**Health, Population and Nutrition Sector Development Programme (HPNSDP) Additional Financing**

**Additional Environmental Action Plan**

**Directorate General of Health Services**

**Ministry of Health and Family Welfare**

**September, 2015.**

**Background**

The Health, Population, and Nutrition Sector Development Program (HPNSDP) is aimed at improving health services and service provision, and strengthening the health system in Bangladesh. With the World Bank and other participating development partner’s support, efforts have been made to develop infrastructure, manpower, and operational capacities of the health care facilities in management of medical waste. The Environmental Assessment and Action Plan for HPNSDP (2011-10) was prepared by Ministry of Health and Family Welfare (MoHFW), Government of People’s Republic of Bangladesh in October, 2010. The Action Plan also highlighted the major environmental issues related medical waste management including patient protection, community protection, disaster management and hospital preparation in emergency, personnel (Staff) protection, safe drinking water, arsenic contamination of drinking water, sanitation, hazardous insecticides/pesticides, construction management and climate change impact issues. In the FY 2010-11, Directorate General of Health Services (DGHS) also prepared a set of Guidelines for the Healthcare Facilities on Medical Waste Management (MWM) as well as a Training Manual on Medical Waste Management. In the year 2014, a review of the Environmental Management Implementation for the program was undertaken by The World Bank and an Environment Safeguards Assessment Report was prepared in June 2014. The Environmental Safeguards Assessment report analyzed the core issues related MWM including the legal and institutional framework, role of different stakeholders, operational framework etc. An assessment of different operations related to MWM such as primary storage, collection, segregation, transport, centralized storage, disposal of medical waste to out-house management, infection control issues. The report highlighted the major findings with regard to the aforesaid issues and also suggested short-term, medium-term and long-term recommendations.

An additional financing (AF) for the Project is required to continue its activities for another year without any changes in the objectives, coverage or other deliverables of the project. In 2015, an Environmental Safeguards Consultant was hired to assist the MoHFW in reviewing the existing implementation of the environmental management in line with the current status of implementation and scope and requirement of AF.

**Methodology of Assessment**

The report is based on desk research followed by interaction with the stakeholders including the DGHS, NGOs, Hospitals and other Health Care Facilities (HCFs), World Bank and other development partners, City Corporations etc. at various levels to assess the present status of MWM in Bangladesh. The report analyzed the gaps in implementation and process related challenges and also the shortcomings in the institutional structure which constrain effective implementation of the existing Environmental Assessment and Action Plan. It reviewed the implementation of both environmental hardware (in-house and outhouse waste management, consumables and equipment) on selected sites as well as Software (training, IEC) and provided recommendations to MOHFW for improvement of the Environmental performance for the remainder of the project and AF in the form of action plans.

**Major Findings Related to Medical Waste Management**

The major findings from the assessment are the following:

* + - The Medical Waste Generators by and large do not maintain any proper record of the different streams of MW generated. Inadequate number of color-coded bins, often improperly placed, results in different waste-streams getting mixed.
		- The segregation of waste is delegated to the ward boys and the sweepers who do not have formal training. The nurses or the ward-in-charge who has received MWM training are not being able to supervise or transfer their knowledge adequately resulting in MWM practices not being implemented.
		- There is lack of uniformity in color-coding and segregation procedures among the HCFs resulting in CTDS facility operator spending additional time and resources for ensuring right kind of treatment of different streams of waste and this reduces the efficiency in the MWM system.
		- In many occasions, the needle cutters which were provided for safely destroying needles and syringes before disposal were not being used. In many instances, the needle cutters were not functional (blades becoming blunt after one or two uses) and more often the needle-cutters are usually kept inside the cupboards and are not used. It was also observed that bins used for sharps are not properly designed as per the International standards.
		- The Information, Education and Communication (IEC) materials were not visible at the appropriate places in the HCF during the visit to these facilities.
		- The waste trolleys have become defunct and instead the trolleys used for ferrying patients were used for transporting the waste from the wards.
		- The pilferage of waste was observed and or reported from number of sources (indications of Involvement of un-authorized person in the waste management process, waste storage area being easily accessible by outsiders as a result of which the infectious waste e.g. blood bags, tubes and other sets were being pilfered out and washed to be sold to the recyclers).
		- The temporary storage of the different streams of Medical Waste is not done properly at the HCFs especially in the Public Hospitals.
		- There is general lack of awareness on use of Personal Protection Equipment (PPE) such as gloves, masks etc. The HCF employees/waste pickers also do not undergo immunization at regular periods, as is required under the Infection Control guidelines.
		- The infrastructure required to develop outhouse MWM facilities in all cities is capital intensive and the operation of such infrastructure also requires considerable recourses. An acceptable financial model for a feasible outhouse MWM facility could not been developed yet mainly due to lack of information of the amount of waste being generated in these HCFs.
		- The regulatory framework for medical waste management does not comprehensively cover the primary producers of medical waste. Also the licenses obtained by the Health Care facilities i.e. Operating License from DGHS and Trade License from the City Corporation do not provide any cross linkages to the medical waste management.
		- Under the existing institutional mechanism, the regulatory authorities do not have any information about the waste generated, treated and disposed. Neither the healthcare facilities nor the CTDE Operators provide any information to the regulators in this regard.
		- At present none of the organizations i.e. DGHS, City Corporation and MoEF/DoE have developed adequate human resources for proper management of Medical Waste. Without dedicated manpower to monitor & supervise the medical waste management, most activities are done on an ad-hoc basis. The constraint of manpower and limited resources hampers DGHS from taking a leading role in this process.

**Actions by DGHS after June 2014 Review**

Based on the recommendations of the June 2014 review, the DGHS has taken some actions to improve the Medical Waste Management (MWM). In this regard, DGHS recently appointed two full time senior environmental consultants to oversee the safeguard activities during the additional financing period. Both of the consultants have a proven track record of working in donor-funded projects related to medical waste management and environmental management. It is expected that with the addition of relevant expertise to oversee the environmental safeguard activities (both for civil construction and medical waste management), the institutional capacity of the borrower will be strengthened. The scope of the work of the consultants include the following:

* Review and assess the implementation progress of the previous Environmental Assessment and Action Plan at the facility level.
* Develop a user friendly and informative reporting format for the facilities to report back on.
* Review the reports submitted by the facilities, analyze and flag issues to management for further improvement.
* Assist in setting-up a system for recording at the facility level the amount of waste generated at each ward as well as aggregate amount per facility.
* Develop mechanism for monitoring HCWM reports and follow-up on issues identified. This should not only cover urban areas (city corporations or municipalities), but also health facilities at Upazila (sub-district) level.
* Recommend a system of self-sustainable Medical Waste Management (MWM) program for urban areas, as well as for health facilities in sub-urban areas like Upazilas.
* Identify the issue for which ministry of Local Government, Rural Development and Cooperatives (MoLGRDC), city corporations, municipalities and Upazilas are not functioning the MWM through ensuring out-houses and recommend actions in bridging the gap so that these entities ensure these.
* Devise modalities and implementation procedure and monitor implementation of MWM program in new HCFs coordinating with corporations, municipalities and Upazilas.
* Undertake any other task associated related to HCWM and control as assigned by the Line Director of Hospital Services Management (HSM) or his/her designated person.

**Major Findings Related to Environmental Assessment and Action Plan Implementation for Civil Works**

Besides the issues related to medical waste management, there has been lack of oversight of environmental safeguards related to construction/rehabilitation/renovation activities carried out under the original project. The application of the previous Environmental Assessment and Action Plan during construction activities carried out during the project period remained very vague and no documentation or progress reports were available to determine whether the environmental mitigation measures and monitoring protocol have been adequately followed in these activities.

Action Plan for Medical Waste Management

In order to strengthen the MWM, the DGHS has prepared the following action plan for the additional financing period. The plan will help to build the foundation for a robust MWM in Bangladesh in long –run. The plan is mainly corrective actions with timelines and the implementing agencies have been identified. The summarized action plan is described as follows:

**Action Plan with Timelines and Implementing Agencies**

| **S.N** |  | **Status** | **Action Plan** | **Timeline** | **Responsibilities** |
| --- | --- | --- | --- | --- | --- |
| **Priority: Very Important** |
|  | Standard Operating Procedures (SoPs) by DGHS | Final Draft of the SOPs under preparation by DGHS on Medical Waste Management by HCFs. After consultation with the stakeholders the final document would be shared with all concerned. | SOPs will be finalized and promoted extensively among all categories of HCFs across the country. SOPs will be publicly disclosed. | February, 2016 | DGHS |
|  | Temporary Storage | Most of the HCFs do not have sufficient and properly protected Temporary Storage of Medical Waste. Temporary Storage needs to be guarded to make it leakage proof to ward off the unauthorized access. | All HCFs will earmark a suitable temporary MW storage site with safety proper measures.  | June, 2016 | DGHS, HCFs |
|  | Segregation of MW and Color coding of different categories of wastes | The MWM Rules 2008 mandates a color-coding with 6 different colors for segregating various streams of MW. Presently 5 categories of Wastes are being segregated. There is no uniformity in color-coding and the segregation procedures. | A uniform color coding for different streams of MW to be initiated in all major HCFs. | June, 2016 | DGHS |
|  | Infection Control | The Infection control and Prevention Policy is in place. However its implementation is tardy with the major issues being improper sharps management, non-usage of PPE by medical & Para-medical staff and a lack of training and capacity building program on Infection Prevention Protocol. | Appropriate capacity enhancement training on infection control will be conducted for the relevant staff of HCFs. | June, 2016 | DGHS, MOHFW |
|  | Transportation | The waste trolleys are defunct as the wheels have come off. Besides trolleys used for ferrying patients were being used for transportation of medical waste. | Proper attention will be provided on transportation of MW. All existing transportation trolleys should be well labeled and should contain the basic information on their content. | June, 2016 | MoEFDGHS |
|  | Management of Sharps | Sharp management is not being done in a proper way. The blades of needle-cutters become blunt after using these a few times. Even if they are functional, they are not being put to optimum use. . | Capacity enhancement training will be introduced for HCFs staff on proper management of sharps. | March, 2016 | MoEF,DGHS |
|  | Plugging Leakages in the System  | The quantities of waste collected by the MW operating NGOs and City Corporations for out-house management, are much less than the generation owing to leakage in the system. Thus phenomenon is more prominent in the Public/Govt. Hospitals where Infected Plastic Waste and Sharps are washed and find their way to unscrupulous Recyclers  | Monitoring and record keeping need to be strengthened in all HCFs. At least 5 selected HCFs will be under close monitoring to identify the leakage and develop future strategy.  |  June, 2016 | DGHS |
|  | IEC and Awareness Campaign | The IEC material and the awareness campaign for MWM at the HCFs is not very effective. The Communication is not properly directed at the target segment and also the display is sometimes carried at wrong locations within the premises of HCF | The consultants will outline the scopes of IEC materials focusing on thematic areas such as segregation of MW at source, Proper Sharps Management, Public Awareness Posters, Color-coding etc.  | March, 2016 | DGHS |
| **Priority : Moderate Important** |
|  | Occupational Health and Safety issues | The Hospital Staff and the employees deployed for the ‘In -house” management do not normally use the requisite PPE. As the storage areas are not properly guarded and are often accessible to the ragpickers, they also come in contact with the Sharps. The personnel employed in the MWM activities also do not follow a periodic immunization program | Appropriate training program will be initiated on Occupational Health and Safety protocols for all employees involved in handling of “in-house” and out-house MW needs to be developed with an effective monitoring mechanism | April, 2016 | DGHS, HCFs,  |
|  | Focal person/Waste Management at the HCF | There is no focal person or a designated Waste Management Committee at the HCF level, which is responsible for effective implementation of MWM within its premises and ensuring compliance with the regulatory framework. This often leads to problems like efficient MWM and leakages of the recyclables from the MW generated at the HCF. | A provision should be made to ensure that a person is designated as the Focal Point in all HCFs. A WMC may also be constituted which should meet frequently to address various issues connected to MWM | February, 2016 | DGHS |
|  | Development of Out-House Medical Waste Management system | Options for out-house MWM is inadequate in terms of capacity & number. Most of the city areas have no medical waste management plant, though MoLGRD have the mandate to establish the MWM facilities.  | A provision will be initiated to establish a MWMP in a city corporation (Rajshahi) with consultation with respective city corporation as pilot basis. A private farm /NGO for the operation of MWMP will be contracted out under some terms of references (ToR)  | June, 2016 | HSM, DGHS |
|  | Develop Mechanism for bridging concerned ministry like MoH&F, MoLGRD & MoEF  | A national committee covering MoH&F, MoLGRD & MoEF was formed in 2007 for uplifting MWM system all over the Bangladesh. But it is unfortunate that the committee is not functioning up to the mark due to lack of proper coordination. | A consulting farm will be hired to coordinate the national committee as well as the concerned Ministry. The farm will vibrant the deadlock in connection with implementation of out-house MWM in different city corporation & paurosova. | June, 2016 | HSM, DGHS |

Besides the abovementioned action plans, DGHS will initiate dialogue and appropriate measures on several other issues at the policy level involving multiple stakeholders. This will improve the overall MWM in the country in long-run.

***Information flow between the key stakeholders:***

The present institutional framework lacks a speedy and transparent system for sharing of information between the various agencies. The City Corporation/Pourashavas, who are responsible for waste management, have the power to prosecute offending health units. However, they do not receive any information from DGHS or MoEF making it difficult for the effectively enforcement of MWM rules. Similarly, DGHS does not have information about the HCFs having received trade licenses from City Corporations. Development of an Online Waste Management Information System may allow effective information sharing through the Inter-Ministerial Group’s Coordinator (DGHS, MOLGRD, MOEF).

***Institutional Strengthening and Coordination with DoE***

There is no separate wing in DoE to monitor compliance of the Medical Waste Operators although there is a separate wing to issue Environment Clearance to the Industries. DoE’s Capacity needs to be enhanced by empowering it to address the compliance issue at the HCF level on Medical Waste. . In addition, better institutional coordination mechanism needs to be established between DoE and DGHS for effective medical waste management and monitoring.

***Segregation in unprotected facility by ragpickers and out-house managemnet workers***

The recycling of the municipal wastes is carried out by the Informal sector. In the event of HCF not segregating MW from MSW, the entire unsegregated waste is likely to go to the Municipal landfill/Dumping Sites. The ragpickers picking recyclables from these wastes are likely to be infected due to their contact with sharps and other infectious wastes. A mechanism may be in place to ensure segregation of MW from MSW. City Corporations should be mandated to monitor this and a penalty system should be put in place for any violations. (DGHS, Waste Facility Operators, City Corporation (DGHS, Waste Facility Operators, City Corporation).

***‘Outhouse’ Management Facilities-Viability***

Outhouse management facilities are operational only in 5 cities namely Dhaka, Jessore, Bogra, Comilla and Chittagong. The operators of these facilities find the operation commercially unviable due to factors such as low quantities of MW provided by the HCFs (specially the Government Hospitals), limited service charges etc. The viability of the system needs to be worked out with the involvement of all major stakeholders (MoHFW, MOLGRD, MOEF).

Revised Action Plan for Environmental Management for Civil Works

In order to adequately address the environmental issues regarding Civil works-related activities, a revised checklist for environmental screening has been formulated (Annex I). There will be a focal person at the subproject level (head of the healthcare facility/ subproject manager) who will be responsible for filling up these forms and sending it to the monitoring cell in DGHS. The environmental focal person at the DGHS (with the help of consultants) will assess the environmental impact of these activities and devise mitigation measures, as applicable Annex II provides for probable environmental impacts and indicative mitigation measures in typical civil works activities. The focal person is responsible for selecting appropriate, site-specific mitigation measures corresponding to those impacts using Annex II. The focal person then will ensure that the relevant environmental mitigation measures/codes of practice are adequately reflected in the contractor's bidding documents so that the contractor takes the overall responsibility of environmental management during construction phase. The implementation of the Environmental Codes of Practice will be monitored time to time, a summary of which will be provided in the quarterly progress reports. The environmental focal person at the DGHS (with the help of consultants) will prepare these progress reports with information gathered from the focal person at the subproject level.

**Annex I**

Environmental Screening Checklist for Civil Works related to HPNSDP

(new construction, renovation/refurbishment works)

**Instructions:**

The purpose of this checklist is to identify potential environment and safety issues related to new infrastructure development, renovation/refurbishing work related to the HPNSDP. The focal person at the subproject level (head of the healthcare facility/ subproject manager) will fill up the forms and send those to the monitoring cell in DGHS. If the screening identified possible environmental impacts, relevant environmental code of practices (ECoPs) will be applicable. The focal person at the monitoring cell in DGHS will assess these impacts, devise relevant and site-specific mitigation measures corresponding to those specific impacts (using Annex II) to be adopted in construction activities and prepare site-specific Environmental Management Plans.

Title of Sub-project:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Institution/ Health CareFacility:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Types of Civil Work (new structure/ renovation/ refurbishment of existing structure):

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Estimated cost of Civil Work: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Duration of Civil work: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tentative Start Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name and Designation of the Sub-project Coordinator/Focal Point:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Brief Description of Small infrastructure renovation/ refurbishing work (Within 200 words, attach separate sheet if necessary)

**Checklist (to be filled up by the focal person at the subproject level)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sl | Screening Questions | Yes | No | Not Aware | Possible Negative Impacts[[1]](#footnote-2) |
| 1 | Will the construction activities generate a significant amount of construction solid waste? |  |  |  |  |
| 2 | Will fuel and/or hazardous goods be used in construction activities? |  |  |  |  |
| 3 | Will fuel and/or hazardous substances be stored at the construction site? |  |  |  |  |
| 4 | Is there a possibility of discharging liquid effluent from the construction site? |  |  |  |  |
| 5 | Will construction materials be stockpiled near surface waters, public drains and natural water courses? |  |  |  |  |
| 6 | Will construction activities affect the natural drainage pattern of the site? |  |  |  |  |
| 7 | Is earthwork (earth excavation, backfilling, stockpiling of excavated soil) involved in construction activities? |  |  |  |  |
| 8 | Is there a possibility of water stagnation at the construction site? |  |  |  |  |
| 9 | Will the topsoil and vegetation be cleared as a result of the construction? |  |  |  |  |
| 10 | Is significant movement of vehicles involved during construction activities? |  |  |  |  |
| 11 | Will dust and vibration-generating equipment be used? |  |  |  |  |
| 12 | Will construction activities be carried out near religious and cultural sites? |  |  |  |  |
| 13 | Will child and pregnant women be used in construction activities? |  |  |  |  |
| 14 | Is there a safe source of drinking water and adequate sanitation facilities available for the workers at or near the construction site? |  |  |  |  |
| 15 | Will the workers be provided protective equipment, devices and clothing and be ensured those are used? |  |  |  |  |
| 16 | Will enough health and safety direction and insurance be provided to the workers? |  |  |  |  |

**Signature:**

The above answers are true and complete. I understand that the DGHS is relying on them to make its decision.

Sub-project Focal Point Signature & Date:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Contact Number and E-mail:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Please sign below to verify that the information in this document is accurate and complete to the best of your knowledge.**

Environmental Professional Signature & Date:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Contact Number and E-mail:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Department/Institutional Head Signature & Date:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Contact Number and E-mail:

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**Annex II**

**General Environmental Codes of Practice for Civil Works (Construction Phase)**

ECP 1: Waste Management

| **Project Activity/ Impact Source** | **Environmental Impacts** | **Mitigation Measures/ Management Guidelines** |
| --- | --- | --- |
| General Waste | Soil and water pollution from the improper management of wastes and excess materials from the construction sites. | The Contractor shall* Organize disposal of all wastes generated during construction in the designated disposal sites approved by the Project authority.
* Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach.
* Segregate all wastes, wherever practical.
* Vehicles transporting solid waste shall be totally confined within an enclosed vehicle or is fully covered with a tarp to prevent spilling waste along the route.
* Tarp must be undamaged (not torn or frayed) properly secured to the body of the vehicle or trailer with ropes, chains, straps, or cords so that no waste is exposed. The edges of the tarps shall extend 12 inches over the permanent sides and back of the open top vehicle or trailer and must be secured to the permanent vehicle. All loads must be tarped from the point of origin of the waste to the tipping area of the final disposal/landfill.
* Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction process.
* Provide refuse containers at each worksite.
* Request suppliers to minimize packaging where practicable.
* Place a high emphasis on good housekeeping practices.
* Maintain all construction sites clean, tidy and safe and provide and maintain appropriate facilities as temporary storage of all wastes before transporting to final disposal.
 |

ECP 2: Fuels and Hazardous Goods Management

| **Project Activity/ Impact Source** | **Environmental Impacts** | **Mitigation Measures/ Management Guidelines** |
| --- | --- | --- |
| Fuels and hazardous goods. | Materials used in construction have a potential to be a source of contamination. Improper storage and handling of fuels, lubricants, chemicals, hazardous goods/materials on-site, wash down of plant and equipment, and potential spills may harm the environment or health of construction workers.  | The Contractor shall* Train the relevant construction personnel in handling of fuels and spill control procedures.
* Refueling shall occur only within bounded areas.
* Store dangerous goods in bounded areas on top of a sealed plastic sheet away from watercourses. Store all liquid fuels in fully bounded storage containers, with appropriate volumes, a roof, a collection point and appropriate filling/decanting point.
* Store and use fuels in accordance with material safety data sheets (MSDS). Make available MSDS for chemicals and dangerous goods on-site.
* Store hazardous materials at above flood level,determined for construction.
* Make sure all containers, drums, and tanks that are used for storage are in good condition and are labeled with expiry date. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur.
* Sit containers and drums in temporary storages in clearly marked areas, where they will not be run-over by vehicles or heavy machinery. The area shall preferably drain to a safe collection area in the event of a spill.
* Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution.
* All machinery is to be stored and away from any water body, drainage inlets or natural drainage area, where practical.
* Oil and chemical spills and washouts shall be cleaned up and collected immediately. Materials shall be transported by an approved / licensed transporter. Contaminated Material to be removed from site as soon as reasonably practical after the incident.
* Provide appropriate personal protective equipment (protective clothing, safety boots, helmets, masks, gloves, goggles, etc.) to the construction personnel, depending on the materials handled.
* Avoid the use of material with greater potential for contamination by substituting them with more environmentally friendly materials.
 |

ECP 3: Water Resources Management

| **Project Activity/ Impact Source** | **Environmental Impacts** | **Mitigation Measures/ Management Guidelines** |
| --- | --- | --- |
| Hazardous material and Waste | Water pollution from the storage, handling and disposal of hazardous materials and general construction waste, and accidental spillage | The Contractor shall* Follow the management guidelines proposed in ECP 1: Waste Management and ECP 2: Fuels and Hazardous Goods Management.
* Minimize the generation of spoils, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways or storm water systems.
 |
| Discharge from construction sites | Construction activities, sewerages from construction sites and work camps may effect the surface water quality. The construction works will modify groundcover and topography, changing the surface water drainage patterns of the area. These changes in hydrological regime lead to increased rate of runoff, increase in sediment and contaminant loading, increased flooding, and effect habitat of fish and other aquatic biology.  | The Contractor shall* Install temporary drainage works (channels and check dams) in areas required for sediment and erosion control and around storage areas for construction materials.
* Install temporary sediment lagoons, where appropriate, to capture sediment-laden run-off from work site.
* Stockpile materials away from drainage lines.
* Prevent all solid and liquid wastes entering waterways by collecting spoils, oils, chemicals, bitumen spray waste and wastewaters from brick, concrete and asphalt cutting where possible and transport to an approved waste disposal site or recycling depot.
* Wash out ready-mix concrete agitators and concrete handling equipment at washing facilities off site or into approved bunded areas on site. Ensure that tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This should be done in every exit of each construction vehicle to ensure the local roads are kept clean.
 |
| Soil erosion and siltation | Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.  | The Contractor shall* Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion.
* Ensure that roads used by construction vehicles are swept regularly to remove dust and sediment.
* Water the loose material stockpiles, access roads and bare soils on an as needed basis to minimize dust. Increase the watering frequency during periods of high risk (e.g. high winds).
 |
| Drinking water | Untreated surface water is not suitable for drinking purposes due to presence of suspended solids and ecoli.  | The Contractor Shall* Provide drinking water that meets National and WHO Drinking Water standards.
 |

ECP 4: Drainage Management

| **Project Activity/ Impact Source** | **Environmental Impacts** | **Mitigation Measures/ Management Guidelines** |
| --- | --- | --- |
| Excavation and earth works, and construction yards | Lack of proper drainage for rainwater/liquid waste or wastewater owing to the construction activities harms environment in terms of water and soil contamination, and mosquito growth. | The Contractor shall* Provide alternative drainage for rainwater if the construction works/earth-fillings cut the established drainage line.
* Establish local drainage line with appropriate silt collector and silt screen for rainwater or wastewater connecting to the existing established drainage lines already there.
* Rehabilitate road drainage structures immediately if damaged by contractors’ road transports.
* Build new drainage lines as appropriate and required for wastewater from construction yards connecting to the available nearby recipient water bodies.
* Ensure that there will be no water stagnation at the construction sites and camps.
* Protect natural slopes of drainage channels to ensure adequate storm water drains.
* Regularly inspect and maintain all drainage channels to assess and alleviate any drainage congestion problem.
 |
| Ponding of water | Health hazards due to mosquito breeding | * Do not allow ponding of water especially near the waste storage areas and construction camps.
* Discard all the storage containers that are capable of storing of water, after use or store them in inverted position.
 |

ECP 5: Soil Quality Management

| **Project Activity/ Impact Source** | **Environmental Impacts** | **Mitigation Measures/ Management Guidelines** |
| --- | --- | --- |
| Storage of hazardous and toxic chemicals | Spillage of hazardous and toxic chemicals will contaminate the soils | The Contractor shall* Strictly manage the wastes management plans proposed in ECP 1: Waste Management and storage of materials and ECP 2: Fuels and Hazardous Goods Management.
* Identify the cause of contamination, if it is reported, and contain the area of contamination. The impact may be contained by isolating the source or implementing controls around the affected site.
* Remediate the contaminated land using the most appropriate available method.
 |

ECP 6: Erosion and Sediment Control

| **Project Activity/ Impact Source** | **Environmental Impacts** | **Mitigation Measures/ Management Guidelines** |
| --- | --- | --- |
| Clearing of construction sites | Cleared areas and slopes are susceptible for erosion of top soils, which affects the growth of vegetation and causes ecological imbalance.  | The Contractor shall* Reinstate and protect cleared areas as soon as possible.
* Cover unused area of disturbed or exposed surfaces immediately with mulch/grass turf/tree plantations.
 |
| Construction activities and material stockpiles | The impact of soil erosion are (i) Increased run off and sedimentation causing a greater flood hazard to the downstream and silt accumulation and (ii) destruction of aquatic environment by erosion and/or deposition of sediment damaging the spawning grounds of fish | The Contractor shall* Locate stockpiles away from drainage lines.
* Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds.
* Remove debris from drainage paths and sediment control structures.
* Cover the loose sediments of construction material and water them if required.
* Divert natural runoff around construction areas prior to any site disturbance.
* Install protective measures on site prior to construction, for example, sediment traps.
* Install ‘cut off drains’ on large cut/fill batter slopes to control water runoff speed and hence erosion.
* Observe the performance of drainage structures and erosion controls during rain and modify as required.
 |
| Soil erosion and siltation | Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.  | The Contractor shall* Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion.
* Ensure that roads used by construction vehicles are swept regularly to remove sediment.
* Water the material stockpiles, access roads and bare soils on an as required basis to minimize dust. Increase the watering frequency during periods of high risk (e.g. high winds).
 |

ECP 7: Air Quality Management

| **Project Activity/ Impact Source** | **Environmental Impacts** | **Mitigation Measures/ Management Guidelines** |
| --- | --- | --- |
| Construction vehicular traffic | Air quality can be adversely affected by vehicle exhaust emissions and combustion of fuels.  | The Contractor shall* Fit vehicles with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition.
* Operate the vehicles in a fuel efficient manner.
* Cover hauling vehicles carrying dusty materials moving outside the construction site.
* Impose speed limits on all vehicle movement at the worksite to reduce dust emissions.
* Control the movement of construction traffic.
* Water construction materials prior to loading and transport.
* Service all vehicles regularly to minimize emissions.
* Limit the idling time of vehicles not more than 2 minutes.
 |
| Construction machinery | Air quality can be adversely affected by emissions from machinery and combustion of fuels.  | The Contractor shall* Fit machinery with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition in accordance with the specifications defined by their manufacturers to maximize combustion efficiency and minimize the contaminant emissions.
* Pay special attention to control emissions from fuel generators.
* Machinery causing excessive pollution (e.g., visible smoke) will be banned from construction sites.
* Service all equipment regularly to minimize emissions.
* Provide filtering systems, dust collectors or humidification or other techniques (as applicable) to the concrete batching and mixing plant to control the particle emissions in all stages, including unloading, collection, aggregate handling, cement application, circulation of trucks and machinery inside the installations.
 |
| Construction activities | Dust generation from construction sites, material stockpiles and access roads is a nuisance in the environment and can be a health hazard, and also can affect the local crops | The Contractor shall* Water the material stockpiles, access roads and bare soils on an as needed basis to minimize the potential for environmental nuisance due to dust. Increase the watering frequency during periods of high risk (e.g. high winds). Stored materials such as gravel and sand shall be covered and confined to avoid their being wind-drifted.
* Minimize the extent and period of exposure of the bare surfaces.
* Restore disturbed areas as soon as practicable by vegetation/grass-turfing.
* Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust generation is minimized during such operations.
* Crushing of rock and aggregate materials shall be wet-crushed, or performed with particle emission control systems.
* Not permit the burning of solid waste.
 |

ECP 8: Noise and Vibration Management

| **Project Activity/ Impact Source** | **Environmental Impacts** | **Mitigation Measures/ Management Guidelines** |
| --- | --- | --- |
| Construction vehicular traffic | Noise quality will be deteriorated due to vehicular traffic | The Contractor shall* Maintain all vehicles in order to keep it in good working condition in accordance with manufactures maintenance procedures.
* Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, etc.
* Perform the loading and unloading of trucks, and handling operations minimizing construction noise on the work site.
 |
| Construction machinery | Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment. | The Contractor shall* Appropriately organize all noise generating activities to avoid noise pollution to local residents.
* Use the quietest available plant and equipment in construction work.
* Maintain all equipment in order to keep them in good working order in accordance with manufactures maintenance procedures. Equipment suppliers and contractors shall present proof of maintenance register of their equipment.
* Install acoustic enclosures around generators to reduce noise levels.
* Fit high efficiency mufflers to appropriate construction equipment.
* Avoid unnecessary use of alarms, horns and sirens.
 |
| Construction activity | Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment. | The Contractor shall* Notify adjacent landholders prior to typical noise events outside of daylight hours.
* Employ best available work practices on-site to minimize occupational noise levels.
* Install temporary noise control barriers where appropriate.
* Notify affected people if major noisy activities will be undertaken, e.g. blasting.
* Plan activities on site and deliveries to and from site to minimize impact.
* Monitor and analyze noise and vibration results and adjust construction practices as required.
* Avoid undertaking the noisiest activities, where possible, when working at night near the residential areas.
 |

ECP 9: Protection of Flora

| **Project Activity/ Impact Source** | **Environmental Impacts** | **Mitigation Measures/ Management Guidelines** |
| --- | --- | --- |
| Vegetation clearance | Local flora are important habitats for birds, provide fruit harvest, timber/fire wood, protect soil from erosion and overall keep the natural balance for human-living. As such damage to flora has wide range of adverse environmental impacts.  | The Contractor shall* Minimize disturbance to surrounding vegetation.
* Get approval from supervision consultant for clearance of vegetation.
* Make selective and careful pruning of trees where possible to reduce need of tree removal.
* Control noxious weeds by disposing of at designated dump site or burn on site.
* Clear only the vegetation that needs to be cleared in accordance with the engineering plans and designs. These measures are applicable to both the construction areas as well as to any associated activities such as sites for stockpiles, disposal of fill, etc.
* Minimize the length of time the ground is exposed or excavation left open by clearing and re-vegetate the area at the earliest practically possible.
* Ensure excavation works occur progressively and re-vegetation done at the earliest.
* Provide adequate knowledge to the workers regarding nature protection and the need of avoid felling trees during construction
 |

ECP 10: Protection of Fauna

| **Project Activity/ Impact Source** | **Environmental Impacts** | **Mitigation Measures/ Management Guidelines** |
| --- | --- | --- |
| Construction activities | The location of construction activities can result in the loss of wild life habitat and habitat quality, | The Contractor shall* Limit the construction works within the designated sites allocated to the contractors.
* Check the site (especially trenches) for trapped animals, and rescue them by the help of a qualified person.
* Provide temporary access to the animals to cross the trenches.
 |
| Vegetation clearance | Clearance of vegetation may impact shelter, feeding and/or breeding and/or physical destruction and severing of habitat areas | The Contractor shall* Restrict the tree removal to the minimum numbers required.
* Fell the hollow bearing trees in a manner which reduces the potential for fauna mortality. After felling, hollow bearing trees will remain unmoved overnight to allow animals to move of their own volition. Care should be taken to make sure bird habitats are not destroyed. If there is no option available, rehabilitate them in other neighboring trees. Also protect and rehabilitate injured or orphaned birds.
 |

ECP 11: Road Transport and Road Traffic Management

| **Project Activity/ Impact Source** | **Environmental Impacts** | **Mitigation Measures/ Management Guidelines** |
| --- | --- | --- |
| Construction vehicular traffic | Increased traffic use of road by construction vehicles will affect the movement of normal road traffics and the safety of the road-users. | The Contractor shall* Provide signs at strategic locations of the roads complying with the schedules of signs contained in the National Traffic Regulations.
* Restrict truck deliveries, where practicable, to day time working hours.
* Operate vehicles, if possible, to non-peak periods to minimize traffic disruptions.
* Enforce on-site speed limit, especiallyclose to the sensitive receptors, schools, health centers, etc.
 |

ECP 12: Cultural and Religious Issues

| **Project Activity/ Impact Source** | **Environmental Impacts** | **Mitigation Measures/ Management Guidelines** |
| --- | --- | --- |
| Construction activities near religious and cultural sites | Disturbance from construction works to the cultural and religious sites, and contractors lack of knowledge on cultural issues cause social disturbances. | The Contractor shall* Communicate to the public through community consultation regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restriction.
* Not block access to cultural and religious sites, wherever possible.
* Stop construction works that produce noise (particularly during prayer time) should there be any church/mosque/religious/educational institutions and health center close to the construction sites and users make objections.
* Take special care and use appropriate equipment when working next to a cultural/religious center.
* Stop work immediately and notify the site manager, if during construction, an archaeological or burial site is discovered. It is an offence to recommence work in the vicinity of the site until ‘approval to continue’ is obtained by the archaeological authority.
* Provide independent prayer facilities to the construction workers.
* Allow the workers to participate in praying during construction time, if there is a request.
* Resolve cultural issues in consultation with local leaders and supervision consultants.
 |

ECP 13: Worker Health and Safety

| **Project Activity/ Impact Source** | **Environmental Impacts** | **Mitigation Measures/ Management Guidelines** |
| --- | --- | --- |
| Best practices | Construction works may pose health and safety risks to the construction workers and site visitors leading to severe injuries and deaths. The population in the proximity of the construction site and the construction workers will be exposed to a number of (i) biophysical health risk factors, (e.g., noise, dust, chemicals, construction material, solid waste, waste water, vector transmitted diseases, etc.), (ii) risk factors resulting from human behavior (e.g., STD, HIV/AIDS, etc.) and (iii) road accidents from construction traffic. | The Contractor shall* Implement suitable safety standards for all workers and site visitors, with sufficient provisions to comply with international standards (e.g. International Labor Office guideline on ‘Safety and Health in Construction; World Bank Group’s ‘Environmental Health and Safety Guidelines’) and contractor’s own safety standards, in addition to complying with national standards.
* Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas.
* Provide personal protective equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection. Maintain the PPE properly by cleaning dirty ones and replacing the damaged ones.
* Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job.
 |
|  | Child and pregnant labor | The Contractor shall* not hire children of less than 14 years of age and pregnant women or women who delivered a child within 8 preceding weeks.
 |
| Accidents | Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims | The Contractor shall* Ensure health care facilities and first aid facilities are readily available. Appropriately equipped first-aid stations should be easily accessible throughout the place of work.
* Document and report occupational accidents, diseases, and incidents.
* Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards, in a manner consistent with good international industry practice.
* Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures.
* Provide awareness to the construction drivers to strictly follow the driving rules.
* Provide adequate lighting in the construction area
 |
| Water and sanitation facilities at the construction sites | Lack of Water sanitation facilities at construction sites cause inconvenience to the construction workers and affect their personal hygiene.  | The contractor shall* Provide safe drinking water facilities to the construction workers at all the construction sites.
* Provide appropriate sanitation facilities for the workers
 |

1. If the answer of the questionnaire is ‘Yes’, please describe the possible negative environmental impact. [↑](#footnote-ref-2)