## 1.1 EMP for Construction Phase

### *1.1.1 Mobilisation and demobilisation*

Mobilization to site have several things to consider including planning mobilization trip based on prevailing weather conditions as well as weather forecasts so that accidental mishaps of huge losses during transport of materials and machinery can be avoided. Mobilization may also result in accidental grounding of vessels on reefs causing reef damage in case of unfamiliarity with travel routes, etc. Therefore, it is important to use competent people and to avoid bad weather.

Mobilization of machinery and materials also involves use of roads and the potential hazards of dust and speed-related incidents must be well explained to the drivers. During rainy season, there will be a need to watch for puddles on the road and avoid splashing on pedestrians. Also accidental spillages of cements, oils, paints and other chemicals may be a cause for concern and the following steps are proposed.

- Don't move full loads of vehicles which may cause accidental fall of paint cans, etc.
- Materials must be carefully moved between harbour and site and within site.

Similar measures shall be adopted during demobilization.

### *1.1.2 Labour and labour facilities management*

While foreign labour is commonplace in all such developmental activities, there have been very few incidences relating to inappropriate social behaviour from construction workforce. However, the following are proposed as important mitigation measures.

- Strict labour supervision should be undertaken of construction workers.
- Labour awareness programmes to educate labourers on codes of conduct shall be undertaken regularly.

Normally, it has been observed in construction phase of many projects that labour camps are not well planned and are generally haphazard in their layouts, without adequate facilities. It is recommended that project authorities can compulsorily ask the contractor to make semi-permanent structures for their workers. These sheds can have internal compartments allotted to each worker.

Families shall not be housed or placed in labour camps without adequate safety and other necessary provisions. The labour camps should have electricity and ventilation system, potable water supply and community toilets. Consultations with contractors revealed that labour camps are often avoided in the islands as rented accommodation can be often available at all sites.

Separate provisions of bottled water need to be made for labour population involved in construction activities of the construction phase for meeting their drinking requirements. The other water requirements can be met by constructing a temporary well in the site or using nearby wells, in case of labour camps.

Sanitation facilities needs to be provided in Fuvahmulah, where there is no sewerage system installed at present. This would be temporary as there is a sewerage system currently under development. If labour camps were to be built, septic tanks shall be provided on site with a view to integrating them within the project components upon completion. In case of rented accommodation, the capacity of the existing septic tanks shall not be exceeded.

Waste must be managed at site and adequately disposed to designated landfill or waste management facility in the island. It should be the contractor's responsibility to manage all waste generated at the construction site on a daily/regular basis.

It is possible that during the construction phase, labour and technical staff can suffer from various manifestations such as insect bites, fever, diarrhoea, work exhaustion and other diseases. In addition, they may suffer from injuries caused by accidents at the work site. Dispensary is operational at the islands. It is important for the Contractor to discuss with the dispensary to ensure that adequate quantity of medicines and other necessary items are always available at the dispensary.

The following safety practices during construction are proposed.

- Necessary barriers, warnings, signs demarcating unsafe areas should be followed according to standard construction practices.
- Where relevant, safety nets should be used to cover buildings and prevent injury to pedestrians. Safety paths should be identified for public use.
- Provide first aid facilities in case of an emergency and safety protocols during such event.

- Aluminum and wood works at site shall be supervised and workers informed of the necessity to take care when using tools such as electric cut-offs.
- Contractor shall be required to comply with all the precautions as required for the safety of the workers as per the International Labour Organization (ILO) Convention No. 62 as far as those are applicable to the contract.
- Provide necessary safety appliances such as protective footwear, cloth gloves, safety goggles for welders, helmets, masks, etc. to the workers and staff.
- In order to guarantee construction safety, efficient lighting and safety signs shall be installed during construction.

A Code of Conduct shall be issued to and ensured to be followed by workers. Such a Code of Conduct may include items as follows.

- No unauthorised cutting of trees or branches.
- No lighting of fires.
- No hunting or fishing.
- No disposal of any kind of waste into water bodies
- Behaviour to comply with defined local cultural and religious sensitivities.
- No unauthorised entry onto private property

### *1.1.3 Management of construction sites*

The following best practice management measures have been considered in the ESMF document, stressing that such good practices shall be in place even if most of the project components may be undertaken by local contractors.

- Vehicles must not be washed at construction sites.
- All liquid fuel and lubricant storage tanks must be 'bunded' to retain the entire contents of the tank in the event of leakage or rupture.
- Construction sites must be watered to suppress dust whenever appropriate during the dry season.
- All site drainage water must be passed through a sediment trap.
- Care must be taken to prevent cement laden drainage water from entering the wetlands.
- Temporary toilets must be provided for construction workers.

- All sewage must be treated before discharge, e.g. using septic tanks.
- All effluents must comply with any national environmental standards.
- All emissions (e.g. from engines, crushers, batching plants, etc) must comply with any local environmental standards.
- All motor-driven generators, compressors, pumps, etc., must be properly silenced.
- The running of machinery and lighting in the vicinity of housing must be limited to normal working hours.
- All solid wastes must be properly disposed of (see 6.4.1.1.2) Management of construction solid wastes and toxic wastes below).
- Proscribed toxic and hazardous substances must not be used or disposed of (see below).
- All plant, equipment and wastes must be removed at the end of construction, and each site must be restored to its original condition.
- No heavy machinery should be used within the Kilhi area and associated marsh land.

### *1.1.4 Air pollution, dust and noise management*

Air pollution control measures include:

- Fine aggregates/construction material stored till the time they are utilized, can be a source of fugitive emissions. It is suggested that stockpiles shall be regularly sprayed with water to prevent the entrainment fugitive emissions.
- All vehicles delivering materials to the site from barge/ship anchoring at the island shall be covered to avoid spillage of materials.
- All roads which are used by project vehicles shall be kept clear of dust and other extraneous materials dropped by such vehicles.
- Loading and especially unloading of vehicles used for transport of construction material shall be done only during day time.
- All vehicles used for the project should have up to date road worthiness certification.

Noise control measures to be considered are:

- Do not undertake any noisy operations during the night after dusk. Noisy construction operations shall be restricted between 8 am to 6 pm.
- As much as possible undertake noisy operations outside the boundary of the protected area.

- Provision of ear plugs to operators of heavy machinery and workers in near vicinity.
- Noise limits for construction equipment to be used will not exceed 75dB(A), measured at one meter from the edge of the equipment in free field.
- Preventive maintenance of construction equipment shall be done to minimize noise level.
- The effect of high noise levels on the operating personnel, has to be considered as this may be particularly harmful. It is known that continuous exposures to high noise levels above 90 dB(A) affects the hearing acuity of the workers/operators and hence, should be avoided.

### *1.1.5 Measures for sustainable building practices*

The following points have been highlighted that will help to achieve sustainability in the building process.

- CCAP staff must be concerned with the quality of the finished product as well as the cost of construction itself. Saving small amounts of money during construction may not be worthwhile if the result is much larger operating costs or not meeting the functional requirements for the buildings/structures.
- Source construction materials responsibly such as wood from known and rapidly renewable sources such as bamboo, recycled materials, non-toxic materials including non-toxic and odour-free paints.
- Choose interior finishing products with zero or low VOC emissions to improve indoor air quality.
- Minimize water use in construction and over-abstraction of groundwater. If wells are constructed at site, use skimming technologies.
- Minimize resource wastage
- Bring in bulk to minimize packaging waste
- Use energy efficient machinery and tools

### *1.1.6 Measures to be taken during excavation of earth*

While planning or executing excavation the contractor shall take all adequate precautions against soil erosion, water pollution etc. and take appropriate drainage measures to keep the site free of water. The contractor shall take adequate protective measures to see that excavation operations do

not affect or damage adjoining structures and water bodies. The proposed recreational facility at Dhandimagu Kilhi will involve some degree of excavation of silt as it is the wetland area and subsequent filling, levelling and compaction. This has to be done in a manner that it will not affect the water quality of the water body.

The other measures are recommended as below:

- Ensure unobstructed natural drainage through proper drainage channels/ structures.
- Dispose surplus excavated earth at sites identified for disposal of construction wastes.
- Ensure minimum hindrance to life of the islanders.
- All excavations will be done in such a manner that the suitable materials available from excavation are satisfactorily utilized as decided upon beforehand.
- Excavations shall conform to the lines, grades, side slopes and levels shown in the drawings or as directed by the engineer.

### *1.1.7 Prevention of soil and groundwater/surfacewater contamination*

While the potential for contamination of groundwater and soil is low, there is potential for surface water contamination, some of the mitigation measures include:

- Vehicle/machinery and equipment operation, maintenance and refueling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground.
- Where the groundwater table may be below about 1.2m from surface, there may be a need for dewatering (localized). While the impact of such small volumes of dewatering during the foundation works may be of no significance, the dewatering regulation currently in place shall be adhere to.
- In case of labour camps at site, oil interceptors may be provided for treatment of effluent from construction site.
- Use of marine grade cement to prevent surface water contamination during construction.
- Completion of construction works as soon as possible.
- Cleaning up of construction debris every day after works and removing the debris from the protected area.

### *1.1.8 Restoration and landscaping of project site*

Contractor shall prepare site restoration plans for approval by the Engineer, which shall be implemented by the contractor prior to demobilization.

On completion of works, all temporary structures will be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of Island Council and Ministry of Environment and Energy, Maldives.

The construction of the proposed project, would marginally affect the existing topography and physiography. Although, no major alteration of the area is expected as the layout has been so conceived that no major impacts on this account are anticipated, it is proposed to landscape the area, so that it integrates with the natural surroundings. It is proposed to clear construction waste material from entire area. It should be made mandatory for the contractor involved in construction activities to remove all the construction waste and restore the original topography of the area.