

### **3B. 深港西部通道口岸場坪填海及地基處理工程—環境影響報告書(一九九九年五月)**

**3B.1** This Study was completed in 1999 by the Shenzhen Environmental Science Research Institute. Potential environmental impacts from the construction and operation of the proposed project were evaluated. The following sections highlight findings from the Report.

#### *Water Quality Impacts*

**3B.2** Major construction activities that may cause water quality impacts to the Deep Bay waters were identified to be the strengthening and construction of dyke or seawall, and the filling and dewatering of reclaimed area. The “strong agitation” construction method would be adopted for the dyke or seawall works. The amount of marine sediment generated by this construction method would be large but re-suspension of sediment particles would be instantaneous. For the filling and dewatering processes, excess water would not be discharged directly from the active cell to Deep Bay waters, but first to adjacent cells where removal of sediment particles by settling would take place. With this practice, the amount of sediment particles entering Deep Bay through the filling and dewatering processes would be small.

**3B.3** Mathematical modelling results showed that increases in suspended solids levels caused by the strengthening and construction of dyke would reach 1,000 mg/L within 20 m of the construction area. This impact would be more obvious during ebb tides. However, as water depth in the area during ebb tides is shallow, sediment particles would quickly settle on the seabed. The affected area would be small and the duration of impact would be short. During flood tides, increases in suspended solids levels were predicted to be relatively low, but with a deeper water column compared to ebb tides, sediment particles would take a longer time to settle, and may be dispersed by currents to Dongjiaotou.

**3B.4** It was noted that dilution, dispersion and settling of sediment particles would lower the levels of suspended solids in the water body. Modelling results showed that suspended solids levels in nearby water body would reach 100 mg/L shortly after the instantaneous discharge of sediment caused by the strong agitation process, exceeding the Category 3 standard ( $\leq 100$  mg/L) specified in GB3097-1997 Sea Water Quality Standard. The area where suspended solids levels would comply with Category 2 standard ( $\leq 100$  mg/L) was predicted to be within 800 m downstream from the instantaneous discharge point. The highest impact would occur 3 hours after strong agitation, and the duration would be about 6 hours. Overall, increases in suspended solids levels in the nearby water body would be less than 10 mg/L or below the Category 1 standard during most of the construction period.

**3B.5** At the later stage of reclamation, the highest suspended solids level in seawater near the discharge point of the filling and dewatering activities was predicted to be about 450 mg/L. Some exceedances of the Category 3 standard would occur during ebb tides. The affected area was predicted to be about 30,000 m<sup>2</sup> in size, and occasional exceedances would occur within a 2-month period.

**3B.6** The Report identified that the source of material for filling would be from sandpit in the shallow waters of Deep Bay. However, subsequent confirmation with Shenzhen authorities has ascertained that the source of fill material would be mainly from land. The use of marine sand fill may also be considered. Thus, no sand dredging in Deep Bay would be required for providing fill material to this project. Overflow from the reclamation site during filling would not be an issue. In view of this change, the potential impacts to the water quality in Deep Bay would be much lower when compared to the originally planned situation.

### *Air Quality Impacts*

- 3B.7** The assessment concluded that air quality impact from construction vehicles exhaust would be minor as the traffic volume was determined to be relatively low.
- 3B.8** Regarding fugitive dust from traffic on the construction road, the assessment predicted that only an area within 100 m downwind from the road would be affected. Beyond that distance, the impact would be minor. As such, areas outside the reclamation site would largely be unaffected.
- 3B.9** Assessment results also showed that fugitive dust from the reclamation works would not affect the adjacent land areas. Wind would carry most of the dust to the sea, but this impact would be minor.

### *Noise Impacts*

- 3B.10** Quantitative assessment has determined that the reclamation works would not pose any adverse noise impact to the residential area nearby, and would not affect the bird conservation areas several kilometers away from the site.
- 3B.11** Noise from vehicles transporting fill material to the site may affect residential areas along Nanshan Road and Dong Bin Road, and to a lesser extent residential areas along Hou Hai Road. If transportation continues into nighttime, noise levels at these residential areas would exceed relevant standard. Avoiding nighttime transportation would keep the overall impact to small magnitude.

### *Ecology*

#### *Constructional phase environmental impact prediction and assessment*

#### Impact assessment for marine ecology

- 3B.12** Three receivers were subject to impacts of the proposed project:
- Water column ecosystem in Shenzhen Bay.
  - Benthic habitat
  - Fisheries resources and aquaculture
- 3B.13** Adverse impacts on the ecosystem were expected from the developments which would occupy sea areas. Permanent loss of sea area and temporary increase in SS levels would result from the proposed project.
- 3B.14** The dominant water pollutant from the proposed project would be suspended solids. Suspended solids affect aquatic organisms by increasing turbidity and thereby reducing light intensity in the water column. Light intensity directly affects the photosynthesis of phytoplankton, which in turn affects the dissolved oxygen (DO) level and primary production rate. Light intensity is also an important factor for the growth and metamorphosis of juveniles of various organisms. Suspended solids themselves could also affect the breathing and feeding activities of various organisms.
- 3B.15** In the present project the increase in SS levels would last for about one year. In the sea areas to the north and west of the reclamation site the baseline water quality would not be favourable for the growth and reproduction of aquatic life due to the poor water exchange, which is limited by the existing breakwaters.
- 3B.16** The sea areas to the east and south of the reclamation site are oyster farming areas. Due to the oyster feeding, the abundance of phytoplankton and zooplankton would be lower than that in the

river mouth areas, but still higher than that in the above-mentioned sea areas. While to the southwest of the reclamation site, aquatic life abundance would also be low.

#### Construction Phase

**3B.17** Although the south and southeast sea areas, which have higher abundance and species richness of aquatic life, would be affected, SS levels would quickly restore to baseline levels, and the impacts caused by construction would also be reduced. These short-term effects would not affect the aquatic life resources in the sea areas to the southeast of the reclamation rate.

#### Benthic Habitat

**3B.18** Adverse impacts to the benthic habitat would mainly arise from two results of the project: Sedimentation and change of the nature of the seabed.

**3B.19** Direct impacts caused by the seawall construction activities would extend to 10m away from the seawall. Within this area, benthos would be subject to physical impact of explosions, and would be covered by sediments and sea wall materials. The benthic habitat would be destroyed. About 15,000 m<sup>2</sup> of benthic habitat would be permanently lost at the eastern edge of the reclamation site.

**3B.20** Between 10-50 m from the seawall, explosion impacts and sedimentation would also degrade the quality of benthic habitats. These changes, however, are reversible and restoration is expected within a few years after completion of construction.

**3B.21** Beyond 50 m distance from the seawall, the changes would be minor and would cause no detectable effects on benthos.

#### Fisheries Resources and Aquaculture

**3B.22** Adverse impacts caused by the proposed project on aquaculture would mainly arise from:

- Disturbance to the water bodies and sea beds.
- Elevated suspended solid levels.
- Water pollution.
- Release of contaminants.

**3B.23** Within 20m from the seawall construction site, impacts from explosion might cause death of oysters. Oyster rafts within this zone should be re-located to areas farther away to avoid this type of impact.

**3B.24** Increase of SS levels caused by reclamation works would also affect oyster farming practices.

**3B.25** Over about 3,000 m<sup>2</sup> of sea area, SS levels would exceed the standard for Category 3 of marine water quality (100 mg/L) for a period less than two months.

**3B.26** If the suspended solid level continuously exceeds 50 mg/L for 10 days during the spring, oyster death might be caused.

**3B.27** For the sea areas in which SS levels reach 10-50 mg/L, DO concentrations and plankton abundance would decrease, which would adversely affect the feeding and gas exchange of oysters.

**3B.28** There would be no significant impact on aquaculture if the suspended solid level is less than 10 mg/L.

**3B.29** H<sub>2</sub>S released from seabed sediments upon disturbance during construction could be lethal to oysters, especially when water temperatures are high, e.g. March to May. During these months, the DO level is relatively low. H<sub>2</sub>S could further reduce the DO level and cause oyster kills.

**3B.30** Levels of other pollutants would not change significantly and would pose no impacts to oysters.

**3B.31** To conclude, among the 550 ha of aquaculture zone affected by the proposed project, 250 ha would not be available for aquaculture operations during the construction phase. Only oyster raft farming is being performed in that area. Oyster rafts could be re-located to areas farther away from the reclamation site. Economic losses would be limited. 30 oyster rafts may need to be re-located.

#### ***Environmental Management and Audit***

**3B.32** An Environmental Management and Audit Plan for the project was prescribed in the Report. The key points of this plan are summarized as follows:

- The main objectives of the plan are to monitor any impact to the environment, and to prevent pollution from the project.
- In appraising tenders for the construction contract, the evaluation process should cover the environmental requirements of the project.
- An approved environmental supervision team should be established to assess the design provided by the construction contractor, and also to implement the environmental measures and suggestions documented in the EIA report.
- A monthly report should be issued by the team to document monitoring and audit results, and to describe pertinent mitigation measures for resolving potential problems.
- The requirements for monitoring air quality, noise and water quality parameters, as well as for auditing specific measures were specified in the plan.