TERMS OF REFERENCE

DRAINAGE PROJECTS, DREDGING & EXCAVATION AND LAND RECLAMATION & MODIFICATION

Notes for NEPA for Generic Terms of Reference

This generic Terms of Reference (TOR) is applicable to **Drainage Projects, Dredging & Excavation and Land Reclamation & Modification** (including the reclamation of wetlands and riverine areas). The TOR outlines the aspects of an Environmental Impact Assessment (EIA) which when thoroughly addressed will provide a comprehensive evaluation of the site, in terms of predicted environmental impacts, needed mitigation strategies, potentially viable alternatives to the proposed development and all related legislation.

In reality, significant environmental issues may be site specific and it is expected that these be incorporated accordingly. Sites of special consideration are:

Coastal Areas: Areas to be considered as coastal should include estuarine areas where a river flows into the sea. Issues such as Coastline stability, coral reef, mangrove and wetland, seagrass impacts, unique coastal environments, saline intrusion upstream which may introduce contaminants to the river system, nutrient loading in coastal waters and impact on coastal commercial fishing should be examined. If dredging will be involved, the spoil disposal site should be evaluated equally with the proposed port infrastructure sites.

Upland Areas: Issues such as slope stability, impact on drainage patterns, property etc. should be examined.

Rivers/ Riverine Areas: Issues such as erosion and siltation, nutrient loading of the river system, macro-invertebrate habitat destruction and loss of biodiversity. Disrupting of regular flow of the river and the possible impact of upstream activities on the mangrove, sea grass, and coral reef systems needs to be assessed.

Sites located within and adjacent to areas listed as protected or having protected species: The main issue(s) of concern will in part be determined by the local legislation as well as GOJ responsibilities under applicable international conventions. The impact of the development on the specific sensitivities of the protected area should be highlighted. Mitigation of impacts should assess if the post mitigation status would be acceptable in the protected area context. Alternative sites should be rigorously evaluated.

Dredging and excavation are processes which involve the sediment/substrate removal. Consequently special attention must be paid to the technique and equipment to be used to ensure that sediment/substrate instability is minimised, as is the spread of spoil plumes in the water body being dredged. An assessment of recycling or re-using the spoil from dredging or excavation must be explored. Drainage projects have special issues of concern. These include habitat loss by virtue of drainage, change in drainage and flooding potential, the safe disposal/relocation of drained fluid, habitat loss and destruction.

Any type of land reclamation needs special consideration. Land reclamation of wetlands, riverine or estuarine, needs critical examination. The wetland ecosystem has been proven to be among the most productive of worldwide ecosystems. Consequently any reclamation of these areas will result in a net loss of species biodiversity and loss of specialised habitats and niches. Issues of special consideration include, fluid displacement, change in drainage patterns, flooding potential and reduced water retention capacity of sediment/substrate. The possibility of the displaced fluid reclaiming its area needs to be critically examined.

Terms of Reference

The Environmental Impact Assessment should:

1) Provide a complete description of the existing area proposed for modification. Detail the elements of the project, highlighting areas to be reserved for drainage/dredging/excavation/land reclamation and the areas which are to be preserved in their existing state.
2) Identify the major environmental issues of concern through the presentation of baseline data which should include social and cultural considerations. Assess public perception of the proposed development.
3) Outline the Legislations and Regulations relevant to the project.
4) Predict the likely impacts of the development on the described environment, including direct, indirect and cumulative impacts, and indicate their relative importance to the design of the development's facilities.
5) Identify mitigation action to be taken to minimise adverse impacts and quantify associated costs.
6) Design a Monitoring Plan which should ensure that the mitigation plan is adhered to.
7) Describe the alternatives to the project that could be considered at that site

To ensure that a thorough Environmental Impact Assessment is carried out, it is expected that the following tasks be undertaken:

Task #1. Description of the Project

Provide a comprehensive description of the project, noting areas to be reserved for modification, areas to be preserved in their existing state as well as activities and features which will introduce risks or generate impact (negative and positive) on the environment. This should involve the use of maps, site plans, aerial photographs and other graphic aids and images, as appropriate, and include

information on location, general layout and size, as well as detailed pre-, and post project plans. For projects to be done on a phased basis it is expected that all phases be clearly defined, the relevant time schedules provided and phased maps, diagrams and appropriate visual aids be included. This should involve the use of maps, site plans and other graphic aids, as appropriate, and include information on location, general layout and size,.

Task #2. Description of the Environment

This task involves the generation of baseline data which is used to describe the study area as follows:

i) physical environment

ii) biological environment

iii) socio-economic and cultural constraints.

It is expected that methodologies employed to obtain baseline and other data be clearly detailed.

Baseline data should include:

(A) Physical

i) a detailed description of the existing **geology** and **hydrology.** Special emphasis should be placed on storm water run-off, flooding potential, drainage patterns and any effect on groundwater by modification of the substrate/sediment. Any substrate stability issues that could arise should be thoroughly explored.

ii) **Water quality** of any existing wells, rivers, ponds, streams or coastal waters in the vicinity of the development. Quality Indicators should include but not necessarily be limited to nitrates, phosphates, faecal coliform, and suspended solids.

iii) Climatic conditions and air quality in the area of influence, including particulate emissions from stationary or mobile sources, NO_x, SO_x, wind speed and direction, precipitation,

relative humidity and ambient temperatures,

iv) Noise levels of undeveloped site and the ambient noise in the area of influence.

v) Obvious sources of pollution existing and extent of contamination.

vi) Availability of waste management facilities.

(B) Biological

Present a detailed description of the flora and fauna (terrestrial and aquatic) of the area, with special emphasis on rare, endemic, protected or endangered species. Migratory species should also be considered. There may be the need to incorporate micro-organisms to obtain an accurate baseline assessment. Generally, species dependence, niche specificity, community structure and diversity ought to be considered. Special attention should be paid to any coral reefs and seagrass beds proposed for modification.

(C) Socio-economic & cultural

Present and projected population; present and proposed land use; planned development activities, issues relating to squatting , community structure, employment, distribution of income, goods and services; recreation; public health and safety; cultural peculiarities, aspirations and attitudes should be explored. The historical importance of the area should also be examined. While this analysis is being conducted, it is expected that an assessment of public perception of the proposed development be conducted. This assessment may vary with community structure and may take multiple forms such as public meetings or questionnaires.

Task #3 - Legislative and Regulatory Considerations

Outline the pertinent regulations and standards governing environmental quality, safety and health, protection of sensitive areas, protection of endangered species, siting and land use control at the national and local levels. The examination of the legislation should include at minimum, legislation such as the NRCA Act, the Wildlife Protection Act, the Forestry Act, the Town and Country Planning Act, The Port Authority Act (if dredging is involved), and the appropriate international convention/protocol/treaty where applicable.

Task #4 - Identification of Potential Impacts

Identify the major environmental and public health issues of concern and indicate their relative importance to the design project. Identify potential impacts as they relate to, (but are not restricted by) the following:

- change in drainage pattern
- flooding potential
- landscape impacts of excavation and construction
- loss of natural features, habitats and species by modification
- Impact on coastal stability
- pollution of coastal, surface and ground waters
- impact of dredging and excavation and spoil disposal
- impact of spoil plumes generated by dredging
- Air pollution
- capacity and design parameters of proposed waste treatment facility (If any).
- socio-economic and cultural impacts.
- risk assessment
- noise
- coral reef smothering, proliferation of macro algal species and loss of sea grass beds.
- solid waste management.

Distinguish between significant positive and negative impacts, direct and indirect, long term and immediate impacts. Identify avoidable as well as irreversible impacts. Characterise the extent and quality of the available data, explaining significant information deficiencies and any uncertainties associated with the predictions of impacts. A major environmental issue is determined after examining the impact (positive and negative) on the environment and having the negative impact significantly outweigh the positive. It is also determined by the number and magnitude of mitigation strategies which need to be employed to reduce the risk(s) introduced to the environment. Project activities and impacts should be represented in matrix form with separate matrices for pre and post mitigation scenarios.

Task #5 Mitigation

Prepare guidelines for avoiding, as far as possible, any adverse impacts due to proposed usage of the site and utilising of existing environmental attributes for optimum development. Quantify and assign financial and economic values to mitigating methods.

Task #6 - Monitoring

Design a plan to monitor implementation of mitigatory or compensatory measures and project impacts during and post development. An Environmental Management Plan for the long term operations of the facility should also be prepared.

An outline monitoring programme should be included in the EIA, and a detailed version submitted to NEPA for approval after the granting of the permit and prior to the commencement of the development. At the minimum the monitoring programme and report should include:

- Introduction outlining the need for a monitoring programme and the relevant specific provisions of the permit license(s) granted.
- The activity being monitored and the parameters chosen to effectively

carry out the exercise.

- The methodology to be employed and the frequency of monitoring.
- The sites being monitored. These may in instances, be pre-determined by the local authority and should incorporate a control site where no impact from the development is expected.
- Frequency of reporting to NEPA

The Monitoring report should also include, at minimum:

- Raw data collected. Tables and graphs are to be used where appropriate
- Discussion of results with respect to the development in progress, highlighting any parameter(s) which exceeds the expected standard(s).
- Recommendations
- Appendices of data and photographs if necessary.

Task #7 - Project Alternatives

Examine alternatives to the project including the no-action alternative. This examination of project alternatives should incorporate the use history of the overall area in which the site is located and previous uses of the site itself. Refer to NEPA guidelines for EIA preparation.

All Findings must be presented in the **EIA report** and must reflect the headings in the body of the TORs, as well as references. Eight hard copies and an electronic copy of the report should be submitted. The report should include an appendix with items such as maps, site plans, the study team, photographs, and other relevant information.