Register of non-compliance Register of corrective actions Monthly Environmental Reports 	M	Document				
34.	Training	<ul style="list-style-type: none"> Environmental training on EMP will be arranged for Construction Field supervisors and Environment & Safety Supervisors. 	M	Document				
35.	Construction of the closure dam							to be assessed when the detailed design is completed

(*1= Once; D=Daily; W=Weakly; M=Monthly; Y=Yearly)

Monitoring Plan for Construction Sites

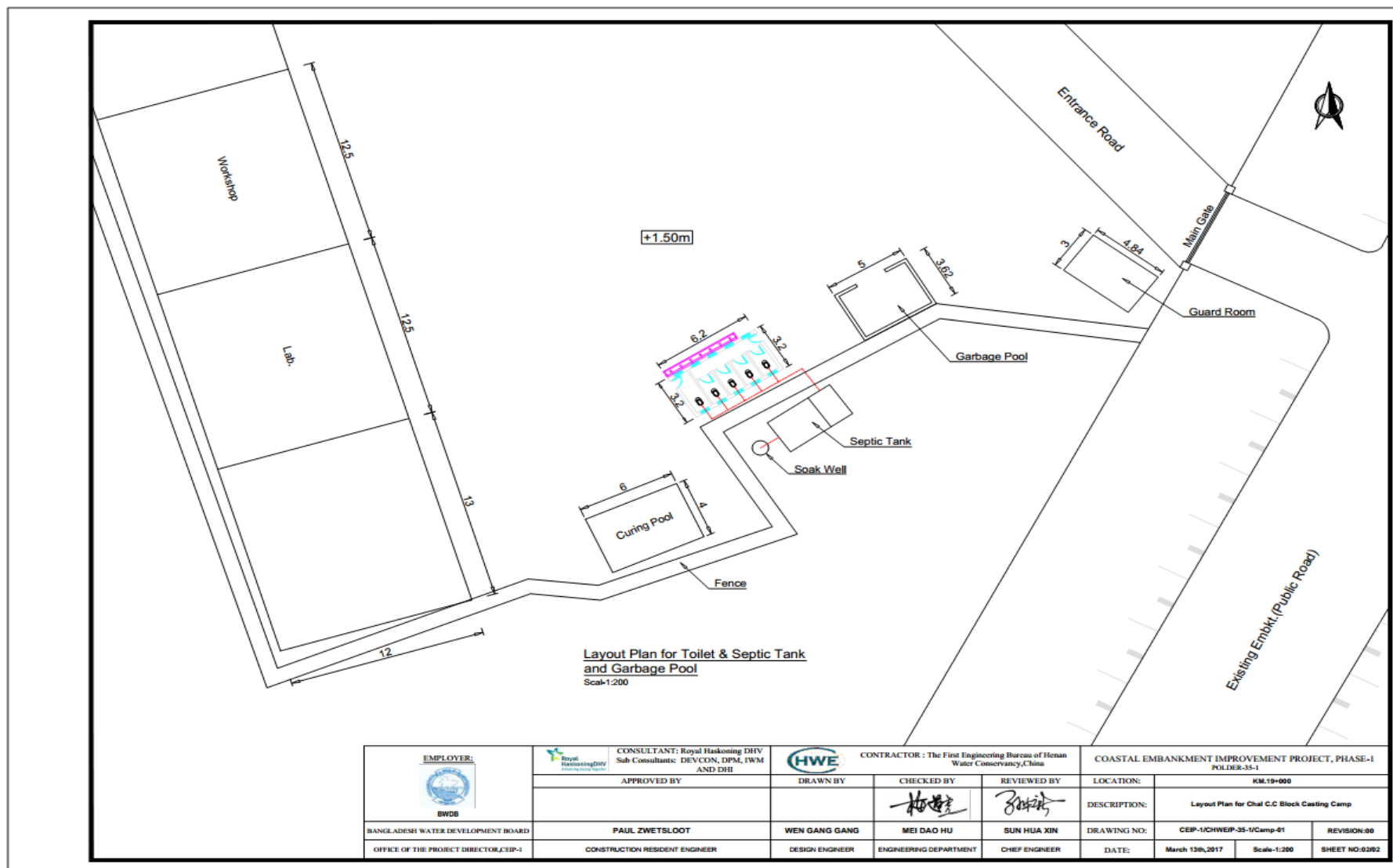
SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)	Remarks
1.	Construction camps	<ul style="list-style-type: none"> Obtaining approval Erection of signboards in Bangla and English with project details Install accommodation facilities for workers Drainage channels installation Supply of safe drinking water Infrastructure for adequate sanitation facilities Solid fencing and demarcation to prevent villagers or outsiders from entering the premises 	1 1 1 1 D W M	Document Field visit Ditto		
2.	Access road construction to construction site	<ul style="list-style-type: none"> Obtaining approval Construction of culverts if needed 	1 1	Document Field visit		
3.	Temporary Facilities Decommissioning	<ul style="list-style-type: none"> Agreeing with local authorities on demolition Review of environmental liabilities Waste removal General re-instatement of site Revegetation implementation Close-out check 	1 1 1 1 1 1	Document Field visit Ditto		
4.	Construction and Demolishing of drainage sluices, flushing sluices and inlets	<ul style="list-style-type: none"> Demolishing debris of sluices and inlets will be disposed of at a site approved by the Engineer. Before starting the construction activities of drainage sluices, ring bundh and diversion channel will be constructed and a dewatering system will be installed in order to work in dry conditions. Disposal of excess soil will be done with no objection from DoE and local authority. No waste water from concrete mixing will be disposed of directly to the surface water. Steel sheet pile driving will not be done at night. The work area will be demarcated clearly. Signals will be installed to indicate the entry and exits of vehicles and movement of construction equipment in the work area. 	W 1 Y W W	Document Field visit Ditto		

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)	Remarks
		<ul style="list-style-type: none"> Prior to every monsoon season all the temporary and permanent drainage structures under construction will be made free from debris. 	W M 1			
5.	Construction and re-sectioning of embankments	<ul style="list-style-type: none"> Pavement (if present) will be removed and disposed of at the premises of BWDB. Top soil from areas of earth works will not be used for construction works. The top soil (from surface to 15 cm depth) will be removed and preserved for later use of replacing after construction in rehabilitation. Disposal of excess soil will be done at site with no objection from DoE and local authority. All works will be demarcated clearly. Signals will be installed to indicate the entry and exits of vehicles and movement of construction equipment in the work area. The contractor shall manage the top fertile soil (15 cm) during earth work activities 	1 W W W W W	Field visit Ditto		
6.	Construction of the closure dam	<ul style="list-style-type: none"> 	W			to be assessed when the detailed design is completed
7.	Occupational Health and safety	<ul style="list-style-type: none"> Development of Health and Safety Plan including emergency procedures Train all staff in health and safety Provision of HIV, including STI (sexually transmitted infections) information, education and communication. Provision of PPE and ensuring their use Provision and use of life jacket during visiting campsite/worksites by boat Installation of first aid facilities at work site and 	1 M 1 W W M 1 W	Document Document Field visit Ditto		

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)	Remarks
		<ul style="list-style-type: none"> camps with adequate stock Provide sanitation facilities where needed Provision of safe drinking water to work force (tube-well water, bottled water or pond water) Proper signalling of work areas 	W			
	Solid Waste Management	<ul style="list-style-type: none"> Ensuring collection and disposal of solid wastes within the construction camps and work areas Taking measure to collect and store inorganic wastes in a safe place within the household and organic wastes cleared on daily basis to waste collector. Establish measures for Waste collection, transportation and disposal systems at approved disposal sites. Disposal of construction and demolition waste. 	M M 1 M	Field visit Document		
	Waste water	<ul style="list-style-type: none"> Installation of decanter boxes for washing buckets and cement mixers Installation of proper filtering elements. Carrying out periodic checks and clean-ups for the decanter box. Prioritize reuse of aggregates and water from the decanter box. Ensure safe disposal of liquid wastes generated at camp site. 	1 1 M M M	Field visit		
	Air	<ul style="list-style-type: none"> Regular maintenance of vehicles Covering or wetting of dusty materials Dust suppression by wetting surfaces Impose speed limits Revegetate bare surfaces soonest 	M M W W M	Field visit		
	Noise	<ul style="list-style-type: none"> Notify nearby population prior to any typical noise events Ensure construction activities do not generate unacceptably high level of noise Restrict working to daylight hours Locate noisy equipment / facilities away from sensitive receptors 	1 M W W	Field visit		
	Monitoring of Air Quality	<ul style="list-style-type: none"> Performance of air quality tests at selected sensitive sites for parameters SPM 2.5/10, SO_x, NO_x and CO during working hours 	M	Chemical analyses		

SI No.	Environmental Issues / Aspects	Actions to be taken / Inspection items	Monitoring Frequency (1, D, W, M, Y*)	Means of monitoring	Compliant (Y/N) Repeating non-compliance (R)	Remarks
	Monitoring of Noise Quality	<ul style="list-style-type: none"> Monitoring of noise level (dB) at selected sensitive sites during working hours 	D	Noise meter at work site		

Annex-6: Layout plan for Construction Camp



Proposed DS-04
Ch. 12+126.228
N=467225.112
E=484335.862

Existing DS-04
Ch. 12+181.080
N=467192.124
E=484378.808

Proposed Embankment C.L.

Note:
1. Houses at the proposed DS-04 position are not shown on this drawing, it will be demolished during the construction of the proposed structure.
2. Center line of the proposed DS-04 & Cofferdam are shown below:

Point Number	Coordinate(m)		Point Number	Coordinate(m)	
	Northing	Easting		Northing	Easting
1	467197.990	484322.437	7	467171.029	484333.473
2	467258.775	484352.525	8	467187.902	484295.050
3	467287.102	484341.467	9	467206.677	484288.973
4	467264.937	484385.201	10	467230.412	484294.455
5	467236.703	484386.133	11	467281.043	484317.124
6	467178.392	484357.105			

Annex-8: GRM for Polder 35/1

A PR officer will be nominated in each polder with assistance of local staff especially the local chairman. Before the construction activities in the surrounding area a GRM leaflet will have to be distributed to the local residence.

The contents of GRM leaflets will contain the following information:

Nature of the work,

Location of work,

Duration of the Work,

The possible risk during the execution,

The contact person as well as the mobile phone number

PR officer will keep a logbook to record all the complaint received including the following information:

The name of complainer, the date and time of complain, the mobile number of complainer, issues complained, action taken.

The GRM logbook shall be checked, reviewed by the supervising engineer.

Several social and environmental issues may arise during implementation stages of the Project. Potential sources of grievances from the affected people, concerned public, construction workers and civil society members may deal with:

- Soil, water, dust, noise and air pollution from construction related activities;
- Traffic movement and congestion;
- Lack of adequate safety at the construction areas and approach roads;
- Lack of water and sanitation facilities at the construction sites/camps;
- Waste disposal;
- Conflicts among construction workers and with local community;
- Disturbances to flora and fauna;
- Failure to comply with standards or contractual obligations.

As this Polder is located close to the Sundarban forest area stretching from chainage km 25 to chainage km 35 along the perimeter, it is expected that some complaints may be received from stakeholders of Sundarban. Awareness raising among own workers on the pristine beauty and the needs to preserve the Sundarban will be undertaken frequently. Special attention will be paid when construction activities are carried out adjacent to the Sundarban.

Of course, the GRM will also entertain concerns about matters of resettlement and land acquisition including livelihood restoration. The role here is to collect the complaints and forward the issues to the competent arrangements such as GRC (consisting of multi-stakeholders' groups).

There exist already three (3) operational GRCs in this Polder-35/1. There are 15 Grievance Redress Committees (GRC) at local level for all Polders of Package-1.

Membership of GRC

- | | |
|--|---------------------|
| 1. Executive Engineer (BWDB Division Office) | : Convener |
| 2. Representative of the RAP Implementing NGO | : Member -Secretary |
| 3. Local UP Member / Ward Councillor | : Member |
| 4. Teacher from Local Educational Institution
(nominated by Upazila Administration) | : Member |
| 5. Representative from Local Women's Group | : Member |
| 6. Representative from the PAP Group | : Member |

Annex-9: Construction Health and Safety plan

**CONSTRUCTION SAFETY & HEALTH
PLAN**

for

**Coastal Embankment Improvement Project, Phase 1
(CEIP-1) Bangladesh**

The First Engineering Bureau of Henan Water Conservancy
19th Feb. 2017

1. SAFETY AND HEALTH POLICY

CHWE believes that no job or no task is more important than worker's health and safety.

If a job represents a potential safety or health threat, every effort will be made to plan a safe way to do the task. Contractors are trained and motivated to implement the EHS requirements. During operation construction activities supervision is done by the Project Environmentalist.

Every procedure must be a safe procedure. Shortcuts in safe procedures by either foremen or workers will not be tolerated.

If a worker observes any unsafe condition, which may pose a potential threat to their health or safety, it is expected that employees will immediately correct the situation when feasible or inform management. Management has the responsibility to take adequate precautions, and assure the safety and health of employees.

If a job cannot be done safely it will not be done.

Management will provide visible ongoing commitment, resources, and leadership to assure the implementation of the SHMS. All employees will be provided equally high quality safety and health protection.

We acknowledge the importance of creating a positive safety culture through employee involvement and effective policies and procedures.

2. SAFETY AND HEALTH OBJECTIVES

CHWE plans to achieve worker safety and health through the following:

1. Designate a qualified safety person to coordinate the program.
2. Make regular job site safety inspections and conduct health monitoring.
3. Follow safety procedures and rules.
4. Provide on-going safety training.
5. Enforce safety rules and use appropriate discipline.

2.1 DESIGNATED SAFETY COORDINATOR

CHWE has designated Ren Gaofei, Song Kunpeng, Yang Chunliang, Meng Qinghua, Yuan Weiming to coordinate, implement, and administer the safety and health system. They will be supervised by Mr. Zia Kai (Khulna Office). The responsibilities include:

1. Understand potential job hazards and how to eliminate them.
2. Conduct or assist with Job Safety Analysis.
3. Assure compliance with construction safety and health standard requirements.
4. Conduct regular job site safety and health inspections.
5. Establish safety and health procedures.
6. Coordinate regular safety and health training.
7. Conduct or assist with Tool Box Talks or Five-Minute Safety Talks.
8. Maintain documentation of training, inspections, injuries and illnesses, and other safety records.
9. Participate in accident investigations and implementation of corrective actions.
10. Create statistical reports that compare severity and frequency rates against prior records.

2.2 SUPERVISOR'S RESPONSIBILITY

Our supervisors' play an important part in creating and maintaining safe and healthful work practices, policies, and procedures. It is the supervisor's responsibility to identify potential hazards, identify methods to control or eliminate the hazards, ensure employees engage in safe and healthful work practices, and ensure employees receive safety and health training to do their work. Safety and health performance will be part of our supervisors' evaluations.

2.3 SAFETY AND HEALTH TEAM

Our management will take an active role on the safety and health team. At least annually the safety and health team will develop written safety and health goals and track monthly progress. Six months report is compiled and submitted as biannual report. These goals will be communicated to all employees. Our team will be comprised of management and hourly employees.

2.4 RESPONDING TO SAFETY AND HEALTH ISSUES

Our management will take prompt consistent action when responding to safety and health issues. They will demonstrate our management commitment to addressing safety and health concerns and encourage employee participation. Management will respond to employees' reports of hazards or potential hazards.

Immediate supervisors will review, investigate, and take any necessary and appropriate action on all employee reports of hazards or potential hazards. The employee reporting the hazard or potential hazard will be notified of the outcome. Reporting of hazards or potential hazards will be without fear of reprimand.

3. EMPLOYEE INVOLVEMENT

3.1 SAFETY AND HEALTH TEAM

The purpose of our safety and health team (Environmental Specialist of PMU, Third party M&E consultant and DDCS & PMS consultants) are to participate in the implementation of the safety and health system.

Our team will be comprised of management and employee representatives. The team will:

- Address safety and health issues.
- Record and post minutes of the meetings.
- Involve employees in problem solving.
- Document action taken and post on the bulletin boards for all employees to read and-or comment.
- Have a formal agenda.
- It needs to be mentioned here that our activities on health and safety will be supervised and monitored by a Health and Safety Team composed by Environmental Specialist of PMU, DDCS & PMS Consultants and Third Party M&E Consultants

3.2 SAFETY INSPECTIONS

Our employees will participate in regular safety and health inspections to help identify potentially hazardous conditions and unsafe actions and initiate corrections. Findings will be presented to for review. Corrective action will be implemented in a timely manner.

3.3 SUGGESTION SYSTEM

Our employees are encouraged to make safety and health suggestions to help improve a process, prevent an accident, or to make any improvement in the safety and health system.

4. WORKSITE ANALYSIS

We will conduct a worksite analysis, through systematic actions that provide information as needed to recognize and understand the hazards and potential hazards of our workplace.

4.1 JOB SAFETY ANALYSIS

CHWE will utilize job safety analysis to determine potential hazards and identify methods to reduce exposure to the hazards.

Job Safety Analysis (JSA) is a method of planning for safety and health. There are three parts to the JSA.

1. The first component of a JSA is breaking down a job or task into the specific steps it takes to complete the job.
2. The second component of a JSA is to list all the hazards that are involved in each step. There may be many hazards that get listed next to some steps and may not be any associated with some steps.
3. The third step is to write down how each hazard will be eliminated or controlled.

Sample JSA Form

Job Title:	Page: ___ of	JSA No.	Date:	___New ___Revised
Equipment:	Supervisor:	Analysis by:		
Department:	Approved by:			
Required Personal Protective Equipment (PPE):				
Job Steps	Potential Hazards	Recommended Safe Job Procedures		
Trainee(s) Name:			Training Date:	
Trainer(s) Name:			Trainer(s) Signature:	
Four-Step Instruction Completed?	Prepare the Worker..... Trainer(s) Initials Present the Operation..... Trainer(s) Initials Try Out Performance..... Trainer(s) Initials Follow Up.....Trainer(s) Initials			
Comments:				

4.2 EMPLOYEE REPORT OF HAZARDS

Our employees play a key role in identifying, controlling, and reporting hazards that may occur or already exist in the workplace. Employee reports of potential hazards can be an effective tool to trigger a closer look at a piece of equipment, operation, or how work is being performed. Reports of potential hazards can also provide suggestions to eliminate a hazard.

4.3 ACCIDENT/INCIDENT INVESTIGATION

We will conduct an investigation for all accidents/incidents and near misses. Our primary goal of conducting an investigation is to determine the "root cause" to prevent the risk of a future occurrence. Investigation reports can help determine injury and illness trends over time, so that patterns with common causes can be identified and prevented. Investigations are not intended to place blame.

Protocol for investigating/handling any incident (elaborated in Section 5.2)

5. HAZARD PREVENTION AND CONTROL

5.1 JOB SITE INSPECTIONS

Job site inspections will be conducted daily. Hazards will be documented, reviewed, and corrections will be made in a timely manner. More detailed, written inspections will be conducted on monthly basis. The Safety Coordinator or other designated safety person will tour each job site and observe potential safety/health hazards, and develop a plan for safeguarding this company's workers which may include the following:

1. Removing the hazard.
2. Guarding against the hazard.
3. Providing personal protective equipment and enforcing its use.
4. Training workers in safe work practices.
5. Coordinating protection of workers through other contractors.

A record of all safety inspections and correctional steps will be kept.

5.2 ACCIDENT INVESTIGATION

All accidents resulting in injury or property damage will be investigated. The purpose of the investigation is not to find fault, but to find the cause of the accident so similar incidents can be prevented in the future.

1. All accidents, no matter how minor must be reported to the Foreman immediately.
2. Foremen must report all accidents to the Safety Coordinator as soon as possible.
3. Foremen must complete an initial written accident investigation the day of the accident, if possible.
4. All workers involved in the accident or who witnessed the accident must complete a written statement describing the incident.
5. The Safety Coordinator will complete a thorough accident investigation to determine root causes and corrective actions.
6. Near misses should be reported. Corrective action must be taken to prevent the same situation from occurring again with the potential for serious injury. Foremen should make a note of near misses and the corrective actions taken and report them to the Safety Coordinator, so that the same corrections may be made on all polder job sites.

5.3 PERSONAL PROTECTIVE EQUIPMENT

1. Helmet will be worn on job sites at all times.
2. Eye protection will be worn when there are potentials of hazards from flying objects or particles, chemicals, arcing, glare, or dust.
3. Leather work boots shall be worn to protect from falling objects, chemicals, or stepping on sharp objects. Safety toe footwear may be necessary in some instances.
2. Protective gloves or clothing shall be worn when required to protect against a hazard.
3. Harnesses and lanyards shall be utilized for fall protection as required.

6. POLICIES, PROCEDURES, SAFETY AND HEALTH RULES

Our management is responsible for implementing major decisions, policies and safety and health procedures. Specific safety and health procedures will be put in writing such as: lock-out, right to know, fall protection, confined space, respiratory program, etc. A copy of our written safety program will be available on every polder jobsite, either in the jobsite trailer, the gang box, or with the foremen. We will inform and enforce the following safety rules:

All of our safety rules must be obeyed. Failure to do so will result in strict disciplinary action.

1. Wear appropriate clothing and vest.
2. Watch where you are walking. Do not run. Keep your mind on your work at all times.
3. The use of illegal drugs or alcohol or being under the influence during working hours shall be cause for termination. Inform your supervisor if taking strong prescription drugs that warn against driving or using machinery.
4. Do not distract the attention of fellow workers or engage in horseplay. Do not engage in any act which would endanger another employee.
5. Keep your working area free from rubbish and debris. A clean job is the start of a safe job.
6. Do not use a compressor to blow dust or dirt from your clothes, hair, or hands.
7. Report any fear of walking at heights to your supervisor.
8. Know where fire extinguishers are located and how to use them.
9. Lift correctly - with legs, not the back. Do stretching exercises prior to work activities. Approximately twenty percent of all construction related injuries result from lifting materials.
10. Keep back at least 10m from all power lines, further if high voltage.
11. Nobody but the operator shall be allowed to ride on equipment.
12. Do not use power tools and equipment until you have been properly instructed in the safe work methods and become authorized to use them.
13. Do not remove, displace, damage, or destroy any safety device or safeguard on equipment or machinery.
14. If you must work around power shovels, trucks, rough-terrain fork-lifts, dozers, or other heavy equipment, make sure operators can always see you.
 - Never walk within the swing radius of equipment counterweights.
 - Never stand next to trucks when load straps are being released.
 - Barricades are required for cranes.
 - High visibility vests may be used to increase your visibility.
15. Never oil, lubricate, or fuel equipment while it is running or in motion.
16. Before servicing, repairing, or adjusting any powered tool or piece of equipment, disconnect it, lock out the source of power, and tag it out.
17. Excavations over five feet deep must be shored or sloped as required. Keep out of trenches or cuts that are not properly shored or sloped. Excavated material or other debris shall not be stored nearer than 1m from the edge of the excavation. Excavations less than 2m will require cave in protection where conditions indicate possible side failure.
18. Build scaffolds according to manufacturers' recommendations.
 - Scaffolds over 10m must have guardrails on all open sides.

- Scaffold planks shall be properly lapped, cleated or otherwise secured to prevent shifting.
19. Use ground fault circuit interrupters at all times with any temporary power supply. Use only extension cords of the three-prong type.
 20. Never enter a manhole, well, shaft, tunnel or other confined space which could possibly have a hazardous atmosphere because of lack of oxygen, or presence of toxic or flammable gas, or has a possibility of engulfment by solids or liquids.
 - Only a qualified person will test the confined area with an appropriate detector before entry.
 - Wear the necessary personal protective equipment.
 - Provide ventilation by blowing fresh air into the confined space.
 - An attendant may be required to be stationed at the entrance.

7. SAFETY DISCIPLINE

The following four step disciplinary system shall be implemented when safety rules are not followed or other unsafe actions endanger workers.

- First violation : Oral warning; notation for personnel file.
Second violation : Written warning; copy for file or Personnel Office.
Third violation : Written warning; one day suspension without pay.
Fourth violation : Written warning and one-week suspension, or termination if warranted.

Zero-tolerance Violations: Some safety violations are of such serious nature that there will be no warnings and termination may result. Examples include:

- Entering hazardous confined spaces without following proper procedures,
- Failing to use fall protection equipment,
- Entering unsafe excavations.

Both the employee and the supervisor allowing these unsafe acts may be terminated.

8. EMERGENCY PROCEDURES (CONTINGENCY PLAN)

In case of an emergency on site the following procedures will be instituted at each polder site.

1. Method of communication will be determined at each site: telephone, mobile phone, etc.
2. Post the following emergency telephone numbers:
 - Police,
 - Fire,
 - Ambulance.
3. Post the polder job site address near the communication station.
4. First Aid Box shall be stored at every polder working site. First responders should obtain all required First Aid.

9. SAFETY AND HEALTH TRAINING

CHWE will provide training to assure the requirements of standards are met and continuously evaluate employee training needs to keep workers safe and healthy on the job.

1. New Employee Orientation: New employees will receive training on the company safety and health management system, safe work practices and expectations, and specific safety and health training for the tasks that they will perform.
2. After inspecting a job site, we will identify and evaluate all potential hazards for potential of serious injuries and probability of an accident. Actions will be taken to minimize the hazards and protect the workers.
3. The Safety Coordinator or other designated site person will appraise the skill and knowledge level of exposed workers, and provide any needed training.
4. Where safety and health training is needed, appropriate training will be provided.
 - Hazards will be identified.
 - Necessary precautions will be explained.
 - Training length and level of detail will be determined by the severity of the hazards.
5. Toolbox Talks: Toolbox talks will be conducted regularly weekly. Topics covered will include:
 - The safe work practices necessary for that day's work.
 - Any safety concerns workers may have.
 - Brief refresher training on relevant safety topics.

Annex-10: Traffic management plan

TRAFFIC MANAGEMENT PLAN

General

The overall objective of the Coastal Embankment Improvement Project -Phase 1(CEIP-1) is to increase the resilience of coastal population to natural disasters and climate change. More specifically, the project aims at (a) reducing the loss of life, assets, crops and livestock during natural disasters; (b) reducing the time of recovery after natural disaster such as cyclone; and (c) improving agricultural production by reducing saline water intrusion which is expected to worsen due to climate change. This objective will be achieved by rehabilitating and improving the existing polder system in the coastal area.

Based on a multi criteria analysis for strategic polder assessment, a first priority group of 17 polders was selected. Among the 17 polders, 4 have been considered for Coastal Embankment Improvement Project -Phase 1(CEIP-1)/W-01, which are 32, 33, 35/1 & 35/3.

Managing traffic at a construction site is an important part of ensuring the site is without risks to health and safety. Vehicles including powered mobile plant moving in and around a site, reversing, loading and unloading are often linked with death and injuries to workers and members of the public. Traffic includes cars, trucks and powered mobile plant like forklifts and loader, and pedestrians like workers and visitors. The most effective way to protect pedestrians is to eliminate traffic hazards. This can be done by designing the layout of the site to eliminate interactions between pedestrians and vehicles. Examples include prohibiting vehicles from being used in pedestrian spaces or providing separate traffic routes so pedestrians cannot enter areas where vehicles are used. Where this is not possible the risks must be minimized so far as is reasonably practicable. This can be done by careful planning and controlling vehicle operations and pedestrian movements at the site.

Signs, warning devices and visibility

Signs should be used to alert workers and pedestrians to potential hazards from vehicles entering and exiting the construction site and other requirements like pedestrian exclusion zones.

Traffic routes should be clearly signed to indicate restricted parking, visitor parking, head-room, speed limits, vehicle movement, key site areas and other route hazards. Standard road signs should be used where possible and speed limits should be implemented and enforced.

The following control measures should be considered to manage risks:

- installing mirrors, reversing cameras, sensors and alarms to help drivers see or be aware of movement around the vehicle
- installing visual warning devices like flashing lights and high-visibility markings for powered mobile plant
- implementing safe systems of work to stop loads being carried forward where they impair clear vision
- appointing trained persons with flag to control traffic
- ensuring high-visibility or reflective clothing is worn by workers, plant operators and pedestrians at the site
- using communication methods like:
 - radio – however ensure a back-up communication process is in place if it fails
 - line of sight communication e.g. hand signals or cap lamp light signals. The person receiving the message should acknowledge the message has been received and understood, and
- Verbal commands and confirmation of warnings and signals.

Traffic management

A traffic management plan documents and helps explain how risks will be managed at the construction site. This may include details of:

- designated travel paths for vehicles including entry and exit points, haul routes for debris or plant and materials, or traffic crossing other streams of traffic
- pedestrian and traffic routes
- designated delivery and loading and unloading areas
- travel paths on routes remote from the site including places to turn around, dump material, access ramps and side roads
- how often and where vehicles and pedestrians interact
- requirements for special vehicles like large vehicles and mobile cranes
- requirements for loading from the side of road onto the site
- the responsibilities of people managing traffic at the site
- the responsibilities of people expected to interact with traffic at the site
- instructions or procedures for controlling traffic including in an emergency, and
- how to implement and monitor the effectiveness of a traffic management plan.

The traffic management plan should be monitored and reviewed regularly including after an incident to ensure it is effective and considers changes at the site.

Workers should be aware of and understand the traffic management plan and receive information, instruction, training and supervision.

Annex-11: Capacity Building

Environmental action success depends of effective capacity building, the training of staff and all others involved. All those responsible for the management, implementation and operation of any aspect shall be adequately trained for their role. Training records shall be maintained on site, for each employee, to provide evidence for auditing/inspection purposes. The following training shall be considered for each organization. Training Plan already added as Annex 16.

1.1. CEIP-1 Project Management Board

The CHWE shall establish an environmental unit to oversee the preparation, implementation and oversight. The environmental unit shall be provided with enough technical and financial resources to complete this oversight role; external resources or contractors may be required. Specific training to the environmental unit should be provided as follows:

- Principles and procedures for environmental impact assessment;
- Fundamentals of environmental management;
- Compliance assessment, monitoring and follow-up;
- Environmental audits;
- Social impact assessment and public consultation; and
- Auditing and follow-up.

1.2. Construction Contractor

The construction contractor shall have environmental staff trained to ensure contractor and all subcontractor compliance with EMP requirements. The construction contractor shall maintain training records, including attendance and specific course, for inspection by the CHWE. Specific training to the construction contractor environmental unit should be provided as follows:

- Principles and procedures for environmental impact assessment;
- Fundamentals of environmental management;
- Compliance assessment, monitoring and follow-up;
- Air, soil and water sampling procedures;
- Construction impacts, including civil works, sediment and erosion control, soil handling and vegetation removal;
- Waste management;
- Fuel and hazardous materials management;
- Construction camp management;
- Community relations and public consultation procedures;

1.3. Technical Assistance In addition to staff training, technical assistance for outside consultants has been included into the training budget. Technical assistance could be full-time onsite within the CHWE or include short visits by consultants to provide training seminars and workshops.

Annex 12-Emergency Response Plan



Coastal Embankment Improvement Project, Phase-1 (CEIP-1)

Field Office, House # 353 (Ground Floor), Road # 02, Sonadanga Residential Area (2nd Phase), Khulna, Bangladesh

HASKONINGDHV NEDERLAND B.V.

WATER

To
Mr. Zhao Lei
Project Manager
The First Engineering Bureau of
Henan Water Conservancy
House: 2A, Road 55, Room 2A
Gulshan-2, Dhaka-1212
Bangladesh

Jonkerbosplein 52
Postbus 151
Nijmegen 6500 AD
Netherlands
+31 (240) 328 42 84 Telephone
info@rhdhv.com E-mail
www.royalhaskoningdhv.com Internet
Gooi-, Eem- en Flevoland 565151454 CoC

Your reference : CHWE/CEIP-1/RE/0318
Our reference : RDCOR_BC5883-100_L397_PZ-MIP
Direct line : +880 173 6097 763
E-mail : paul.zwetsloot@rhdhv.com
Date : 15.December.2016
Enclosure(s) :

Subject: Emergency Response Plan.

Dear Sir,

We refer to your above letter, dated 27.Nov,2016, under which you submitted the Emergency Response Plan.

After our review, we herewith give our consent for the Emergency Response Plan

Kind regards

A handwritten signature in blue ink, appearing to read 'Paul Zwetsloot'.

Paul Zwetsloot
Construction Resident Engineer - CEIP-1/W-01
CEIP-1, Khulna

Copy to:

1. Team Leader, CEIP-1, Banani, Dhaka-1213
2. The Executive Engineer, CEIP-1, Khulna
3. Md. Mazibur Rahman Khan, Deputy Resident Engineer, CEIP-1, Khulna
4. Office copy



The First Engineering Bureau of Henan Water Conservancy

Coastal Embankment Improvement Project Phase-1(CEIP-1)

Project Office: House 411, Road 4, Sonadanga 2nd Phase, Khulna, Bangladesh

Our Ref. No.: CHWE/CEIP-1/RE/0318

Date: 27th Nov. 2016

To:

Paul Zwetsloot,

Construction Resident Engineer, CEIP-I

House 353 (Ground Floor), Road 02, Sonadanga 2nd Phase

Khulna, Bangladesh

Subject: Submission of Emergency Response Plan for CEIP-1/W-01

Dear Sir,

Please kindly find herewith our Emergency Response Plan for your kind review and reference.

Best regards!

Yours faithfully,

Zhao Lei

Project Manager



Enclosure(s): Emergency Response Plan for CEIP-1/W-01

CC.

1. Mr. Jean Henry Laboyrie, Team Leader of RHDHV for CEIP-1
2. Mr. Md. Abdul Hannan, The Executive Engineer, CEIP-1, Khulna
3. Office copy

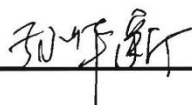
Coastal Embankment Improvement Project, Phase-1 (CEIP-1)



Bangladesh Water Development Board (BWDB)



Emergency Response Plan

Approved by: 

Checked by:  Sun. huaxin.

Prepared by:  

Jia Kai
QC In Charge
CHWE, CEIP-1

Ren Gaofei
HSE Engineer
CHWE, CEIP-1

**The First Engineering Bureau of Henan Water
Conservancy (CHWE)**

2016

Coastal Embankment Improvement Project Phase-1 (CEIP-1) , Bangladesh

Emergency Response Plan

1 Purpose

To ensure the implementation of the occupation health, safety target of the Project as per stipulated in the company's environment, occupation health and safety policy and organization system. To form a safe, healthy, civilized, clean and tidy cultural environment in the entire Project, and to continuously improve the management level of engineering construction.

As stipulated in the EIA management system, EIA management system shall be under control during the whole construction activities, the ability of EIA management shall be continuously improved so as to ensure effective prevention and rapid response to the potential EHS emergency accident occur in the building construction activities via the products and services, at the same time to minimize the damage and lost to the personnel and the company.

Based on the above mentioned, the EHS Emergency Response Plan is made.

2 Emergency Rescue Principle and Procedure

2.1 Emergency Rescue Principles

- (1) Confirm no secondary danger first, then rescue personnel and property;
- (2) Personnel first and then property;
- (3) Life-saving prior to cure, serious wound prior to minor wound, save alive prior to corpse treatment;
- (4) Record of the original site situation shall be made before moving the personnel and goods at accident site;
- (5) The wounded rescue work shall be carried out rapidly in time, and shall be work hard for sending the wounded to hospital as soon as possible and as fast as possible, for the situation of severe bleeding, severe trauma, suffocation, severe heatstroke, the wounded should be sent to the nearby hospital under medical monitoring.

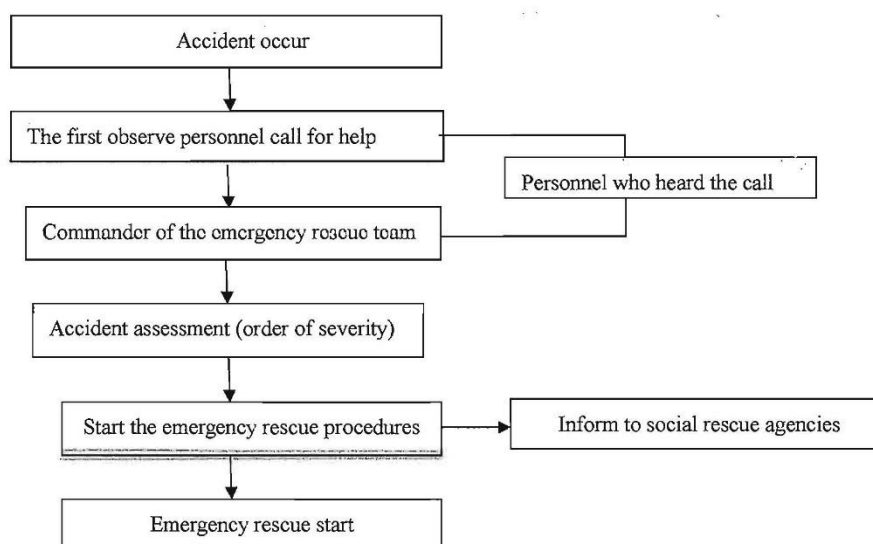
Coastal Embankment Improvement Project Phase-1 (CEIP-1) , Bangladesh

2.2 Principles of Emergency organization

Emergency rescue work shall on the premise of 'prevention first, combining prevention with remedying', as well as under the principle that 'Unity of command, Graded responsibility, mainly in area, self-rescue combine with social rescue'.

All personnel take part in the emergency rescue shall obey the command from the rescue group, individual obeying organization, the lower level subordinates itself to the higher level, normal work give the way to the emergency one.

2.3 Rescue procedure



3 Scope of Emergency

This Emergency plan is suitable for following emergency situations occur on site: the fire hazard, collapse, high falling, object strike, electric shock, lifting injury, mechanical injury, asphyxia, heatstroke, strong wind, thunder and lighting, epidemic, drowning, etc.

3.1 Occupational Health and Safety Emergency Accident Focus

Key point of occupational health and safety emergency accident:

- (1)Hoisting and erection of equipment;
- (2)Erection and removal of scaffolding;
- (3)Power supply for construction;

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- (4)Machinery injury during construction;
- (5)Fire welding and electric welding;
- (6)Aloft work;
- (7)Vehicles for indoor transportation;
- (8)Marine transport and offshore operations.

3.2 Occupational health and safety accident types

Classification of occupational health and safety emergency accident: Mechanical injury accident, lifting injury accident, traffic accident, fire accident, object strike accident.

4 Emergency organization

4.1 Emergency Rescue Team

Accident Emergency rescue leading group shall be set up to organize, commander the accident rescue and to allocate various task, deploy Emergency resources (manpower, vehicles, equipment), so as to achieve the Emergency action to the accident in the first time. Handling process of the accident shall be report to the higher management layer and related department, and the follow-up situation shall be feedback to the aforesaid relatives in due time.

Organization of Emergency team are as follows:

Duty	Name	Position	Cell Number
Team Leader	Zhao Lei	Project Manager	01993-345005
Deputy Team Leader	Xue Yingke	Deputy Project Manager	01992-177661
	Sun Huaxin	Chief Engineer	01995-623946
	Jia kai	In charge of QSE Department	01992-177659
	Wei Lei	Manager of Engineering Department	01725-772045
Team Member	Ren Gaofei	QSE Department, Khulna	01992-219783
	Zhou Wenyi	Manager of Polder 32	01753-379019
	Dou Xin'guo	Manager of Polder 33	01990-777498
	Liu Tailiang	Manager of Polder 35/1	01768-783959
	Song Shebin	Manager of Polder 35/3	01753-353967
	Jiao Huaitao	QSE Department ,Polder 32&33	01995-623943
	Meng Qinghua	QSE Department ,Polder 35/1	01992-177659
	Zhi Chaoyang	QSE Department ,Polder 35/3	01971-562183

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	Md. Shariful Islam	Assistant Engineer	01911-920319
	Md. Shahin	Quantity Engineer	01981-690283
	Md. Arafat	Assistant Engineer	01925-370060

The phone shall be 24 hours unimpeded.

4.2 Emergency Team

The Emergency team should reaction rapidly once they get the emergency information, and report the accurate situation to the commander or deputy commander the time, location, patient information, first-aid situation and injury type of the accident. At the same time, site rescue command group shall be set up under the command of the commander of deputy commander consist the related personnel. The rescue command group shall deploy the related Emergency team to element the dispose and coordinate work on basis of the requirement.

5 Emergency resources

First aid medicines and equipment of Polder 32

S.N	Equipment name	Purpose	Specification	Deployment	Commander	Remarks
1	Ferryboat	Transport	Mini scale	Polder site	All Staffs	2 Nos.
2	Sedan car	Wounded transfer	Mini scale	Pre-cast Yard	Zhou Wenyi Zhang Shuai	1 Nos.
3	Extinguisher	Fire fighting	Dry powder	Polder site	All Staffs	2 Nos.
4	First-aid Box	Emergency treatment	Local standards	Polder site	All Staffs	2 Set
5	Life buoy	Water first-aid	Local standards	Polder	All Staffs	2 Set

First aid medicines and equipment of Polder 33

S.N	Equipment name	Purpose	Specification	Deployment	Commander	Remarks
1	Toll cart	Transport	Mini scale	Pre-case Yard	All Staffs	1 Nos.
2	Sedan car	Wounded transfer	Mini scale	Pre-case Yard	Polder Manager	1 Nos.
3	Extinguisher	Fire fighting	Dry powder	Polder site	All Staffs	6 Nos.
4	First-aid Box	Emergency treatment	Local standards	Polder site	All Staffs	2 Set

First aid medicines and equipment of Polder 35/1

S.N	Equipment name	Purpose	Specification	Deployment	Commander	Remarks
1	Toll cart	Transport	Mini scale	Pre-case Yard	Shi Guangming/ Wang Suo	3 Nos.

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2	SUV car	Wounded transfer	Medium scale	Main camp	Polder Manager	1 Nos.
3	Extinguisher	Fire fighting	Dry powder	Main/Vice camp	All Staffs	6 Nos.
4	First-aid Box	Emergency treatment	Local standards	Main/Vice camp	All Staffs	2 Set

First aid medicines and equipment of Polder 35/3

S.N	Equipment name	Purpose	Specification	Deployment	Commander	Remarks
1	Toll cart	Transport	Mini scale	Main camp	Zhang Yongli	1 Nos.
2	Sedan car	Wounded transfer	Medium scale	Main/Vice camp	Liu Zhanqing	1 Nos.
3	Extinguisher	Fire fighting	Dry powder	Main/Vice camp	All Staffs	8 Nos.
4	First-aid Box	Ambulance	Local standards	Main/Vice camp	All Staffs	1 Set

Note: First aid kit shall be allocated on site and the following medicines shall be prepared and periodic replaced: first-aid packet, Hydrogen Peroxide, mercurochrome, injector, Medicinal alcohol, cotton yarn, wound plaster. These medicines shall custody by specialist so as to ensure the effectiveness.

6 Emergency plan

6.1 Accident report

The site insider shall report the site information to the Polder Manager immediately after the accident happened. The Polder Manager shall report to the personnel at Project Office who is in charge of the emergency team. The personnel in charge shall estimate the order of severity and report this to the commanders.

The commanders shall send a report to the relatives and the local safety production management department, the report shall contain the followings: the time, location, organization and context of the accident, the situation and quantity of the casualty, the economic damage, scope and site situation of the accident, etc.

6.2 Prevention of Casualties

(1)The principle of prevention of casualties

Comprehensive and systematic measures shall be adopted to ensure safety produce, prevention of injury and death accident. To keep the system safety, the detailed principle of prevention and reducing vulnerability of accident contains but not limited to the followings:

①The principle of reducing, controlling and eliminating potential hazards;

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②Raise the safety factor;

③Locking principle (interlocking principle of automatic fault prevention);

④The principle of barrier and distance;

⑤The principle of warning and prohibition of information;

⑥The principle of PPE;

⑦The principles of asylum, survival and e.

(2)Measures of prevention

Casualty prevention is to eliminate the insecurity of people and objects, to keep operating practices and operating conditions safe.

①Artificial unsafe behavior, ensure operation safe

i)Carry out safety education and ideological education safety regulations;

ii)Carry out safety knowledge training, enhance the worker's safety engineering quality;

iii)Popularize safety standardization management operations and safety confirmation system activities, Carry out the work by strictly following the stipulation of safe operation and procedure.

iv)Enhance the safety management and monitor of the key working equipment and personnel, ensure safety production;

v)Alternate work with rest so as to maintain full energy therefore no unsafe behavior occur.

②Eliminate the unsafe physical object so as to ensure working conditions safe.

i)Adopt new technology, new technologies, new equipment, improve working conditions;

ii)Strengthen the safety technology research, adopt safeguard equipment to keep apart the dangerous positions

iii)Adopt safe PPE;

iv)Carry out security checks, find and rectify the unsafe hidden danger in time.

v)Periodically carry out safety assessment of operating conditions (environment) in order to take safety measures to ensure compliance with the operational safety requirements.

③Strengthen safety management to achieve safety measures.

Strengthening the safety management is an important guarantee for the achievement of safety measures. Make a good basic job of accident prevention by establish, finalize and strictly implement safety stipulations, carry out regular safety education, job training and safety knowledge contest, through safety management such as formulate safety inspection and

Coastal Embankment Improvement Project Phase-1 (CEIP-1) , Bangladesh

implementation of safety prevention measures to eliminate potential accident.

6.3 Emergency Rescue Procedures

(1) Report to the headman to startup the Emergency plan and related procedure immediately after the accident.

(2) According to different incidents, each group dispatches the corresponding professional technicians, transfers the corresponding rescue and protection equipment, and endeavors to minimize the accident loss with the corresponding technical measures. Deploy corresponding professional technicians, rescues/protective equipment, adopt corresponding technical measures to minimize the damage caused by the accident on basis of the various accident situation.

(3) Unite and cooperate with the Emergency rescue commander team to carry out the rescue, mobilize the masses, staffs, relatives and social youths who is high-quality but out of the professional rescue team and allocate them into the various professional rescue team as per their major, while serious accident happened and there is not enough resources of the professional rescue.

6.4 Site Emergency rescue, rescue specific measures

6.4.1 Fire emergency

(1) Call for help

When there is a fire on site, the person who first found it shall cry out lustily for help by telling the clear information of where and what happened. The man who heard the call shall report to the nearest management person or the manager of the Polder.

(2) Rescue

First rescue the wounded to a safe place from the accident site and carry out the rescue, then evacuate the staffs in the fire region, cut off the electric power, organize people to fight with the fire so as to prevent the fire from spreading. Investigate the wounded quantities and order of severity at the same time

In case the wounded lost large quantity of blood and feel fear, apply proper analgesic treatment; if the wounded develop fidgety and wanna drink, prepare some dilute saline and let the wounded to drink in several times. Plain boiled water and/or syrup shall not apply to the wounded merely. During physical examination and transporting additional attention shall be

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paid to protecting the wound to prevent the enlargement of the wound.

In case the clothes is on fire, take off the clothes and lie down immediately, get the fire out via slowly roll over or using water.

In case burnt by hydrothermal fluid, take off the clothes impregnated by hydrothermal fluid, rapidly cool the burnt area either by soaking in the cool water or sprinkling cool water to the burnt.

Chose a place in good ventilation and lay down the wounded rescued from the fire before the ambulance arrive the site. Artificial respiration shall be carried out when the wounded has dyspnea.

Personnel on a fire site shall apply clothes to muffle his/her mouth and nose, bent down in the lowest position to evacuate from the fire site rapidly.

Ask help from the professional medical staffs while carrying out the aforesaid procedure. At the same time, inform them of the location of fire and phone number of linkman.

Rescue the property via well organization.

Assist the fire-fighter, medical staffs to carry out the rescue work, transport the wounded to the hospital as soon as possible.

Keep the site original.

6.4.2 Height falls, mechanical injury, lifting damage

Stop the field operations immediately when accident happened, bring the wounded out to the flat area for checking by the relief-experienced staff on-site, keep still and take certain emergency relief according to the situation of the wounded. Escort the wounded with the medical staff to the hospital as soon as possible after the ambulance arrived.

(1) First aid on shock and coma

Work-site shock coma is due to trauma, pain, brain damage caused by spinal cord.

①Let the shock lay supine without pillows and 30 degrees legs raised. If the shock cannot lay supine due to the cardiogenic shock accompanied by heart failure, shortness of breath, make him half-lying, keep warm, quiet and unmoved unless it is necessary to move. The move action should be gently.

②Take Oxygen or artificial respiration to keep the shock breath smoothly. Critically ill patients shall be given oxygen under nasal or endotracheal intubation

③The secretions, vomit should be removed from the nose and mouth of the unconsciousness',

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and then keep the injured lay lateral to prevent suffocation.

(2) First aid for bleeding

① General hemostasis: for small bleeding wound, apply with saline coated with mercurochrome syrup first, and then covered with sterile gauze, band it tightly

② For severer bleeding, suppress method, the most basic, the most common and most effective method of hemostasis, shall be applied. It is temporary applicable to the head, neck, limbs, arterial bleeding. That is, with the fingers or the palm of your hand to suppress the part of the artery which is nearer to the heart than the wound is. As long as the suppressed location is precise, this method can immediately play a hemostatic effect.

③ There are usually 8 hemostats on the body. Generally, the upper arm artery, thigh artery, radial artery are more commonly used. Upper arm artery: use 4 finger to pinch the muscles of the upper arm and press the arm; thigh artery: use the end of the palm of your hand to suppress the middle of the thigh slightly above the point of the medial; radial artery: use 3 fingers suppress the part close to the end of the thumb.

④ Other methods of hemostasis. In addition to aforesaid methods for hemostasis, there are tourniquet hemostasis, compression bandage hemostatic method and add pad to stop bleeding and other hemostasis method.

Tourniquet hemostasis is applicable for limb hemorrhage, especially arterial bleeding. Use a tourniquet (usually a rubber tube, can also be replaced with a towel, cloth or rope, etc.) tie around the limb tightly, or stick a short wooden stick throughout the knot and entwine tight until no blood so far. When entwine the tourniquet, do not over-tighten or over-loosen. Too tight will cause skin and nerve damage, too loose cannot play a hemostatic effect.

In this way there is the risk of tissue necrosis resulting from ischemia of the injured limb, so pay attention to the following points:

① Tourniquet cannot be directly in contact with the skin, first use gauze, cotton or clothes for separation.

② after the tourniquet tied, transfer to the hospital as soon as possible. During the transfer, release 1-2 minutes every hour to temporarily restore blood circulation, and then tie tightly on the higher parts.

③ the part applying the tourniquet shall be not too far from the bleeding point, in order to avoid more muscle tissue ischemia, hypoxia. Generally tied position shall be on the one third

Coastal Embankment Improvement Project Phase-1 (CEIP-1) , Bangladesh

place away from upper arm or thigh.

(3)First aid for fracture

The correct fixation is most important for fractured victims.

Field fixation of fractures:

①The material used for fixing bones can be locally drawn, such as sticks, branches, wood, and crutches, cardboard etc. the length of the material shall be enough to keep the upper and lower joints of the fracture fixed or unmoved.

②Spinal fractures or fractures of neck fractures, unless it is special circumstances such as indoor fire, or let the injured remain in place, waiting for medical personnel with medical equipment to carry to move.

③when lift the injured person up from the ground, many people should hold up the injured slowly; during delivery, use wood or hard materials other than stretcher or rope bed. Board can be padded with quilts other than pillows, the head of the cervical vertebra fractured person shall be placed between the sandbags in both sides with the head grip.

(4)Other aid

①In case of traumatic injury on brain or abdominal, such as brain tissue or abdominal visceral out, contaminated tissue should not be tugged inside. It should be covered with a clean bowl, and then wrapped; avoid eating, drinking or with analgesics, sending to the hospital for treatment.

②Don't pulled out when there are stakes and other objects into the body cavity or limbs. It is necessary to saw off the outside part of the piercing (keep a small part near the body). It can be pulled out when the surgery is ready to be carried out in the hospital. Because in some case, the object pierced is right on the blood vessels, which can temporarily stop the bleeding. Massive hemorrhage may occur if the stick pulled out immediately.

③If there is the chest wall floating, immediately use clothing, cotton pad, etc. filling with the appropriate pressure to band to limit the floating. In case of failure of aforesaid activity, lay the injured person on his floating wall to limit the abnormal breathing.

④If there is a traumatic injury on chest, immediately making the injured person take a semi-supine position and bind the chest wall wound tightly and closely So that adjust the open pneumothorax into a closed pneumothorax and speed to the hospital. If the rescue personnel is enough experienced to determine that the symptom is tension pneumothorax, the methods of

Coastal Embankment Improvement Project Phase-1 (CEIP-1) , Bangladesh

puncture exhaust or upper thoracic drainage tube can be applied upon good conditions.

6.4.3 Electric shock accident

(1) The circuit shall be verified and the switches shall be cut off rapidly when there is an electric shock, so as to implement the rescue and prevent the accident from extension.

(2) Electric shock first aid

①The first-aid to electric shock wounded shall be a matter of seconds. The contact with professional shall be carried out at the same time when rescuing due to normally the electric shock wounded with no breath and heart beat is in a bad way. The rescue shall not be interrupted during the transferring of wounded to the hospital.

②Turn off the switches, cut off the power supply prior to the rescue. Dry wooden stick or dry bamboo pole shall be adopted to remove the cables from body of the wounded when it is not available to cut off the power supply. In case of the failure, dry rope could be adopted to hold the wounded and to tow him/her away from the electric current. The rescuer shall wear rubber gloves and rubber shoes. Touching the wounded by hand is strictly prohibited and own safety shall be always keep in mind when rescuing others.

③Lay down the wounded and closely observe his/her situation if the wounded is in his/her senses as well as independent breathing and heart beating, no stand up and walk is allowed in order to prevent from shock or heart failure.

④Call the ambulance immediately and try to awaken the wounded when he/she is out in his/her senses. Lay down the wounded when no breath but heart beating, unbutton his/her clothes to ensure respiratory unimpeded and start mouth-to-mouth respiration immediately. External chest compression shall be adopted to the wounded who has no heart beat but breath. Rescue measures such as mouth to mouth artificial respiration and external chest compression shall be adopted immediately when the wounded is found to have no breath or heart-beat. The rescue time shall not less than 60-90 minutes till the wounded restore his breath and/or heart-beat or the wounded is proved to be absolutely dead. If there are two people on site to carry out the mouth to mouth artificial respiration and external chest compression respectively. The ratio of artificial respiration and external chest compression shall be carried out with ratio 1:5, that means 1 time artificial respiration and then 5 times external chest compression. If there is only 1 people to do this, the ratio shall be 2:15 which means first 15 times external chest compression and then 2 times artificial respiration. The artificial respiration and external

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chest compression shall be carried out alternatively and thoroughly.

⑤Note:

Additional attention of checking other injury/hurt shall be paid before treat the wound of electric burns. Syndrome such like cranio-cerebral trauma, hemopneumothorax, visceral rupture, limbs and pelvic fractures may occur when the wounded falling from high after the electric shock.

Optional movement of the wounded is prohibited during the site rescue. The interrupted time shall not exceed 30 seconds when it is really must to move the wounded. During moving the wounded or transporting the wounded to the hospital, continuously rescue shall be maintained as well as the wounded lying flat on the stretcher with flat, wide, harden wood board under his back. Artificial respiration and/or external chest compression shall be adopted to the wounded who has no breath and no heart-beat. Such rescue shall not be interrupted before the professional medical rescue staff take over the rescue work.

The wound of electric burns shall be wrapped by clean gauze rather than ointment or dirty gauze, or to be treated by doctor after got to the hospital.

6.4.4 Emergency measures for collapse accident

(1) Once there is a collapse, the evacuate management shall first organize people to evacuate and then count up the number of people present to be aware of lost and/or injured. After familiar with the situation and numbers of personnel in the collapse region, effective rescue via excavation shall be immediately carried out when someone is found to be lost during the collapse.

(2) Excavation should use artificial excavation, prohibit the use of mechanical excavation, to prevent mechanical damage to the buried staff. Artificial digging Avoid sharp tools as far as possible. For large heavy objects, should be reasonable organization of handling, in particular, buried in the body pressure on large objects, must be organized enough manpower before handling, handling clear responsibilities, by the person responsible for moving the buried staff.

The excavation shall be carried out artificially, equipment such as excavators are prohibited so as not to mechanical hurt the buried. For objects which is big-sized and heavy, the carrying shall be reasonable, adequate number of personnel shall be well organized and responsibility shall be confirmed especially when carrying the big-sized object which pressed above the

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buried. The buried shall be carried out by specialist.

(3) Rescue excavation staff should be arranged in groups and distributed to different work reaches according to the situation. The staff shall be timely shifted to avoid over consume of the physical strength, so that buried personnel can be rescued in the shortest possible time.

If any personnel missing or injured, immediately report to the police. Keep well experienced vehicle guider for the guidance of the rescue vehicles.

(4) Delimit the dangerous area, maintain the regular deformation displacement observation on the slope and arrange experienced technical personnel to do the monitoring work. In case unstable situation found out, take measures to deal with immediately.

(5)The rescue team shall carry out some preliminary aid to the wounded before the professional medical staffs arrive.

①Race against the clock to rescue the buried via head exposed first so as to enable the wounded breath freely.

②Artificial respiration and subsequently standard cardio-pulmonary resuscitation (CPR) shall be carried out after the wounded were digged out.

③Tourniquet shall be adopted for the bleeding wound.

④Hot compress and massage shall be forbidden to the crush wound.

6.4.5 Traffic accident

(1)When a traffic accident occurs, the emergency command of the project department immediately organizes the force and promptly rushes to the scene.

The Emergency rescue team of the Project Office shall organize resources and rush to the site immediately when there is a traffic accident.

(2)Rapidly report to the local traffic department in charge on the brief site situation and consequences, rescue wounded and investigate the accident site by asking for help from the department of hygiene, insurance, transportation, fire brigade in accordance with the situation at accident site.

(3)Cordoned off the area, maintain the original site, interrupt the traffic via apply to the local traffic department in charge when necessary, signs and traffic vehicle routes shall be clearly indicated.

(4)Emergency measures such as rescue, firefighting shall be adopted and the principle of ‘nearby and group’ shall be followed. The specific rescue measures please see to the aforesaid

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chapters and sections of the fire hazard accident, high falling accident, mechanical injury accident, physical objects injury accident, etc. Parking conditions shall be considered when transfer the dead.

(5)Get people who concerned custody and search for the witness.

(6)Arrange someone as the commander to guide the site investigation.

6.4.6 Heat stroke

6.4.6.1 Premonitory heat stroke

(1)Rescue immediately through separate the patient away from hyperthermia condition, bring the patients to the place with good ventilation for rest, unbutton the clothes and waist belt of the patient, rip open or take off the patient's clothes.

(2)Organize mutual rescue. Give cooler salty drink to patient and anti- heat stroke medicine such as Camphoradin, Jintan, Ageratum-liquid, etc.

Massage shall not be adopted when the patient has a muscle cramps, otherwise it will increase the pain to the patient. Salts and calcium shall be given to the patient as soon as possible for humoral supplement.

Dial the emergency call for help and at the same time carry out the above said procedures when the patient present to be circulatory failure. Cooperate with the medical staffs to carry out emergency rescue and transfer the wounded to hospital as soon as possible.

6.4.6.2 Severe heat stroke

(1)Rescue immediately through separate the patient away from hyperthermia condition, bring the patients to the place with good ventilation for rest, unbutton the clothes and waist belt of the patient, rip open or take off the patient's clothes.

(2)Organize mutual rescue, take various cooling measures rapidly, the measures are as follows:

①4□ water bath method: immerge the patient in to 4□ water except the head so as to enable the heat to be absorbed by cooling water, but this not apply to the extremely serious, comatose, shocked, heart failure patient.

②Transfer the patient into the Air-conditioned room with temperature about 25□, place ice-bags near main artery of his/her head, neck, neck sides, armpit, groin and wash his/her body by using icy water, continuously rub his/her skin to make it red to prevent hypostasis

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occur.

③Sprinkling icy water and/or placing ice cubes in the room and fans shall be adopted when air-condition is not available. At the same time, wash the whole body by using well water and cover the body by wet towel to accelerate hypothermy.

While performing the above-mentioned steps, the medical emergency aid 120 is assisted. To assist 120 to carry out medical emergency work, quickly sent to the hospital for treatment of the wounded.

Dial the emergency call for help and at the same time carry out the above said procedures when the patient present to be circulatory failure. Cooperate with the medical staffs to carry out emergency rescue and transfer the wounded to hospital as soon as possible.

7 Environmental management and control measures

7.1 Dust control

(1)Dust discharging shall follow the standard that not to endanger the operating personnel health.

(2)Measures of dust control

①The cement shall be stored in a sealed warehouse, workers for transportation shall wear dustproof mask, and transportation shall be carried out in gentle so as to prevent from forming dust.

②For sand and aggregate stacking yard, materials shall be stored in stipulated area as per the civilized construction. Covers shall be adopted to prevent dust from forming on basis of the various weather.

③Dust disposal methods for operating activities:

i)For the dust pollution of the batching equipment operation, dustproof cover shall be installed firstly in shed with good ventilation condition, batching equipment shall be fixed properly, and workers shall wear dustproof masks and operate the equipment in upwind direction.

ii)When clearing up the site after the construction finished, bagging-off the big-sized first, then sweep and sprinkle water to prevent from forming dust, the sweeper shall wear dustproof mask. Vacuum cleaner shall be adopted for the powder dust, and then cleaned by water.

iii)Operators/Workers shall wear dustproof masks in closed rooms when doing the grinding

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process of the coating work. Prevent the dust from spreading by the method of one room grinded, one room sealed.

iv) during the demolition process, to do things removed can not be littering, unified by an export transport, to take chute or bag transport, to prevent the removal of objects falling down caused by dust.

During dismantling work, components removed shall not to be thrown optional, and shall be transferred in one unitive outlet via adoption of slots or bags, so as to ensure there is no dust formed by the compaction of the dismantled parts.

v) Oxygen cutting and welding work shall be carried out in an open field, ventilation measures and dustproof mask shall be adopted when such work is carried out in closed room or basement where ventilation is not so good.

vi) For area of vehicles transportation which is easy to form dust, speed limit area shall be set up first, then specialist shall be arranged to sweep and sprinkle water regularly.

vii) For sieving of sand and aggregate, no such work is allowed to carry out during the strong wind, operators shall be upwind when carrying out such work in normal weather conditions.

(3) The full-time safety supervisor, civilized construction management staffs and safety construction supervisor of labor union shall supervise the place where the dust formed and follow the related activities, make record of this, find out the potential factors, issue the rectification notice and push the site staffs to implement the rectify.

(4) The Quality Control (QC) department under the leadership of Project Office, shall carry out the supervision and inspection of the dust management, issue the rectification notice with the signature of the Project Manager when problem is found, feedback the rectification results to the Project Manager in time.

7.2 Noise control

(1) Source of pollution: High decibel noise may occur during installation or operation of large and/or medium-sized machinery; installation and removal of scaffolding and protective sheds, transportation and stacking of formwork, material and equipment, and when using other mini type machinery.

(2) Mechanical equipment, noise control

① Maintenance to the excavation, transportation equipment of various pile construction shall be carried out prior to the construction in accordance with the stipulation of maintenance. All

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troubles of the equipment found during construction shall be debugged in time so as not to working with troubles.

② Large-scale equipment set up on site such as tower crane, construction elevator, concrete pump and concrete batching plant shall be checked/inspected and shall be used only the checking/inspection result qualified. During operating, operators shall clean, lubricate, maintenance the parts of the equipment in order to reduce the possibility of emitting noise.

③ For small and medium-sized mechanical equipment which may emit large noise, it should be checked and identified before use, used for normal maintenance and maintenance. If necessary, special noise control measures should be taken for the equipment, such as equipment, Device protective cover, try to use environmentally friendly machinery and equipment.

For the mini-type and medium-type equipment which may emit big noise, inspection and normal maintenance shall be done prior to use. Special noise control measures such as soundproof sheds and protective cover for rotating device shall be adopted when necessary.

④ Service time, frequency, and quantities shall be strictly controlled when using mini power tools such as electric-pick, portable electric saw, etc. Such work shall be carried out as less as possible at night.

⑤ Noise control of construction

i) Noise from construction shall be strictly controlled. Activities such as erecting and dismantling machinery equipment and formwork, installing scaffolding and reinforcement, batching concrete shall be carried out in daytime on basis of the degree of noise.

ii) In the tower crane, construction elevator, concrete mixing station installation, removal, to control the construction time, spare parts, tools placed lightly to minimize the impact of metal parts, not from the higher metal parts, so as not to a larger sound.

Construction time shall be well arranged when erecting, dismantling the tower crane, construction elevator, concrete batching plant. Accessories and tools shall be handled with care in order to reduce the impaction of metal parts. No high throw of metal parts is allowed which will cause big noise.

iii) Procedure shall be followed strictly when installing/dismantling scaffold and various types of metal gratings by using components such as steel pipe and steel frame. No high throw of steel pipe, fastener and other components is allowed, especially during the dismantling.

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iv) Sound from impaction during transport, install, remove the formwork and bending, installing reinforcement shall be limited when constructing structures. Construction shall be carried out as per requirement of the noise control measures. No optional knocking of steel formwork and reinforcement, no free falling or throwing from high when removing the formwork.

v) Construction shall be carried out as per the procedure when vibrating the concrete, environment friendly vibrators shall be adopted when necessary so as to limit the harsh sound from impaction of vibrators and the steel reinforcement and steel formworks.

⑥ Noise control in transportation

i) Noise from the transportation of materials and equipment on site shall be limited via implementation of noise control measures. The equipment adopted for transportation shall meet the requirement of sound emission.

ii) Mechanical lifting or manual handling measures shall be adopted for the dismantling/removing for the materials such as reinforcement, steel pipes, meal components, steel formwork, etc.

iii) Handle with care when stacking materials which is easy to sounding so as to prevent from making big noise. No materials to be thrown and/or stacked from high.

iv) Noise shall be tested and recorded, it can be done either by the construction team via their own or the rent equipment or by professional testing agency via authorize from construction team.

Special protective measure (such as soundproof working place) shall be adopted as well as making special plan and set up a special fund. Environment friendly tools (such as vibrators) could be used for soundproof cover.

7.3 Solid waste control

(1) Classification of solid waste

① Non-toxic, harmfulness and valuable waste

- i) waste steel, waste wood, waste nonferrous metals;
- ii) Packing boxes, buckets and bags for materials and equipment;
- iii) Waste electrical materials, waste accessories of mechanical metals;
- iv) Waste buildings as well as the bricks, tiles, doors and windows, etc.
- v) Disused office supplies;

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vi)Waste decoration materials;

vii)Materials;

②Non-toxic, harmfulness and not valuable waste

i)Disused construction waste;

ii) Waste broken bricks, broken stones.

iii)Domestic waste;

③Toxic and harmful

i)Waste fluorescent tubes, batteries, accumulators;

ii) Discarded ball-point pen refill, calculator;

iii)Waste carbon paper, photographic film, cingulate;

iv)Waste cartridges, disks, selenium drum ;

v)Waste rubber, plastic products;

vi)Discard toxic and harmful chemical packaging;

vii)Waste oil drums, drums for chemical additives;

(2)Collection and storage of solid waste

①Set up stack yard or containers for solid waste prior to the commencement of the construction work. Rainproof facilities shall be established for the waste which is easy to pollute the environment when wet by the rain.

②The solid waste staked on site shall be categorical in accordance with the marked labels, toxic or non-toxic shall be separated stored.

③Hazardous and toxic waste shall not be stored together with non-toxic and harmless waste.

④The stacking of solid waste shall be neat, reasonable and in compliance with the requirements of the construction civilization on site.

⑤The solid waste collection shall be confirmed by the foreman via the work arrangement, and specialist shall be arranged for daily management.

(3)Disposal of solid waste

①The solid waste shall be treated by the personnel who is in charge of waste disposal management according to the amount of waste storage and storage place arrangements, report shall be submitted to the Project Manager when the storage is overloaded, the site civilized construction image is affected by the waste or the project is going to be completed in short time.

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- ②The Project Manager shall review the disposal report submitted by the personnel in charge of waste dispose and he shall then report to the company's material department. After got the approval of the company, a disposal team shall be set up to deal with the solid waste which contains the staffs of material department and the man in charge of waste management.
- ③Solid waste shall be classified according to the toxic properties and then be treated, combined treatment shall be prevented.
- ④For non-toxic, harmless and valuable solid waste, if it is re-useable in other projects, recycling suggestions and responsible recycling department shall be reported to the material dept. and construction dept. Business certificated agency shall recycle it when the solid waste is uselessness.
- ⑤For non-toxic, harmfulness and not valuable waste, sanitation department shall be entrusted to clean up it.
- ⑥For the toxic and hazardous solid waste, entrust companies who is qualified with hazardous substances business license with it.

7.4 Control of Water pollution-control

- (1)Sources of pollution: Muddy water from construction, water from flushing vehicles, sewage water from construction staffs, and surface water in the monsoon.
- (2)Control measures and requirements:
- ①Wastewater discharged into the city sewer, for wastewater discharged into city sewer suspended solids (SS) follow the standard 400 mg/L of grade III in "Integrated Wastewater Discharge Standard" (GB8978-1996). For Wastewater discharged in to nature water, suspended solids (SS) follow the standard 150 mg/L of grade II in "Integrated Wastewater Discharge Standard" (GB8978-1996)
- ②Choosing of location and method of discharging shall be in accordance with the trend and overload capacity of the drainages in various construction areas.
- ③Complete the drainage system and wastewater treatment plant prior to the commencement of the work, make sure their effectiveness during the whole construction period to get no ponding at site, no overflow, no block so as to enable the water quality meet the requirements.
- ④The size of the stockpile of backfilling earth and sedimentation tank of muddy water shall on basis of the sediment time required.
- ⑤Water discharging Emergency plan of monsoon, especially the heavy rain period which is

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for the purpose to prevent water pollution accident from wastewater discharged unorganized, overflow or block the sewer of city, shall be made and implement when required on basis of the practical construction situation and considering of rainfall characters of Khulna City.

⑥ Exclusive oil storage shall be set up on site, anti-seepage treatment shall be made to the floor of the storage to prevent the oil from drop/leakage and/or pollute the soil and water.

7.5 Air Pollution

(1) Sources of pollution: transportation, excavation, fuel machinery, stoves and so on.

(2) Impact: dust (during preparation and excavation construction stage), dust, waste gas (during the whole construction period).

(3) Control measures and requirements:

① It is forbidden to burn down any waste and other materials which may produce toxic and hazardous gases, soot and bad smell while burning. Toxic material such like melting-asphalt shall be used cooperatively with the sealable equipment with soot treatment plant.

② Commercial concrete shall be used for the Project.

③ Cement and other materials which is easy to blow away shall be stored in the warehouse. Spoil pit, outdoor stockpile of loose material shall be covered and compacted.

④ Qualified transportation equipment shall be adopted so as to ensure nothing drop while transporting.

⑤ Tires of vehicles shall be washed before go out the site in order to reduce the soil/dust adhere to the tires.

⑥ Green energy shall be used, stoves to be used shall meet the soot emission requirements.

⑦ The construction site shall be well planned and arranged prior to the commencement of the work, foundation of temporary construction road shall be compacted and the road shall be harden.

8 Evaluation and Adjustment of Emergency Plan

The Project Office shall organize the evaluation and conclusion on the following situations:

(1) After the Emergency maneuver plan but not more than one week.

(2) Not more than a week after investigation and conduction completed when potential accident and/or emergency situation occur. The evaluation shall be organized by the Quality

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Control Dept. of the Project Office and the personnel involved in the accident shall be present. The evaluation shall contain the comments on the reasonability, measure of rescue and implementation effective, suggestion on improvement shall be given at the same time.

9 Improve the Emergency rescue ability, Strengthen Safety education of Project staffs

In order to improve the commanding ability of Emergency rescue, as well as the self and mutual medical aid of the staffs and minimize the damage, the Emergency rescue shall be carried out semiannually in accordance with different construction stage by the construction units under the leadership of the Project Office.

Furthermore, the Project Office shall educate and train the staffs on safety conducted weekly and get ready for the proper safety inspection, prevention and rectify so as to make sure no safety accident will incur.

10 Emergency calls

(1)Emergency call of Polder 32:

Police station: Secretary	01712-575296
Resident Doctor 1:	01820-633270
Resident P Doctor 2:	01914-311213
Vice Manager of Polder 32: Mr. Zhou Wenyi	01753-379019
Mr. Zhang Shuai	01779-615576

(2) Emergency call of Polder 33:

Fire Emergency	04176033
Hospital	01717-613738
Police Station	01713-374110
Manager of Polder 33: Mr. Dou Xin'guo	01990-777498
Chief Engineer of Polder 33: Mr. Xing Cangsheng	01753-353897

(3)Emergency call of Polder 35/1:

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Fire Emergency	0465956222
Hospital	0175856813
First Aid	01934-817444
	01748-931196
Police station	0465956007
	01713-374128
	01716-132101
Manager of Polder 35/1: Mr. Liu Tailiang	01768-783959
Vice Manager of Polder 35/1 Mr. Zhao Huaijiang	01745-088067
(4)Emergency call of Polder 35/3:	
Fire Emergency	199
First Aid: Mossarrof Hossain	01730-324793
Traffic accident: Mannan	01757-833555
Imran	01794-438171
Manager of Polder 35/3 Mr. Song Shebin:	01753-353967

Annex 13-Layout Plan for Fuel Storage

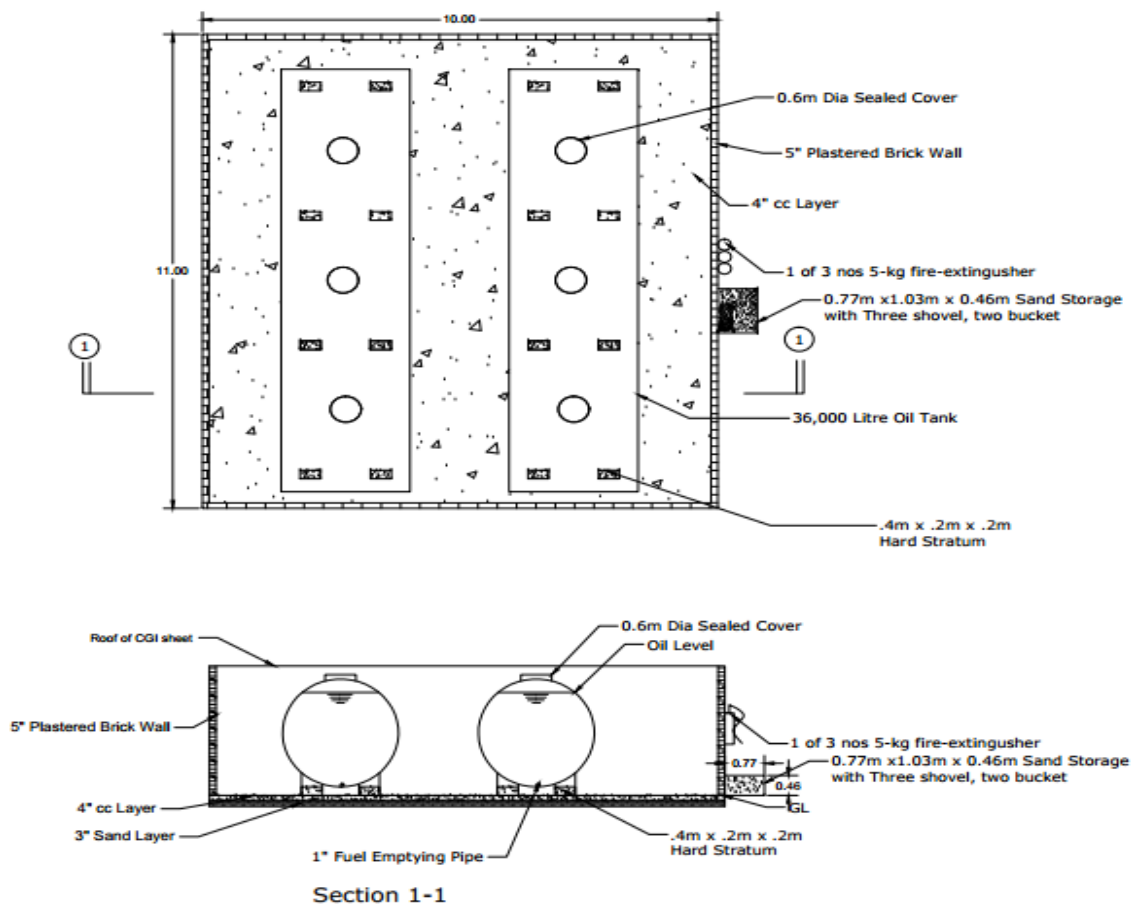
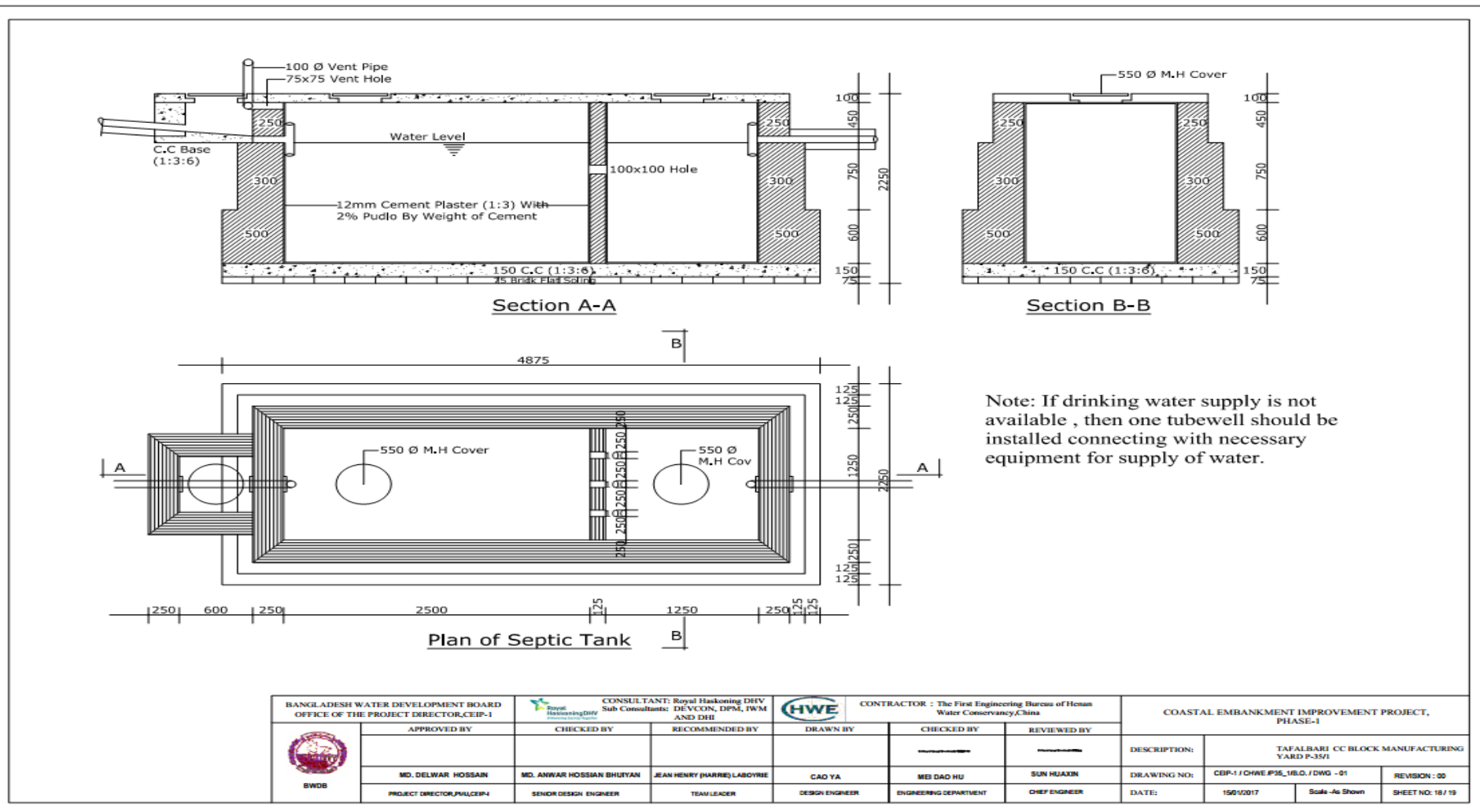
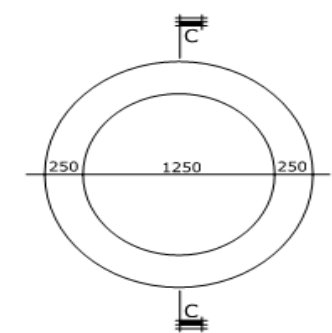


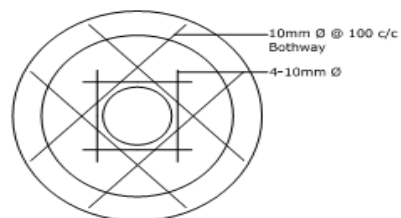
Figure: Fuel Storage layout plan for P-35/1, Tafalbari Block Manufacturing Yard

Annex 14-Layout Plan for Sewage Treatment Plan

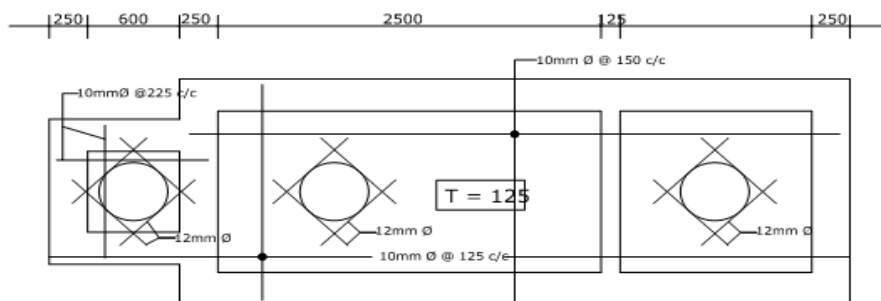




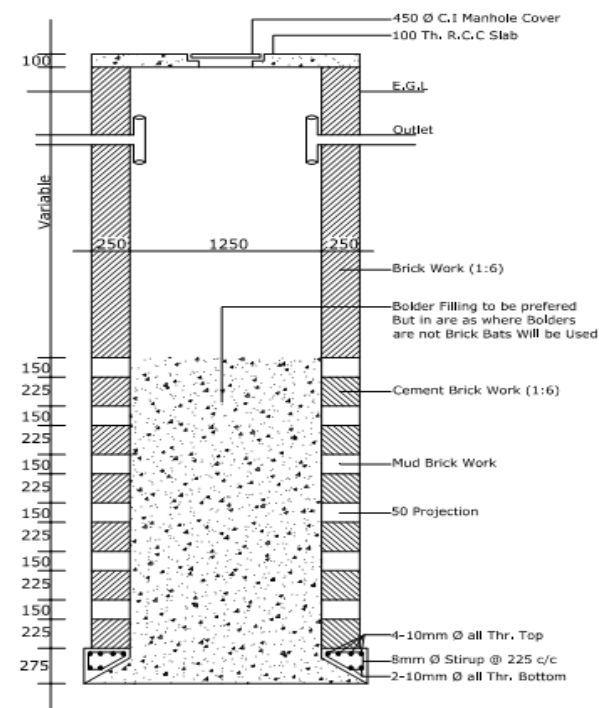
Plan of Sock Well




Re-inforcement Plan of Top Slab (Sock Well)



Top Slab of Septic Tank



Section C-C

BANGLADESH WATER DEVELOPMENT BOARD OFFICE OF THE PROJECT DIRECTOR, CEIP-1		CONSULTANT: Royal Haskoning DHV Sub Consultants: DEVCON, DPM, IWM AND DHI		CONTRACTOR : The First Engineering Bureau of Henan Water Conservancy, China		COASTAL EMBANKMENT IMPROVEMENT PROJECT, PHASE-1			
 BWDB	APPROVED BY	CHECKED BY	RECOMMENDED BY	DRAWN BY	CHECKED BY	REVIEWED BY	DESCRIPTION:	TAFALBARI CC BLOCK MANUFACTURING YARD, P-35/1	
	MD. DELWAR HOSSAIN	MD. ANWAR HOSSAIN BHUIYAN	JEAN HENRY (HARRIS) LABOYRE	CAO YA	MEI DAO HU	SUN HUAXIN	DRAWING NO:	CEIP-1 / CHWE / P35_V8.0 / DWG - 01	REVISION : 00
	PROJECT DIRECTOR, P/ALICE/PH	SENIOR DESIGN ENGINEER	TEAM LEADER	DESIGN ENGINEER	ENGINEERING DEPARTMENT	CHIEF ENGINEER	DATE:	15/01/2017	SHEET NO: 19 / 19

Annex 15-Specified Provisional Sums (upto IPC 9)

Specified Provisional Sums

						Quantity			Value			Total Amount (BDT)
Item No	Sub.CI(part 2: Section VII)	Description of Item	Unit	Total Quantity for 4 Polders	Amount in BDT	Current IPC Cumulative to date	Previous IPC Cumula- tive	In Current IPC	Current IPC Cumulative to date	Previous IPC Cumulative	In Current IPC	
1	1.26	Crop Compensation to the direct looser land owner / share croppers of construction sites/ damage due to dredge spoils	1 Item	Sum	5,400,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2		Waste disposal arrangment at construction site	1 Item	Sum	3,500,000.00	0.333	0.213	0.120	1165500.00	746,655.00	418,845,00	1,165,500
3		Water quality monitoring	1 Item	Sum	2,800,000.00	0.333	0.167	0.166	932400.00	466,760.00	465,640,00	932,400
4		Air & Noice quality monitoring analysis	1 Item	Sum	3,000,000.00	0.333	0.133	0.200	999000.00	399.000.00	600,000,00	999,000
5		Soil and water salinity monitoring cost	1 Item	Sum	2,000,000.00	0.333	0.150	0.183	666000.00	300.600.00	365,400,00	666,000
6		Conservation & stoking of threatened frish species	1 Item	Sum	3,500,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0,00
Total for Specified provisional Sums (Economic Code 7081 (j)) carried forward to Grand summary												3762900.00

It is certified by the Engineer that the volumes of works of Specified prov. Sum incorporated in this IPC are correct and have been executed as per designs and specification of the Contract.

Annex 16: EHS Training Plan

EHS Training Schedule in 2018

Sl.NO.	Construction Area	Comparison	March				April			
			P-32	P-33	P-35/1	P-35/3	P-32	P-33	P-35/1	P-35/3
1	CC Block Casting Area	Plan	11	10	12	12	8	9	10	8
		Actual								
2	Sluice	Plan	9	14	12	12	9	8	10	10
		Actual								
3	Embankment	Plan	4	4	4	2	2	4	3	2
		Actual								
4	Dumping Area	Plan	8	0	8	0	4	0	4	0
		Actual								

Explanation: this year's plan is divided into plan and actual. Please write "√". Please specify the quantity and reason.

EHS Training Schedule in 2018

Sl.NO.	Construction Area	Comparison	May				June			
			P-32	P-33	P-35/1	P-35/3	P-32	P-33	P-35/1	P-35/3
1	CC Block Casting Area	Plan	8	7	10	10	4	4	2	4
		Actual								
2	Sluice	Plan	10	9	10	8	3	4	2	2
		Actual								
3	Embankment	Plan	2	2	4	2	0	0	0	0
		Actual								
4	Dumping Area	Plan	4	0	4	0	2	0	2	0
		Actual								

Explanation: this year's plan is divided into plan and actually. Please write "√". Please specify the quantity and reason.

EHS Training Schedule in 2018

Sl.NO.	Construction Area	Comparison	July				August			
			P-32	P-33	P-35/1	P-35/3	P-32	P-33	P-35/1	P-35/3
1	CC Block Casting Area	Plan	5	5	4	3	5	4	5	5
		Actual								
2	Sluice	Plan	6	4	4	8	4	4	6	6
		Actual								
3	Embankment	Plan	0	0	0	0	0	0	0	0
		Actual								
4	Dumping Area	Plan	2	0	2	0	2	0	2	0
		Actual								

Explanation: this year's plan is divided into plan and actual. Please write "√". Please specify the quantity and reason.

EHS Training Schedule in 2018

Sl.NO.	Construction Area	comparison	September				October			
			P-32	P-33	P-35/1	P-35/3	P-32	P-33	P-35/1	P-35/3
1	CC Block Casting Area	Plan	12	10	10	10	10	8	9	10
		Actual								
2	Sluice	Plan	9	10	9	10	8	10	8	8
		Actual								
3	Embankment	Plan	4	4	2	2	4	2	4	4
		Actual								
4	Dumping Area	Plan	4	0	4	0	2	0	2	0
		Actual								

Explanation: this year's plan is divided into plan and actual. Please write "√". Please specify the quantity and reason.

EHS Training Schedule in 2018

Sl.NO.	Construction Area	comparison	November				December			
			P-32	P-33	P-35/1	P-35/3	P-32	P-33	P-35/1	P-35/3
1	CC Block Casting Area	Plan	8	12	10	10	10	8	12	8
		Actual								
2	Sluice	Plan	10	9	10	12	8	9	10	8
		Actual								
3	Embankment	Plan	4	2	4	2	4	4	3	2
		Actual								
4	Dumping Area	Plan	0	0	0	0	0	0	0	0
		Actual								

Explanation: this year's plan is divided into plan and actuals. Please write "√". Please specify the quantity and reason.

Annex 17: EHS Risk Assessment for Polder-35/1

The First Engineering Bureau of Henan Water Conservancy (CHWE)



Coastal Embankment Improvement Project, Phase-I (CEIP-I)



EHS Risk Assessment for Polder 35/1 March 2019

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1 Introduction

1.1 Project background

In 1960s, Polderization was started in the coastal zone of the country to convert the area into permanent agricultural lands. The Polders in this area are enclosed on all sides by dykes or embankments, separating the land from the main river system and protecting against tidal floods, salinity intrusion and sedimentation. The lands inside the polders are slightly higher than sea level. The Polders were designed to keep the land safe from the daily tides and allow agriculture activities inside the Polder. Without embankments the coastal communities would be exposed to diurnal tidal fluctuations. These polders are equipped within and outlet sluice-gates to manage the water inside the embanked area.

The polders were originally designed without proper attention to storm surges. Recent cyclones caused substantial damage to the embankments and further threatened the integrity of the coastal Polders. In addition to breaching of the embankment due to cyclones, siltation of peripheral rivers surrounding the embankment caused coastal polders to suffer from water logging, which lead to large scale environmental, social and economic degradation. Poor maintenance and inadequate management of the polders have also accelerated the internal drainage congestion and heavy external siltation. As a result, soil fertility and agriculture production in some areas are declining because of water logging and salinity increase inside the polders.

The above reasons led the Government to re-focus its strategy on the coastal area from one that only protects against high tides to one that would provide protection against frequent storm surges as well. The long term objective of the Government is to increase the resilience of the entire coastal population to tidal flooding as well as natural disasters by upgrading the whole embankment system. With an existing network of nearly 5,700 km long embankments in 139 polders, the magnitude of such a project is daunting and requires prudent planning. Hence, a multi-phased approach of embankment improvement and rehabilitation will be adopted over a period of 15 to 20 years. The proposed CEIP-I is the first phase of this long term program.

The overall objective of the Coastal Embankment Improvement Project -Phase 1(CEIP-1) is to increase the resilience of coastal population to natural disasters and climate change. More specifically, the project aims at (a) reducing the loss of life, assets, crops and livestock during natural disasters; (b) reducing the time of recovery after natural disaster such as cyclone; and (c) improving agricultural production by reducing saline water intrusion which is expected to worsen due to climate change. This objective will be achieved by rehabilitating and improving the existing polder system in the coastal area.

Based on a multi criteria analysis for strategic polder assessment, a first priority group of 17 polders was selected. Among the 17 polders, 4 have been considered for Coastal Embankment Improvement Project -Phase 1(CEIP-1)/W-01, which are 32, 33, 35-1 & 35-3 in the following referred to as "the Project".

<http://www.ifc.org/wps/wcm/connect/3aa0bc8048855992837cd36a6515bb18/4%2BConstruction%2Band%2BDecommissioning.pdf?MOD=AJPERES>

1.2 Project details

Located in Bagerhat District of southern Bangladesh, the Polder 35/1 covers a gross area of 13,058 hectare (ha) with net cultivable area of 10,400 ha. The Project aims to enhance protection against natural disasters, increase resilience during and after such disasters, and improve agricultural production by reducing saline water intrusion. To meet these objectives, the key improvement and rehabilitation works to be carried out in Polder 35/1 under CEIP-I are: re-sectioning of embankment (49.70 km); construction of retired embankment (6.30 km); sea dyke (6.5 km); interior dyke (11 km); construction of 15 sluices; repairing of two

sluice; construction of 17 flushing inlets; repairing of three flushing inlets; demolishing of three flushing inlets; re excavation of drainage channels (70.50 km); slope protection of embankment (17.25 km); and afforestation on the foreshore areas (2 ha). Other components of the CEIP-I will include implementation of social action plan and environmental management plan; supervision, monitoring and evaluation of project impacts; project management, technical assistance, trainings, and technical studies; and contingent emergency response. The proposed intervention of Polder 33/1 is as below:

Table 1:1 Project activities for rehabilitation and improvement

Sl. No	Project Activities of Polder 35/1	Quantity
1	Re-sectioning of embankment	49.70 km
2	Construction of retired embankment	7.30 km
3	Construction of Forward embankment	5.00 km
4	Forwarding of embankment with slope protection	1.5 km
5	Construction of drainage sluices	15
6	Construction of drainage sluices under Aila	
7	Repairing of drainage sluice	2
8	Construction of flushing inlets	17
9	Repairing of flushing inlets	3
10	Demolishing of drainage sluices	-
11	Demolishing of flushing inlets	3
12	Re-excavation of drainage channels	70.50 km
13	Bank revetment/protection works	1.0 km
14	Slope protection of embankment	17.25 km
15	Closure	-

2 EHS Risk Assessment

2.1 Introduction

Risk is a very well-known and familiar term in any kind work place. Any uncertain or chance events during work period that planning cannot overcome or control is called risk. Therefore, to put oneself "at risk" means to participate any one voluntarily or involuntarily in an activity or event that could lead to injury, damage, or loss.

Involuntary risks are negative impacts associated with an occurrence that happens to us without our prior consent or knowledge. Acts of nature such as being struck by lightning, fires, floods, tornados, etc., and exposures to environmental contaminants are examples of involuntary risks. Voluntary risks are hazards associated with activities that we decide to undertake (e.g., driving a vehicles like trucks, forklifts, barge, riding a motorcycle; climbing a ladder; smoking cigarettes; etc.).

As part of managing the health and safety of all the employees who are involved in the work site, various risks in workplace need to be controlled. For the purpose the Contractor need to think/assess about what harm might cause to the employees, which is known as risk assessment for which they need to take decision/required step to prevent the risk.

2.2 What is a risk assessment?

Risk assessment is a term used to describe the overall process or method where the contractor can:

- Identify hazards and risk factors that have the potential to cause harm (hazard identification).
- Analyze and evaluate the risk associated with that hazard (risk analysis, and risk evaluation).
- Determine appropriate ways to eliminate the hazard, or control the risk when the hazard cannot be eliminated (risk control).

A risk assessment is a thorough look at the contractor's workplace to identify those things, situations, processes, etc. that may cause harm, particularly to both local people and contractor's employees. After identification is made, contractor will analyze and evaluate how likely and severe the risk is. When this determination is made, contractor can next, decide what measures should be in place to effectively eliminate or control the harm from happening.

2.3 Why is risk assessment needed?

A risk assessment is not about creating huge amounts of paperwork, but rather about identifying sensible measures to control the risks in project workplace. Though contractor is probably already taking steps to protect their employees from risk, but risk assessment will help the contractor to decide whether it is covered all that need to the project.

Risk assessments are very important as they form an integral part of an occupational health and safety management plan. This assessment will make to able the contractor to think about how risk event could happen and concentrate on real risks – those that are most likely and which will cause the most harm. Also, it will help the contractor to:

- Create awareness of hazards and risk.
- Identify who may be at risk (e.g., employees, cleaners, visitors, contractors, the public, etc.).
- Determine whether a control program is required for a particular hazard.
- Determine if existing control measures are adequate or if more should be done.

- Prevent injuries or illnesses, especially during the project implementation period.
- Prioritize hazards and control measures.
- Meet legal requirements where applicable.

2.4 What is the goal of risk assessment?

The aim of the risk assessment process is to evaluate hazards, then remove that hazard or minimize the level of its risk by adding control measures, as necessary. By doing so, the contractor will create a safer and healthier workplace.

The goal is to try to answer the following questions:

- a) What can happen and under what circumstances?
- b) What are the possible consequences?
- c) How likely are the possible consequences to occur?
- d) Is the risk controlled effectively, or is further action required?

2.5 Benefits of risk assessment

- A proactive rather than reactive approach.
- Reduces surprises and negative consequences.
- Prepares the project manager to take advantage of appropriate risks.
- Provides better control over the future.
- Improves chances of reaching project performance objectives within budget and on time.

2.6 Structure of risk assessment

In any kind of development or construction work, there should maintain a standard process for the risk assessment of that specified work. The project named "Coastal Embankment Improvement Project, Phase-1 (CEIP-1)" under the work Package-01 is following the standard process as described below:

2.6.1 Planning

If a risk assessment process starts with a good planning along with proper observation then the implementation will be proper. Though there is a need to make an early judgment when planning, major risk assessment regarding the purpose, scope and technical approaches will be used.

To start, the assessors will typically ask the following question:

1. Who/What/Where is at risk?
 - Individual worker
 - General population or worker
 - Workers sub-group
2. What is the environmental hazard of concern?
 - Physical (dust, fall from height, impact with object etc.)
 - Chemical (single or multiple risk)
 - Microbiological or biological
3. Where do these environmental hazards come from?

- Point sources (for example, smoke or water discharge from main camp, CC block manufacturing yard or other work site; contamination from a fuel storage area, generator)
- Non-point sources (for example, automobile or vehicle exhaust)
- Natural sources

2.6.2 Risk assessment process

The risk assessment of CEIP-1 under contract Package-01 will maintain the risk assessment process as described below:

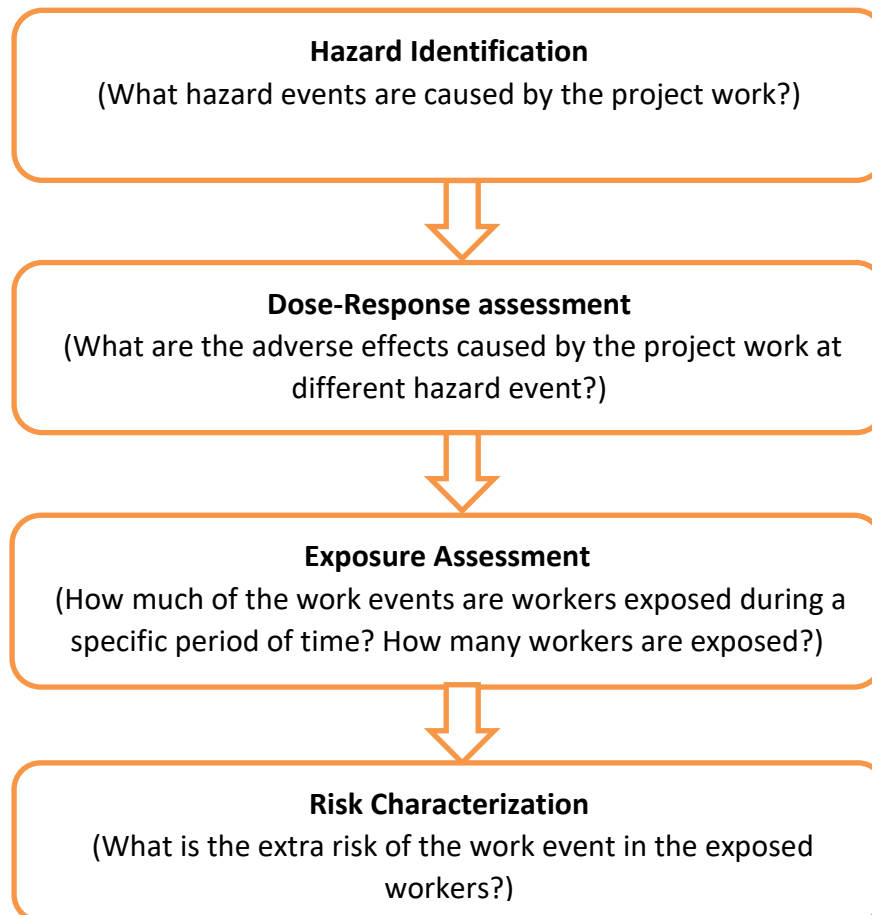


Figure 2:1 EHS Risk assessment process flow diagram

➤ **Hazard Identification**

Hazard Identification is the process of determining whether exposure to the workers can cause an increase in the incidence of specific adverse health effects. It is also whether the adverse health effect is likely to occur in workplace. The objective of the hazard identification is to identify the types of adverse health effects that can be caused by the work event.

➤ **Dose-Response assessment**

The dose-response assessment describes how the likelihood and severity of the work event creates the adverse health effect. The response is related to the amount and condition of exposure to the workers (the dose provided). Typically, as the dose increases, the measured response also increases. At low doses there may be no response. At some level of dose the responses begin to occur in a small fraction of exposed harmful work event or at a low probability rate. Both the dose at which response begin to appear and the rate at which it increases given increasing dose can be variable between different pollutants, individuals, exposure

routes, etc. The objective of the dose-response is to document the relationship between dose (applied actions) and response (exposed adverse effects).

➤ **Exposure assessment**

Exposure assessment is the process of measuring or estimating the magnitude, frequency, and duration of human exposure to the hazard work event in the environment, or estimating future exposures for the hazard work event that has not yet been released. Exposure can be measured directly, but more commonly it is estimated indirectly.

Exposure assessment considers both the exposure pathway (the hazard work event takes from its source to the person(s) being contacted) as well as the exposure route (means of entry of the hazard work event into the workers community). The exposure route is generally further described as intake (taken in through a body opening, e.g. as eating, drinking, or inhaling) or uptake (absorption through tissues, e.g. through the skin or eye). Range of exposure for any specific agent or site, there is a range of exposures actually experienced by individuals. Some individuals may have a high degree of contact for an extended period. Other individuals may have a lower degree of contact for a shorter period.

There are three basic approaches for quantifying exposure. Each approach is based on different data, and has different strengths and weaknesses; using the approaches in combination can greatly strengthen the credibility of an exposure risk assessment.

1. **Point of Contact Measurement** - The exposure can be measured at the point of contact (the outer boundary of the body) while it is taking place, measuring both exposure concentration and time of contact, and then integrating them.
2. **Scenario Evaluation** - The exposure can be estimated by separately evaluating the exposure concentration and the time of contact, then combining this information.
3. **Reconstruction** - The exposure can be estimated from dose, which in turn can be reconstructed through internal indicators (biomarkers, body burden, excretion levels, etc.) after the exposure has taken place (reconstruction).

➤ **Risk characterization**

The objective of risk characterization is to summarize and integrate information from the proceeding steps of the risk assessment to synthesize an overall conclusion about risk.

For characterization of risk, should evaluate the risk score.

$$\text{Risk Score} = \text{Likelihood} \times \text{Consequence}$$

Table 2:1 Definition of likelihood and consequence

Likelihood	Definition
Almost certain	Once a day
Likely	Once per week
Moderately likely	Once per month
Unlikely	Once per year
Rare	Once every 5 years
Consequences/Impact	Definition
Catastrophic	Potentially lethal to large population
Major	Potentially lethal to small population
Moderate	Potentially harmful to large population
Minor	Potentially harmful to small population
Insignificant	No impact or not detectable

Table 2:2 Evaluation of risk matrix

Risk Matrix		Consequence or Severity				
		Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)
Likelihood	Almost Certain (5)	5	10	15	20	25
	Likely (4)	4	8	12	16	20
	Possible (3)	3	6	9	12	15
	Unlikely (2)	2	4	6	8	10
	Rare (1)	1	2	3	4	5

Risk Severity		
High	Medium	Low
>15	15-5	≤5

2.7 Relevant EHS risk assessment

The EHS risk assessment report has been prepared for Polder 35/1, which contains the EHS risk assessment for automatic CC block manufacturing plant in Tafalbari during construction phase. Also for other works like, Drainage Sluice (DS) or Flushing Sluice (FS), Embankment section and Barge.

2.8 EHS risk assessment for automatic CC block manufacturing plant

2.8.1 Introduction

Under the project "Coastal Embankment Improvement Project (CEIP-1), contract Package-01 consists of four Polders. Every polder has at least one automatic CC block manufacturing plant for the sake of harden concrete block production. A mixture of cement, water, sand and aggregate is called concrete. One major and significant item of concrete product is cement named 'Portland Cement' because after hardening the product resembles a natural limestone quarried at Portland, in England. That block will be used for river bank erosion protection, embankment slope protection. Polder 35/1 has one automatic CC block manufacturing plant is located Tafalbari.

2.8.2 Objective

This EHS risk assessment will assist the automatic CC block manufacturing plant to achieve the best practical environmental outcome, while allowing flexibility as to how this will be achieved. Thus, the assessment provides the plant and regulators with:

- A statement of the potential impacts of automatic CC block manufacturing plant on each element of the environment.
- A clear environmental performance objective for each element of the environment.
- Suggested measures to avoid adverse environmental impacts and thus meet the performance objective.
- The flexibility to meet the environmental objectives by other measures, as long as they achieve equivalent or better outcomes.

2.8.3 Components of concrete

The process for making Portland cement is relatively simple, but the chemistry of cement manufacture is complex. The components of concrete include calcium, silica, alumina, magnesia, ironoxide and sulfur dioxide compounds along with:

- Fly ash – a glass-like substance used in good quality cement products
- Aggregates – consisting of gravel and sand, which comprise the major raw material of concrete (aggregates are graded according to their size and character)
- Admixtures – compounds added to the concrete in small quantities to modify its properties.

2.8.4 Type of batching plant

In a concrete block manufacturing plant, generally there are two types of concrete raw materials mixing batching plant. The raw materials are mixed in one of the ways discussed below.

➤ **Front end loader concrete batching**

In front end loader plants, a front end loader is used to transport coarse and fine aggregates from a ground level storage bin to an aggregate weigh hopper. The aggregate is then added to an agitator. Cement and fly ash are weighed in a separate hopper and transferred to the agitator. The correct proportion of water is added to the agitator. The concrete is mixed, ready for final slumping, inspection and transportation to the customer.

➤ **Overhead bin concrete batching**

In overhead bin batching plants, coarse and fine aggregates are stored in separate bins. Aggregates are transported from the bins to a compartmentalized overhead storage hopper by conveyor belts. A weigh hopper is situated directly beneath the overhead storage hopper, where aggregate is weighed and transferred to the agitator. Cement and fly ash are stored in separate overhead silos. They are weighed in a separate hopper and dropped into the agitator. The correct proportion of water is added, along with any required admixtures and the concrete is mixed, ready for final slumping, inspection and transportation to the building site.

This “overhead bin concrete batching” type is used in Tafalbari CC block manufacturing plant.

2.8.5 Policies and Legislations

➤ **Bangladesh Environment Conservation Act (ECA), 1995**

The Environmental Conservation Act (ECA) of 1995 is the main legislative framework relating to environmental protection in Bangladesh. This umbrella Act includes laws for conservation of the environment, improvement of environmental standards, and control and mitigation of environmental pollution. This Act has established the Department of Environment (DOE), and empowers its Director General to take measures as he considers necessary which includes conducting inquiries, preventing probable accidents, advising the Government, coordinating with other authorities or agencies, and collecting and publishing information about environmental pollution. According to this act (Section 12), no industrial unit or project shall be established or undertaken without obtaining, in a manner prescribed by the accompanying Rules, an Environmental Clearance Certificate (ECC) from the Director General of DOE.

➤ **Bangladesh Environment Court Act, 2010**

Bangladesh Environment Court Act, 2010 has been enacted to resolve the disputes and establishing justice over environmental and social damage raised due to any development activities. This act allows government to take necessary legal action against any parties who creates environmental hazards/ damage to environmentally sensitive areas as well as human

society. According to this act, government can take legal actions if any environmental problem occurs due to CEIP-I interventions.

- ***National Environment Management Action Plan, 1995***

The National Environment Management Action Plan (NEMAP, 1995) identifies the main national environmental issues, including those related to the water sector. The main water related national concerns include flood damage, riverbank erosion, environmental degradation of water bodies, increased water pollution, shortage of irrigation water and drainage congestion; various specific regional concerns are also identified.

- ***National Water Policy, 1999***

Endorsed by the GoB in 1999, the National Water Policy (NWP) aims to provide guidance to the major players in water sector for ensuring optimal development and management of water. According to the policy, all agencies and departments entrusted with water resource management responsibilities (regulation, planning, construction, operation, and maintenance) are required to enhance environmental amenities and ensure that environmental resources are protected and restored in executing their tasks.

- ***National Water Management Plan, 2001 (Approved in 2004)***

The National Water Management Plan (NWMP) 2001, approved by the National Water Resources Council in 2004, envisions to establish an integrated development, management and use of water resources in Bangladesh over a period of 25 years. Water Resources Planning Organization (WARPO) has been assigned to monitor the national water management plan. The major programs in the Plan have been organized under eight sub-sectoral clusters: i) Institutional Development, ii) Enabling Environment, iii) Main River, iv) Towns and Rural Areas, v) Major Cities; vi) Disaster Management; vii) Agriculture and Water Management, and viii) Environment and Aquatic Resources.

- ***National Land Use Policy (MoL, 2001)***

The National Land Use Policy (NLUP), enacted in 2001, aims at managing land use effectively to support trends in accelerated urbanization, industrialization and diversification of development activities. The NLUP urges that increasing the land area of the country may be not possible through artificial land reclamation process, which is cost-effective only in the long run. Therefore, land use planning should be based on the existing and available land resources.

2.8.6 Site considerations

Concrete batching plants must be located in an area where they will not pose a hazard to the environment or the amenity of the local community.

Highly alkaline wastewater, dust emissions and noise are the key potential impacts associated with concrete batching plants. These problems need to be considered when planning new operations and major upgrades of existing sites. Plants should be located so that contaminated storm water and process wastewater can be retained on-site. The land should not be flood-prone (it should have a flood average recurrence interval less than 100 years). These measures will help to ensure that wastewater is not discharged to waterways.

Dust problems can be minimized by siting the concrete batching plant out of prevailing high winds. The prevailing wind direction should be considered during the planning proposal, to ensure that bunkers and conveyors are sited in the leeward direction to minimize the effects of the wind. The provision of natural or artificial wind barriers – such as trees, fences and landforms – to help control the emission of dust from the plant should be considered during the planning process.

To protect amenity, buffers should be provided between batching plants and sensitive land uses. Buffers are designed to minimize any potential impacts due to accidental or fugitive air emissions. They assume that good control practices will be followed and do not eliminate the need for effective point source emission control.

Access and exit routes for heavy transport vehicles should be planned to minimize impacts on the environment and amenity of the locality. Thoughtful site selection and planning will mean fewer problems for future environmental management.

2.8.7 Waste Minimization

Waste minimization is an integral part of CC block manufacturing plant area. By focusing on waste avoidance and reduction through the use of better processes and practices, pollution control and waste disposal costs can be lowered.

The principle of reducing waste, reusing and recycling resources and products is often called the "3Rs."

- Reducing means choosing to use items with care to reduce the amount of waste generated.
- Reusing involves the repeated use of items or parts of items which still have usable aspects.
- Recycling means the use of waste itself as resources.

Waste minimization can be achieved in an efficient way by focusing primarily on the first of the 3Rs, "reduce," followed by "reuse" and then "recycle." The waste hierarchy refers to the "3Rs" i.e., reduce, reuse and recycle, which classify waste management strategies according to their desirability. The 3Rs are meant to be a hierarchy, in order of importance. The waste hierarchy has taken many forms over the past decade, but the basic concept has remained the cornerstone of most waste minimization strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste.



Figure 2:2 Waste Hierarchies

Preference should be given to waste avoidance or reduction, ahead of recycling and reuse. Treatment and the least preferred alternative of waste disposal should only be considered if these actions are not possible. Waste minimization includes good housekeeping practices and staff attitudes, as well as technical factors. Actions as simple as reducing the volume of water used during washouts may significantly reduce waste generation. The potential impact of such straightforward measures should not be underestimated. Some of the smaller incremental improvements are easy to gain, but difficult to maintain. Teamwork and commitment from production staff, supported by strong management and effective management systems, should enable sustainable and continuous performance improvement.

In the concrete batching industry, waste minimization principles can be applied to water, cement, aggregate and all other inputs. Significant cost savings have been achieved by plants using this approach. A useful starting point for a waste minimization program is to prepare a waste management plan (WMP). The first step to preparing a WMP is a waste audit, which involves identifying the sources, types and quantities of wastes generated by a concrete batching plant. The waste audit should:

- Identify all waste streams.
- Quantify and characterize them.
- Establish how each waste stream is generated.

After the waste audit is completed, a waste assessment is conducted. This involves identifying the options available to minimize each of the waste streams. A technical and economic feasibility analysis is then conducted to determine which of the identified waste minimization opportunities should be adopted. The WMP contains an implementation timetable and description of the method of implementation, and the anticipated costs and environmental benefits. The waste minimization program should not be a one-off activity. It should be periodically reviewed to ensure the WMP is being adhered to, and to identify any new waste minimization opportunities. The waste minimization program should be an integral part of the company's approach to environmental management: it should be a key element when an environmental management system is established.

In the last updated version of EAP, December 2017(*Version 2.0*) the contractor has prepared the Waste Management Plan (WMP) for automatic CC block manufacturing plant.

2.8.8 Water Quality

Potential pollutants in batching plant wastewater include cement, sand, aggregates and petroleum products. These substances can adversely affect the environment by:

- Increasing soil and water pH
- Increasing the turbidity of waterways (turbidity is a measure of the cloudiness of a suspension).

Increased turbidity results in less light entering an aquatic environment. This in turn affects the rate of photosynthesis by plants, and reduces the visibility of aquatic organisms. Turbidity can also clog fish gills, smother bottom feeding flora and fauna and generally decrease the amenity of an area.

➤ Wastewater management principles

Using the waste minimization approach, the keys to avoiding adverse impacts on water quality are to minimize wastewater generation and to recycle the wastewater which is generated. These steps require that:

- The area of the site which generates contaminated storm water is minimized
- Separate dedicated drainage systems are provided for contaminated and clean storm water
- All contaminated storm water and process wastewater is collected and recycled.

➤ Drinking Water Quality

The contractor has to supply safe drinking water to worker during working. The water supplied for the purpose need to be tested in the laboratory for required parameters for assuring its quality.

➤ **Wastewater generation**

The main sources of wastewater at batching plants are:

- Contaminated storm water runoff
- Dust control sprinklers
- The agitator washout station
- The agitator charging station
- The slumping station
- Cleaning and washing.

The site should be designed to minimize the areas which are contaminated with cement dust and thus have the potential to generate contaminated storm water runoff. Clean storm water runoff such as that from office buildings and staff car parks should be separated from contaminated storm water, or it will add to the volume of wastewater needing management. Separate drains should be provided for clean storm water runoff.

All contaminated storm water and process wastewater should be collected and retained on site. All sources of wastewater should be paved and bunded. (A bund is a small wall of concrete or another impervious material, similar to the curb beside a bitumen road. Bunds serve the dual purpose of ensuring all wastewater is captured and excluding clean storm water runoff.)

The specific areas that should be paved and bunded include:

- The agitator washout area
- The truck washing area
- The concrete batching area
- Any other area that may generate storm water contaminated with cement dust or residues.

➤ **Wastewater capture and reuse**

Contaminated storm water and process wastewater should be captured and recycled by a system with the following specifications.

- The system's storage capacity must be sufficient to store the runoff from the bunded areas generated by 20 mm of rain.
- Water captured by the bunds should be diverted to a collection pit and then pumped to a storage tank for recycling.
- An outlet (overflow drain) in the bund, one metre upstream of the collection pit, should divert excess rainwater from the bunded area when the pit fills due to heavy rain (more than 20 mm of rain over 24 hours).
- Collection pits should contain a sloping sludge interceptor, to separate water and sediments. The sloping surface enables easy removal of sludge and sediments.
- Wastewater should be pumped from the collection pit to a recycling tank. The pit should have a primary pump triggered by a float switch and a backup pump which automatically activates if the primary fails.
- Collection pits should be provided with two visual alarms. The first should activate when the primary pump fails. The second should activate when water reaches the high level mark in the pit. Both alarms should activate warning devices on the operator's console.

Many of the problems with wastewater management at batching plants have been caused by failure to recycle stored wastewater as quickly as possible. Uses for recycling tank water include concrete batching, spraying over stockpiles for dust control and washing out agitators.

As the wastewater system captures and recycles process water, wastewater must not be discharged from concrete batching plants in dry weather. Whenever wet weather discharges occur, they should be monitored for pH and suspended solids, and records retained. If unacceptable levels are found:

- An investigation should be carried out to determine the causes
- Remedial actions should be identified and implemented.

Equipment and training should be provided; so that staff can carry out pH testing and take suspended solids samples for laboratory analysis (turbidity monitoring may also be used to provide an immediate indicator of discharge quality).

2.8.9 Air Quality

Dust from cement, sand and aggregates are a pollutant. Emission of dust will cause deterioration of workers health (respiratory system). Fine dust particles can enter neighboring premises and adversely affect amenity. Dust must be controlled so that there are no significant emissions from the plant.

➤ Dust emission sources

Potential sources of dust pollution include:

- Delivery of raw materials in trucks, trailers and tankers
- Storage of raw materials in bunkers and stockpiles
- Transfer of raw materials by front end loaders, conveyors, hoppers and agitators
- Leakage or spillage of raw materials from silos, inspection covers and duct work.

The best way to avoid offsite dust problems is to prevent the release of the dust through good design and management techniques described as below:

1. Ground Pavement

The entire plant compound traversed by vehicles including driveways leading into and out of the plant should be paved with a hard, impervious material. Unsealed surfaces should be protected with barriers to exclude vehicles. The pavement should be kept clean and dust-free. Spills and leaks must be contained and cleaned up immediately, before dust is generated.

2. Sand and Aggregate Stockpiles

Sand and aggregates should be delivered in a dampened state, using covered trucks. If the materials have dried out during transit, they should be re-wetted before being dumped into the storage bunker. Sand and aggregates should be stored in a hopper or bunker which shields the materials from winds. The bunker should enclose the stockpile on three sides. The walls should extend one meter above the height of the maximum quantity of raw material kept on site, and extend two meters beyond the front of the stockpile. The hopper or bunker should be fitted with water sprays which keep the stored material damp at all times. Monitor the water content of the stockpile to ensure it is maintained in a damp condition. If a combination of wall height and length coupled with water sprinklers is unable to contain the material, roofing and/or rubber entry curtains should be installed. In-ground storage bunkers minimize dust emissions from stockpiles. Where these are filled by drive-over deliveries, the bunker should be shielded on two sides by shrouds or walls that are at least 0.5 meters high and extend the entire length of the bunker. It is still essential to ensure the raw ingredients are damp on receipt and before they are delivered to the in-ground bunkers.

3. Overhead Bins

Overhead storage bins should be totally enclosed. The swivel chute area and transfer point from the conveyor should also be enclosed. Rubber curtain seals may be needed to protect the opening of the overhead bin from winds.

4. Conveyor belts and raw material transfer

Conveyor belts which are exposed to the wind and used for raw material transfer should be effectively enclosed, to ensure dust is not blown off the conveyor during transit. Conveyor transfer points and hopper discharge areas should be fully enclosed. Double rubber curtain seals are recommended for transfer point outlets to prevent dust from raw materials escaping into the atmosphere. Conveyor belts should be fitted with belt cleaners on the return side of the belt. It is important that any raw material collected by the belt cleaners is contained, so that dust is not discharged.

5. Aggregate weigh bins

Weigh hoppers at front end loader plants should be roofed and have weigh hoppers shrouded on three sides, to protect the contents from the wind. The raw materials transferred by the front end loader should be damp, as they are taken from a dampened stockpile.

6. Cement transfer and storage

Store cement in sealed, dust-tight storage silos. All hatches, inspection points and duct work should be dust-tight. Cement should be delivered in sealed vehicles equipped for pneumatic transfer from the vehicle to the cement storage silo. Any cement spills should be cleaned up as soon as they are detected.

7. Cement delivery

The silo feed pipe must be made of material able to withstand the effects of cement. The delivery pipes should be clearly labeled with the silo identification and material stored inside the silo. The silo delivery pipe should be kept locked at all times except when a delivery is in progress. The infill pipe should be fitted with a fail-safe valve, which is 'tight shut-off', made of wear resistant materials, able to withstand high velocity product delivery. The valve should be located less than one meter above the fill point.

8. Silo over-fill protection

Silos should be equipped with a high level sensor alarm and an automatic delivery shut-down switch to prevent overfilling. The high level alarm set point should be at a level which ensures the silo is not overfilled. The following points should be considered when setting the high level alarm:

- Silo profile.
- Maximum fill rate.
- The response time of the shut-down system.
- Volume of delivery vehicles.

An automatic shut-down switch should stop the flow of cement to the silo within 60 seconds of the high level alarm's activation. Twin radio frequency probes are recommended for high level alarms. The silo over-fill protection system should incorporate a 30 minute reset time delay. The high level alarm should be audible (or visual only, in areas sensitive to excess noise). There should be a test circuit to test the operation of the high level alarm sensor, which is tested before every delivery of cement to the silo.

9. Silo dust control

Cement dust emissions from the silo during filling operations must be minimized. The minimum acceptable performance is obtained using a fabric filter dust collector (FFDC). Equivalent or better performance using alternative dust control technology is acceptable.

10. Dust during work

Use of mask by the workers. Workers health will be affected by inhaling. The contractor has to provide effective mask to the workers to prevent dust pollution of the workers that will affect their health otherwise. The workers also need to motivate to use mask when needed.

2.8.10 Noise Emissions

Noise is a form of pollution and a potential source of conflict between the operators of a concrete batching plant and the local community. Noise emitted from a concrete batching plant must be managed as carefully as other discharges from the site.

Because of the potential for noise to affect residential amenity, management should give high priority to liaising with the local community so that it can be aware of, and resolve, noise issues.

➤ Definition of noise

Noise is unwanted sound. The disturbing effects of noise depend on the level of the noise and its character such as tones, intermittency, and so on. Higher frequency tones are more disturbing than lower frequency tones, but lower frequency tones are not easily controlled and can penetrate buildings, such as houses. Noise can cause stress in both employees and neighbors of the plant. Sound levels are measured in units of decibels, dB (A). The 'A' weighting of a measured sound level approximates how the human ear perceives sound. If a sound is intensified by 10 dB (A), human ears would perceive the sound to have doubled in loudness.

➤ Noise sources at concrete batching plant

Major noise sources at batching plants include:

- Truck and front end loader engine noise
- Hydraulic pumps
- Aggregate delivery to bunkers and hoppers
- Conveyor belts
- Air valves
- Truck air brakes
- Filters
- Alarms
- Amplified telephones
- Public address system
- Compressors
- Swinging, scraping, loading devices
- Opening and closing of gates
- Radios
- Reverse warning devices.

➤ Noise mitigation measures

Noise abatement can often be achieved by relatively simple measures such as:

- Locating noisy equipment away from potential sources of conflict
- Locating noisy equipment behind sound barriers or sound absorbers for example, gravel stockpiles or constructed barriers
- Using self-cleaning weigh hoppers
- Enclosing compressors and pumps
- Fitting silencing devices to all pressure operated equipment

- Lining hoppers with a sound absorbing material such as rubber
- Sealing roads and plant site with concrete or bitumen
- Positioning access and exit points away from noise sensitive areas
- Fitting efficient muffling devices to all engines
- Using visual alarms in preference to audible alarms
- Using a personal paging service instead of hooters to gain attention of staff
- Relocating sirens to face away from residences
- Weighing fine aggregates before coarse aggregates
- Ensuring that maintenance is conducted in enclosed sheds, away from sources of conflict
- Ensuring an adequate buffer is kept between the plant and neighbors
- Erecting screens and barriers to reduce noise transmission
- Storing aggregates below ground level where possible
- Limiting operations to between 7.00am and 5.00pm Saturday to Thursday, and 7.00am and 1.00pm on Friday if other noise mitigation measures are inadequate.

Where noise abatement requires more detailed analysis and control, an acoustic consultant should be used.

- Use of ear plug and ear muff by the workers of high noise area will reduce their potential damage of hearing capacity.
- Introducing rotational works to limit the working time of workers at high noise area (e.g. CC block manufacturing area, generator area etc.)

Table 2:3 Standards for Sound according to ECR, 97 Bangladesh

Sl. No.	Category of areas	Standards determined at dBA unit	
		(Day time)	(Night time)
a	Silent zone	45	35
b	Residential area	50	40
c	Mixed area (mainly residential area, and also simultaneously used for commercial and industrial purposes)	60	50
d	Commercial area	70	60
e	Industrial area	75	70

Notes:

1. The time from 6 a.m. to 9 p.m. is counted as daytime.
2. The time from 9 p.m. to 6 a.m. is counted as night time.
3. Area up to a radius of 100 meters around hospitals or educational institutions or special institutions/ establishments identified/to be identified by the Government is designated as Silent Zones where use of horns of vehicles or other audio signals, and loudspeakers are prohibited.

The Tatalbari CC block yard of polder 35/1 is a mixed area (residential/industrial), for which the day time noise standard level is 60 dB, whereas it is 50 dB for night time.

2.8.11 Human Health Hazard and Risk Score

During the operation of automatic CC block manufacturing plant, there need two of three staff to operate it. To carry the produced block from plant area to curing area and curing area to stacking area need forklift with operator. Other activities such as loading and unloading of

raw materials, lining of cc block etc. need human involvement. So human health hazard and risk score is essential for those tasks to know the level of severity as contractor can take action on that regards. See the Annex-01 for Human Health Hazard and Risk Score for automatic CC block manufacturing plant.

2.8.12 Pollution from oils and chemicals

Leakage/ Spillage of Fuels/chemicals will cause pollution of soil and ground water. Every CC block manufacturing plant has a fuel storage and the fuel storage should have certified tank and provided with a secondary CC paved container with minimum 110% capacity of total volume of fuel containment to check pollution by potential spillage of fuel. Moreover, the fuel delivery sites needs to be paved along with raised sump/ditch to arrest potential fuel spillage. Spill kits also need to be provided to check any spillage of fuel.

Various cautionary signs of fuel need to be displayed at fuel site along with required information. All facilities for combating any potential accident from fuel and chemical need to be kept available at site. Signboard with fuel information need to be erected at the fuel storage site.

2.8.13 Erection of informative signboard and cautionary sign/signals

Informative Signboard and cautionary sign need to be erected at all sensitive work sites for understanding of various activities and adopting required steps to avoid any kind of untoward happening /accident from the project activities assuring risk management. This will also improve community participation in project activities

2.8.14 Provision of PPE and using them by the workers

Personal protective equipment (helmet, hand gloves, mask, safety boot, vest, safety belt etc.) are important for the workers to wear during conduct of activities in a work site. Thus, contractor needs to supply these to the workers during work and the workers should use them as requirement to avoid any accident at work site. Conduct of a tool box talk at the start of work promote the worker's use of PPE.

2.8.15 Speed limit of Vehicles

The movement of vehicles within work site (e.g. automated CC block manufactured area) need to be kept at safer speed to assure the safety of the working personnel. Thus, the highest speed limit needs to be maintained at 15km/hour. Accordingly, the drivers need to be trained and motivated and signboard for speed limit needs to be erected at several strategic locations of the work sites.

Annex- 1 Human Health Hazard and Risk Score for Automatic CC Block Manufacturing Plant

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
Sl. No.	List individual task	Identify hazards associated with task	Likelihood X Severity	Use Risk Matrix	<ul style="list-style-type: none"> List procedures that apply List appropriate engineering controls List procedures or other administrative controls 	List appropriate PPE
01	Automatic Machine Plant	<ul style="list-style-type: none"> Produce high noise 	4x2=8	Medium	<ul style="list-style-type: none"> Provide noise control barrier around the plant area as possible Make a closed chamber for plant operators Periodic hearing check for the exposed workers Shifting duty for the workers of noise exposed area 	Good quality ear plug and ear muff
		<ul style="list-style-type: none"> Emission of dust stream 	4x2=8	Medium	<ul style="list-style-type: none"> Spray water at certain intervals in the plant area Wet and clean the aggregate before using Cover/Wet the dusty parts or materials 	Dust protective mask
		<ul style="list-style-type: none"> Any part of aggregate can come out during vibration 	2x1=2	Low	<ul style="list-style-type: none"> No operation without the screen or barrier provided with the machine 	Safety goggles
		<ul style="list-style-type: none"> Sudden off /start due to operator 	1x2=2	Low	<ul style="list-style-type: none"> Conduct toolbox talk regularly Establish and practice the safe operation procedure 	Helmet, visible vest and boot
		<ul style="list-style-type: none"> Lockout-tagout (LOTO) of automatic plant 	5X1=5	Low	<ul style="list-style-type: none"> Regular checking of Automatic CC plant Check electric switch, fuel and all types connection line during off and on the plant. Reserve the key with the designated person only Conduct proper repair, whenever required 	Helmet, safety boot, mask and gloves
02	Conveyor system	<ul style="list-style-type: none"> Emission of dust 	2x1=2	Low	<ul style="list-style-type: none"> Properly cover the conveyor system 	Dust protective mask
		<ul style="list-style-type: none"> Collapse of conveyor roller 	2x1=2	Low	<ul style="list-style-type: none"> Check the roller system before and after the work every day or at regular intervals 	Helmet, visible vest and boot
		<ul style="list-style-type: none"> Breakdown of conveyor belt 	2x1=2	Low	<ul style="list-style-type: none"> Regular check on the belt system 	Helmet, visible vest and boot

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
Sl. No.	List individual task	Identify hazards associated with task	Likelihood X Severity	Use Risk Matrix	<ul style="list-style-type: none"> List procedures that apply List appropriate engineering controls List procedures or other administrative controls 	List appropriate PPE
		<ul style="list-style-type: none"> Collapse of conveyor system 	1x4=4	Low	<ul style="list-style-type: none"> Regular check on conveyor system 	Helmet, visible vest and boot
03	Mixing system	<ul style="list-style-type: none"> Falling into the hopper hole 	2x2=4	Low	<ul style="list-style-type: none"> Make protective fence or moveable barrier around the hopper hole 	Helmet, visible vest and boot
		<ul style="list-style-type: none"> Failure of hopper weir 	2x1=2	Low	<ul style="list-style-type: none"> Regular check on weir system Proper maintenance Change the weir immediate when need 	Helmet, visible vest and boot
		<ul style="list-style-type: none"> Failure of hopper lock during cleaning of hopper hole 	2x1=2	Low	<ul style="list-style-type: none"> Check the lock before use Regular maintenance 	Helmet, visible vest and boot
		<ul style="list-style-type: none"> Breakdown of hopper due to over load 	2x1=2	Low	<ul style="list-style-type: none"> Regular check and maintenance of hopper before loading 	Helmet, visible vest and boot
04	Concrete core cutter	<ul style="list-style-type: none"> Produce high noise 	3x3=6	Medium	<ul style="list-style-type: none"> Use ear plug and ear muff before starting the work Set the equipment at one open site away from the plant area, curing area, living area 	Ear plug and ear muff
		<ul style="list-style-type: none"> Emission of concrete dust 	2x2=4	Low	<ul style="list-style-type: none"> Provide continuous water flow during cutting operation by pipe 	Dust protective mask
		<ul style="list-style-type: none"> Exposure of hand and skin due to cutter plate failure 	2x2=4	Low	<ul style="list-style-type: none"> Use hand gloves during operation Check the plate joint regularly, about its stability 	Hand gloves
05	Loading and unloading of materials	<ul style="list-style-type: none"> Emission of wind-blown dust stream 	3x2=6	Medium	<ul style="list-style-type: none"> Spray water at during intervals Wet the sand or aggregate 	Dust protective mask
		<ul style="list-style-type: none"> Uncertain falling of materials upon the workers 	2x2=4	Low	<ul style="list-style-type: none"> Worker's standing area should maintain certain distance from the loading and unloading area Temporary separation around the specified area 	Helmet, visible vest and boot

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
Sl. No.	List individual task	Identify hazards associated with task	Likelihood X Severity	Use Risk Matrix	<ul style="list-style-type: none"> List procedures that apply List appropriate engineering controls List procedures or other administrative controls 	List appropriate PPE
06	Stockpile	• Produce windblown dust stream	3x2=6	Medium	<ul style="list-style-type: none"> Spray water at during intervals Wet/cover the sand or aggregate storage 	Dust protective mask
		• Potential slide	2x2=4	Low	<ul style="list-style-type: none"> Make a wall around the storage area. The height will be related to the height of stockpiling Make it no entry zone Provide cautionary signboard 	Helmet, visible vest, boot and dust protective mask
07	CC block stacking area	• Collapse of Stacked block	2x2=4	Low	<ul style="list-style-type: none"> Demarcate the stacking area Provide cautionary signboard Make it no entry zone 	Helmet, visible vest, boot
08	High voltage power supply	• Electric firing	2x3=6	Medium	<ul style="list-style-type: none"> Regular check the switch board and weir system Turn off the main switch board Use the fire-extinguisher and sand as required 	Helmet, visible vest and boot
		• Electrification	2x2=4	Low	<ul style="list-style-type: none"> Rise the wire system up or underground conduit system should be established All joint will be insulated Regular check the switch board and weir system Closed all the switch board properly. Only responsible person will check at regular intervals 	Insulating hand gloves and boot
09	Welding area	• Gas / Metal contamination to workers	3x2=6	Medium	<ul style="list-style-type: none"> Provide the gas mask properly during welding 	Gas musk, eye protective welding glass
		• Exposure to hand, leg and skin	2x2=4	Low	<ul style="list-style-type: none"> Provide special cloth for welding 	Gas musk, eye protective welding glass Special type of cloth
		• Oxy-acetylene flash to eye	3x2=6	Medium	<ul style="list-style-type: none"> Provide the eye protective welding glass 	Gas musk, eye protective welding glass
		• Welding spark	2x2=4	Low	<ul style="list-style-type: none"> Provide the protective cloth 	Gas musk, eye protective welding glass Special type of cloth

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
Sl. No.	List individual task	Identify hazards associated with task	Likelihood X Severity	Use Risk Matrix	<ul style="list-style-type: none"> List procedures that apply List appropriate engineering controls List procedures or other administrative controls 	List appropriate PPE
		<ul style="list-style-type: none"> Burst of oxygen and gas cylinder 	2x4=8	Medium	<ul style="list-style-type: none"> Maintain a minimum distance (6.1 m) from the fuel gas cylinder 	Gas mask, eye protective welding glass Special type of cloth
		<ul style="list-style-type: none"> Firing due to leakage of hose pipe 	2x2=4	Low	<ul style="list-style-type: none"> Check the pipe system regularly 	Eye protective glass, hand gloves, helmet, visible vest
10	Fuel storage	<ul style="list-style-type: none"> Exposure to eye, skin during fuelling and Re-fuelling 	2x2=4	Low	<ul style="list-style-type: none"> Maintain the minimum distance during fuelling and Re-fuelling Provide eye protective glass Provide the hand gloves 	Eye protective glass, hand gloves, helmet, visible vest
		<ul style="list-style-type: none"> Occur firing 	1x3=3	low	<ul style="list-style-type: none"> Store the fuel away from the flammable sources 	Eye protective glass, hand gloves, helmet, visible vest
11	forklift	<ul style="list-style-type: none"> Occur accident to pedestrian 	3x2=6	Medium	<ul style="list-style-type: none"> Maintain the speed limit Prepare the safe operation manual Conduct regular toolbox talk Provide forklift safety training Separate lane for pedestrian and forklift 	Helmet, visible vest
		<ul style="list-style-type: none"> Can be unbalanced/ stumble down 	2x2=4	Low	<ul style="list-style-type: none"> Make a forklift safety procedure and erect to forklift moving area 	Helmet, visible vest
		<ul style="list-style-type: none"> Scraper attrition 	2x1=2	Low	<ul style="list-style-type: none"> Regular check and maintenance of the scraper 	Helmet, visible vest
12	Electric switch board and weir	<ul style="list-style-type: none"> Electrification due to poor joint and low quality cable 	2x2=4	Low	<ul style="list-style-type: none"> Rise the wire system up or underground conduit system should be established All joint will be insulated Regular check the switch board and weir system <p>Closed all the switch board properly. Only responsible person will check at regular intervals</p>	Insulating hand gloves and boot
		<ul style="list-style-type: none"> Spark of firing 	2x1=2	Low	<ul style="list-style-type: none"> Cover the joint by tape or other insulating materials 	Insulating hand gloves and boot

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
<i>Sl. No.</i>	<i>List individual task</i>	<i>Identify hazards associated with task</i>	<i>Likelihood X Severity</i>	<i>Use Risk Matrix</i>	<ul style="list-style-type: none"> <i>List procedures that apply</i> <i>List appropriate engineering controls</i> <i>List procedures or other administrative controls</i> 	<i>List appropriate PPE</i>
13	Motorcycle	<ul style="list-style-type: none"> Occur collision with forklift, pedestrian 	2x2=4	Low	<ul style="list-style-type: none"> Segregate the pedestrian and motor vehicle movement area 	Helmet, visible vest
14	Dust pollution in Silo	<ul style="list-style-type: none"> Dust/chemical contamination 	3x1=3	Low	<ul style="list-style-type: none"> Checking silo surface for avoidance leakage Avoid excess load 	Safety belt, helmet, safety shoe, mask, visible vest.

2.9 EHS Risk Assessment for Sluice (Drainage Sluice and Flushing Sluice)

2.9.1 Introduction

Fifteen drainage sluices will be replaced under the proposed Project in Polder 35/1. Moreover, two sluices will be repaired under this Project. Only two new flushing inlets will be constructed under the proposed interventions for rehabilitation work of Polder 35/1. Seventeen flushing inlets will be replaced under the proposed Project in Polder 35/1. Besides, three old flushing inlets will be repaired. The details description of these sluices has been given in Table 1.1.

2.9.2 Description of construction activities

At the beginning of the work i.e. during pre-construction activities for construction of drainage sluices i.e. construction of labour shed, development of sanitation and other facilities etc. should be done. During this period, required construction materials (sand, cement, wood, shuttering materials etc.) will be procured by the contractor as per tender schedule. Meanwhile, a suitable site will be selected and prepared for construction of the sluices. Before starting the construction activities of drainage sluices, Ring bundh and diversion channel will have to be constructed. After that the foundation treatment required for the structure will be carried out. The concrete cement (CC) and reinforced concrete cement (RCC) works along with cutting, bending and binding of rods will then be performed as per specification. CC blocks will be prepared and placed as and where required as per design. After construction of approach roads, fitting and fixing of gates and hoisting device will be carried out. Gates will be properly painted. The intake and outfall of the gate will be constructed as per design. The CC blocks will be made for river training works and pitching works will then be conducted.

Before starting the construction activities of flushing inlets a labour shed will be constructed with proper sanitation and other facilities. The required construction materials (sand, cement, wood, shuttering materials etc.) will be procured simultaneously. A suitable site of the structure will then be selected and prepared accordingly. Alternative diversion channels will be constructed before the starting of construction works. After that the foundation treatment required for flushing inlets will be carried out. Then the RCC works, pipe and machine pipe along with construction allied and fittings will be made along with construction of and collar joints will be made as and where required. After few days of constructions the gates both in the upstream of each flushing inlets will be executed. After completion of all construction activities, the approach embankments will be constructed and turfed with grass. Finally, a channel is to be excavated through lead cut and tail cut to make the flow to be channelled through the flushing gate.

During those work, Human Health Hazard and Risk Score Assessment is needed. Please see the Annex-02 for Human Health Hazard and Risk Score for Sluice (Drainage Sluice and Flushing Sluice)

Annex- 2 Human Health Hazard and Risk Score for Sluice (DS and FS)

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
Sl. No.	List individual task	Identify hazards associated with task	Likelihood X Severity	Use Risk Matrix	<ul style="list-style-type: none"> List procedures that apply List appropriate engineering controls List procedures or other administrative controls 	List appropriate PPE
01	Cofferdam/ Ring bundh	<ul style="list-style-type: none"> Failure of cofferdam 	2x2=4	Low	<ul style="list-style-type: none"> Check properties of soil as per the guideline of DDC&PMS consultant Make arrangement for emergency work or some immediate action 	Helmet, visible vest, boot
		<ul style="list-style-type: none"> Difficulties to local pedestrian 	3x1=3	Low	<ul style="list-style-type: none"> Make diversion road or dedicated path way for local pedestrian 	Helmet, visible vest, boot
		<ul style="list-style-type: none"> Exposure to leg 	2x2=4	Low	<ul style="list-style-type: none"> Provide the boot 	Helmet, visible vest, boot
02	Sand piling	<ul style="list-style-type: none"> Falling of hammer 	2x4=8	Medium	<ul style="list-style-type: none"> Separate the worker's standing area during hammering Check the U-clamp and all joint regularly Maintain the uniform velocity Avoid the certain falling of hammer Avoid hammering during pouring of sand 	Helmet, visible vest, boot, mask, hand gloves
		<ul style="list-style-type: none"> Falling of casing 	2x4=8	Medium	<ul style="list-style-type: none"> Separate the other workers during removing the casing Check the joint before start 	Helmet, visible vest, boot, mask, hand gloves
		<ul style="list-style-type: none"> Failure of different joints 	2x4=8	Medium	<ul style="list-style-type: none"> Check the all joint regularly at start and end of the work Replace the joint at regular intervals 	Helmet, visible vest, boot, mask, hand gloves
		<ul style="list-style-type: none"> Slit of supporting weir 	2x2=4	Low	<ul style="list-style-type: none"> Check the all weir regularly at start and end of the work Replace the weir at regular intervals 	Helmet, visible vest, boot, mask, hand gloves
		<ul style="list-style-type: none"> Failure of piling system 	2x4=8	Medium	<ul style="list-style-type: none"> Regular check of all parts of piling system 	Helmet, visible vest, boot, mask, hand gloves

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
Sl. No.	List individual task	Identify hazards associated with task	Likelihood X Severity	Use Risk Matrix	<ul style="list-style-type: none"> List procedures that apply List appropriate engineering controls List procedures or other administrative controls 	List appropriate PPE
		• Produce noise	5x2=10	Medium	<ul style="list-style-type: none"> Provide ear plug and ear muff Periodic hearing check 	Ear plug and ear muff
		• Exposure of dust	3x2=6	Medium	<ul style="list-style-type: none"> Use the wet sand as per required amount 	Dust protective musk
		• Exposure to hand, skin, eye	2x2=4	Low	<ul style="list-style-type: none"> Toolbox talk conduct beginning of the work 	Helmet, visible vest, boot, mask, hand gloves, safety glass
03	Rod cutting	• Metal contamination	2x2=2	Low	<ul style="list-style-type: none"> Use paved workshop for rod cutting Collect the residual materials in a specified place Provide gas musk to the workers 	Gas musk, helmet, visible vest
		• Produce noise	4x2=8	Medium	<ul style="list-style-type: none"> Set the cutting area away from the receptor as possible Provide ear plug/muff to the operator and the surroundings 	Helmet, visible vest, ear plug/muff
		• Exposure to hand and leg	2x2=4	Low	<ul style="list-style-type: none"> Conduct toolbox talk at the beginning of the work 	Helmet, visible vest, hand gloves
		• May cause electric firing	2x2=4	Low	<ul style="list-style-type: none"> Check the circuit system before starting the welding Turn off the main switch, then use the fire extinguisher 	Gas musk, helmet, visible vest, special cloth
		• Metal arch expose to body	1x2=2	Low	<ul style="list-style-type: none"> Use the protective cover of the cutting machine Conduct toolbox talk at the beginning of the work 	Gas musk, helmet, visible vest, special cloth
04	Rod bending	• Exposure to body	1x2=2	Low	<ul style="list-style-type: none"> Conduct toolbox talk at the beginning of the work 	Helmet, hand gloves, visible vest

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
Sl. No.	List individual task	Identify hazards associated with task	Likelihood X Severity	Use Risk Matrix	<ul style="list-style-type: none"> List procedures that apply List appropriate engineering controls List procedures or other administrative controls 	List appropriate PPE
05	Welding	• Gas / Metal contamination to workers	3x2=6	Medium	• Provide the gas mask properly during welding	Gas mask, eye protective welding glass
		• Exposure to hand, leg and skin	2x2=4	Low	• Provide special cloth for welding	Gas mask, eye protective welding glass Special type of cloth
		• Oxy-acetylene flash to eye	3x2=6	Medium	• Provide the eye protective welding glass	Gas mask, eye protective welding glass
		• Welding spark	2x2=4	Low	• Provide the protective cloth	Gas mask, eye protective welding glass Special type of cloth
		• Burst of oxygen and gas cylinder	2x4=8	Medium	• Maintain a minimum distance (6.1 m) from the fuel gas cylinder	Gas mask, eye protective welding glass Special type of cloth
		• Firing due to leakage of hose pipe	2x2=4	Low	• Check the pipe system regularly	Eye protective glass, hand gloves, helmet, visible vest
06	RCC work	• Exposure to body	4x2=8	Medium	• Conduct toolbox talk at the beginning of the work	Helmet, visible vest, boot, hand gloves
		• Rod parts/bar Fall to head	2x2=4	Low	<ul style="list-style-type: none"> Conduct toolbox talk at the beginning of the work Provide helmet to every workers 	Helmet, visible vest, boot, hand gloves
07	Material stockpiling(sand, ce-	• Produce windblown dust stream	3x2=6	Medium	<ul style="list-style-type: none"> Spray water at regular intervals Wet/cover the sand or aggregate storage 	Dust protective mask

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
Sl. No.	List individual task	Identify hazards associated with task	Likelihood X Severity	Use Risk Matrix	<ul style="list-style-type: none"> List procedures that apply List appropriate engineering controls List procedures or other administrative controls 	List appropriate PPE
	ment, stone)	<ul style="list-style-type: none"> Potential sliding 	2x2=4	Low	<ul style="list-style-type: none"> Make a wall around the storage area. The height will be related to the height of stockpiling Make it no entry zone Provide cautionary signboard 	Helmet, visible vest, boot and dust protective mask
08	Shuttering work	<ul style="list-style-type: none"> Failure of shuttering system 	2x3=6	Medium	<ul style="list-style-type: none"> Maintain the shuttering space as per design Support should be placed in level ground 	Helmet, visible vest, hand gloves
09	Generator	<ul style="list-style-type: none"> Produce noise 	4x2=8	Medium	<ul style="list-style-type: none"> Periodic health check of generator Closed by noise protective board Set the generator away from the sensitive receptors 	Ear plug and ear muff
		<ul style="list-style-type: none"> Gas exposed to worker 	4x2=8	Medium	<ul style="list-style-type: none"> Use filter media to suck the emitted gas Rise the outlet stack height above the breathing zone 	Gas mask, helmet, visible vest
		<ul style="list-style-type: none"> Firing 	2x2=4	Low	<ul style="list-style-type: none"> Provide fire-extinguisher to nearby the generator area 	
10	Height work	<ul style="list-style-type: none"> Falling of workers 	2x4=8	Medium	<ul style="list-style-type: none"> Make a stable platform with ladder No workers will be allowed to walk over pipe Provide safety belt to the workers who worked in above 2 m height 	Safety belt, helmet, visible vest, boot
		<ul style="list-style-type: none"> Heavy object fall down 	2x4=8	Medium	<ul style="list-style-type: none"> Put a net system with sufficient capacity to catch the fallen object 	Helmet, visible vest, boot
		<ul style="list-style-type: none"> Light object fall down 	2x2=4	Low	<ul style="list-style-type: none"> Put a net system with sufficient capacity to catch the fallen object 	Helmet, visible vest, boot
11	Sheet piling	<ul style="list-style-type: none"> Produce noise 	4x2=8	Medium	<ul style="list-style-type: none"> Only the pile to be driven in day time Before starting the pile driving, notify the adjacent receptors about the noisy activity 	Ear plug/ear muff, helmet, visible vest, boot

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
Sl. No.	List individual task	Identify hazards associated with task	Likelihood X Severity	Use Risk Matrix	<ul style="list-style-type: none"> List procedures that apply List appropriate engineering controls List procedures or other administrative controls 	List appropriate PPE
		<ul style="list-style-type: none"> Failure of sheet pile 	1x2=2	Low	<ul style="list-style-type: none"> Check the strength and load bearing capacity before driving Gradually increase the load value, not suddenly 	Helmet, visible vest, boot
		<ul style="list-style-type: none"> Failure of pile driving equipment 	1x4=4	Low	<ul style="list-style-type: none"> Check the equipment before use Follow the manual from manufacturer 	Helmet, visible vest, boot
12	Painting	<ul style="list-style-type: none"> Exposure to eye, nose and mouth 	3x2=6	Medium	<ul style="list-style-type: none"> Conduct toolbox talk before starting the work For work in height, make a stable platform with railing and ladder 	Gas protective mask, helmet, visible vest, hand gloves
13	Excavation	<ul style="list-style-type: none"> Danger at night for local people and vehicle 	2x2=4	Low	<ul style="list-style-type: none"> Provide solid demarcation around the excavation Establish sufficient sign/signalling that can visible in night Erect light reflective signboard 	
		<ul style="list-style-type: none"> Excavator may collapse during excavation 	2x2=4	Low	<ul style="list-style-type: none"> Set and check the stability of excavator after certain interval during work 	Helmet, visible vest, hand gloves, boot
		<ul style="list-style-type: none"> Sudden falling of workers and others 	2x2=4	Low	<ul style="list-style-type: none"> Make the demarcation around the excavation Erect the cautionary signs and signals Conduct the toolbox talk to grow the awareness about 	Helmet, visible vest, hand gloves, boot
14	Concrete casting	<ul style="list-style-type: none"> Exposure to body 	3x1=3	Low	<ul style="list-style-type: none"> Conduct toolbox talk before starting the work 	Helmet, visible vest, hand gloves, boot

2.10 Risk Assessment for Embankment Section

2.10.1 Introduction

Under the proposed interventions in the Polder, a total of about 50 km of embankments will be re-sectioned and their height will be increased, a total of 6.3 km of embankments will be retired, and a total of 5 km of embankments will be forwarded, as shown in the Table 2:4 below:

Table 2:4 Details of Works on Embankments

	Description	Chainage (km)	Embankment Height (m)	Length (km)
1	Increasing the height of embankments	10.50 to 12.50	5.00	2.00
2		26.00 to 36.50		10.50
3		37.00 to 38.00		1.00
4		43.00 to 62.50		19.50
5		1.00 to 2.00	6.00	1.00
6		3.80 to 10.50		6.70
7		13.70 to 17.00	6.50	3.30
8		18.50 to 19.50		1.00
9	Retirement	21.00 to 26.00		5.00
10		0.00 to 1.00	-	1.00
11		2.00 to 3.80	-	2.80
12		17.00 to 18.50	-	1.50
13		19.50 to 21.00	-	1.50
14	Forwarding of Embankment	36.50 to 37.00	-	0.50
15		38.00 to 43.00	-	5.00

2.10.2 Description of construction activities

During pre-construction phase, labour sheds should be constructed with proper sanitation and other required facilities before the commencement of construction activities for embankment works. A suitable site shall be selected and prepared by cleaning bushes, weed, trees etc. Alignment of embankments has to be fixed with adequate base width. Base stripping and removal of trees, weed etc. will be done as per instruction of the Engineer in charge. The tools required for construction of embankments will be procured during this period. After validating the final design, excavation of soil/carried earth will be followed and deposited in a selected area. Soil will be dumped with layers. At the same time, each layer (of 1.5 feet) of dumped soil will be compacted by compactor machine. The sloping and shaping of embankment will be developed after proper compaction of layers. Then required turfing with grass will be provided on embankment. Watering and fertilizing will also be provided.

During those work, Human Health Hazard and Risk Score Assessment is needed. Please see the Annex-03 for Human Health Hazard and Risk Score for Embankment Section.

Annex- 3 Human Health Hazard and Risk Score for Embankment Section

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
<i>Sl. No.</i>	<i>List individual task</i>	<i>Identify hazards associated with task</i>	<i>Likelihood X Severity</i>	<i>Use Risk Matrix</i>	<ul style="list-style-type: none"> <i>List procedures that apply</i> <i>List appropriate engineering controls</i> <i>List procedures or other administrative controls</i> 	<i>List appropriate PPE</i>
01	Collection of soil	<ul style="list-style-type: none"> Failure of excavator 	2x3=6	Medium	<ul style="list-style-type: none"> Check the physical condition of excavator regularly Conduct the toolbox talk before starting the work Training on driving safety at regular interval 	Helmet, boot, visible vest
		<ul style="list-style-type: none"> Failure /accident of dump truck 	2x3=6	Medium	<ul style="list-style-type: none"> Check the physical condition of truck regularly Conduct the toolbox talk before starting the work Training on driving safety at regular interval 	Helmet, boot, visible vest
02	Compaction of embankment section	<ul style="list-style-type: none"> Electrification with electric pole weir and compaction vehicles 	3x2=6	Medium	<ul style="list-style-type: none"> Rise the weir up to enough height before starting the work 	Helmet, boot, visible vest
		<ul style="list-style-type: none"> Failure of compaction vehicle 	2x2=4	Low	<ul style="list-style-type: none"> Check the physical condition of compaction vehicle Conduct the toolbox talk before starting the work Training on driving safety at regular interval 	Helmet, boot, visible vest
03	Survey at embankment section	<ul style="list-style-type: none"> Collapse of survey equipment 	2x1=2	Low	<ul style="list-style-type: none"> Conduct the toolbox talk before starting the work Training on driving safety at regular interval 	Helmet, boot, visible vest

2.11 Risk Assessment for Barge

A barge is a flat-bottomed [boat](#), built mainly for [river](#) and [canal](#) transport of heavy goods. Some barges are not self-propelled and must be towed or pushed by [towboats](#), canal barges or towed by draft animals on an adjacent [towpath](#). Barges contended with the [railway](#) in the early [industrial revolution](#), but [were outcompeted](#) in the carriage of high-value items due to the higher speed, falling costs and route flexibility of [railways](#).

For dumping of CC block manufactured in automatic CC block manufacturing plant, contractor is using barge in this CEIP-1 project. So, it is needed to evaluate the human health hazard and risk score for barge. Please see the Annex-4.

Annex- 4 Human Health Hazard and Risk Score for Barge

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
Sl. No.	List individual task	Identify hazards associated with task	Likelihood X Severity	Use Risk Matrix	<ul style="list-style-type: none"> • List procedures that apply • List appropriate engineering controls • List procedures or other administrative controls 	List appropriate PPE
01	Forklift	<ul style="list-style-type: none"> • Occur accident to pedestrian 	3x2=6	Medium	<ul style="list-style-type: none"> • Maintain the speed limit • Prepare the safe operation manual • Conduct regular toolbox talk • Provide forklift safety training • Separate lane for pedestrian and forklift 	Helmet, visible vest
		<ul style="list-style-type: none"> • Can be imbalanced/ stumble down 	2x2=4	Low	<ul style="list-style-type: none"> • Make a forklift safety procedure and erect to forklift moving area 	Helmet, visible vest
		<ul style="list-style-type: none"> • Scraper attrition 	2x1=2	Low	<ul style="list-style-type: none"> • Regular check and maintenance of the scraper 	Helmet, visible vest
02	CC block stacking area	<ul style="list-style-type: none"> • Collapse of Stacked block 	2x2=4	Low	<ul style="list-style-type: none"> • Demarcate the stacking area • Provide cautionary sign-board • Make it no entry zone 	Helmet, visible vest, boot
03	Lining of CC block	<ul style="list-style-type: none"> • Worker may fall into river 	2x2=4	Low	<ul style="list-style-type: none"> • Make indication mark by visible paint from 0.5-1.0 m from the end of the Berge • Provide life jacket to every workers 	Helmet, visible vest, boot, life jacket
04	Anchorage of barge	<ul style="list-style-type: none"> • Failure of anchorage system 	2x3=6	Medium	<ul style="list-style-type: none"> • Regular check the anchorage system 	Helmet, visible vest, boot, life jacket

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
<i>Sl. No.</i>	<i>List individual task</i>	<i>Identify hazards associated with task</i>	<i>Likelihood X Severity</i>	<i>Use Risk Matrix</i>	<ul style="list-style-type: none"> <i>List procedures that apply</i> <i>List appropriate engineering controls</i> <i>List procedures or other administrative controls</i> 	<i>List appropriate PPE</i>
05	Load- ing of CC block	<ul style="list-style-type: none"> May im- balance the barge due to heteroge- neous loading 	2x2=4	Low	<ul style="list-style-type: none"> Appoint responsible person to check the line of CC block during loading 	Helmet, visible vest, boot, life jacket
06	Dump- ing of CC block	<ul style="list-style-type: none"> Falling of excavator due to unbal- anced op- eration 	2x2=4	Low	<ul style="list-style-type: none"> Conduct toolbox talk Establish the forklift safety procedure Conduct training facilities to workers 	Helmet, visible vest, boot, life jacket

2.12 Site Specific EHS Risk Assessment Monitoring and Record Keeping

Contractor will maintain the site specific EHS Risk Assessment register form according to the above discussed "Human Health Hazard and Risk Score" by the contractor site specific EHS person. Please see the Annex-5 for Work site Hazard Assessment Form.

2.13 Translation

The EHS Risk Assessment document needs to be translated in Bangla and Chinese for communication to Bangladeshi and Chinese workers for improvement of knowledge and awareness on workers' environment, Health and safety issues relevant to the Package-1 areas of CEIP-1 program. The translated copies will be maintained at all susceptible work site locations.

2.14 Training and Motivation

Training on EHS risk assessment (including mitigation measures) will be imparted to the Contractor and workers of Package-1 area of CEIP-1 for improvement of EHS levels at all work sites.

2.15 EHS Risk Assessment, a Living Document

EHS Risk Assessment may also be treated as a living document like the EAPs. Thus, with inclusion of new activities the new/additional EHS risk assessment will be addressed and already Annexed with respective updated EAP.

2.16 Implementation of Mitigation Measures for EHS Risk Assessment

The mitigation measures as required in EHS Risk Assessment will be implemented by following institutional arrangement proposed in EIA that includes regular monitoring to be carried out by DDCS & PMSC along with additional monitoring to be carried out by the Environmental, Social and Communication Unit (ESCU). In addition, the Third party M&E Consultants will also monitor the environmental qualities on different occasions.


It is agreed (during video conference on February 11, 2019) that the budget for implementation of mitigation measures (items) as proposed in the EHS Risk Assessment will be assured under the contract agreement with package 1 contractor (Contract Item 1.26, page 119).

Proposed Annual EHS risk assessment budget items (Polder 35/1)

Sl no.	Items for mitigation of EHS risk
1	<p>Installation of automatic CC plant ensuring right safety measures</p> <ul style="list-style-type: none"> • Installation of noise barrier • Covered conveyer belt • Regular checking of mixer machine • Regular checking of automatic machine • Covering of hopper • Checking of silo fitting • Management of cement discharge by ditch excavation • Supplying of PPE
2	<p>Safety in barge</p> <ul style="list-style-type: none"> • PPE (Life jacket, safety shoes, vest & helmet) • Signal man (as shifting duty) • Metal barrier around barge • Preparation and erection of forklift safety procedure
3	<p>Management of stock pile</p> <ul style="list-style-type: none"> • Uses of covering to check spreading of materials by wind blow • Strong fencing around materials piling • Signboard & signage • Maintaining the height of the stock piles to check potential slides
4	<p>Electric safety</p> <ul style="list-style-type: none"> • Erection of electric safety data sheet • Regular checking of the electrical fittings (by Existing manpower)
5	<p>SMART welding area</p> <ul style="list-style-type: none"> • Paved ground with roof • Supplying of required PPE • Make available the fire extinguisher • Management of welding waste
6	<p>Secured fuel storage area</p> <ul style="list-style-type: none"> • Installation of secondary paved containment around authentic fuel tank (at least 1.15 times larger than fuel tank)- Already installed in site • Pasting fuel safety data sheet • Make available the fire extinguisher
7	<p>Safety in forklift/vehicle movement</p> <ul style="list-style-type: none"> • Regular checking the fitness of forklift/vehicle by existing skilled mechanics • Preparation and pasting of forklift safety procedure. • Training on driving safety at regular interval
8	<p>Ring bundh construction for sluice area on arrangements from BOQ items</p>

	<ul style="list-style-type: none">• Safe ring bund with proper signboard & signage• Right fencing in running sites• Strong enough to stand the vehicle load• Cautionary signboard & signage
9	Generator <ul style="list-style-type: none">• Paved ground to check oil leakage• Available of fire extinguisher• Barrier around generator• Supply of PPE (Ear plug & Ear muff)
10	Works at height (especially for sluice works) <ul style="list-style-type: none">• Making of stable platform with ladder• Provided safety belt, shoes & helmet

Annex- 5 WORKSITE HAZARD ASSESSMENT FORM

 The first Engineering Bureau of Henan Water Conservancy CEIP-1, Bangladesh	<p>Safety Management System</p>	Document No:	
		Initial Date	
		Action taken Date:	
<p align="center">HAZARD IDENTIFICATION AND ASSESSMENT</p>			
Preparation: Name of site specific safety Manager	Checked by : Site Engineer	Issuing Dept. Safety	<p>Page:</p>

CERTIFICATE OF HAZARD ASSESSMENT STATEMENT FOR __ SITE

I certify a worksite hazard assessment was performed for this facility on date by the CHWE Safety Manager. (*Signature on File*)

	TASKS	HAZARDS	RISK SCORE	RISK LEVEL	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE
Sl. No.	List individ- ual task	Identify hazards associated with task	Likelihood X Severity	Use Risk Matrix	<ul style="list-style-type: none"> • List procedures that apply • List appropriate engineering controls • List procedures or other administrative controls 	List appropriate PPE