16.3 Water Quality Impact

16.3.1 Implementation of mitigation measures reduces the water quality impacts arising from the construction and operational phases of the development. The remaining water quality impacts after implementation of mitigation measures are referred to as residual impacts.

16.3.2 The reduction in cross-sectional area in the harbour after reclamation would slightly increase the current speeds and reduce the quantity of flow passing through the harbour. Based on the model predictions, the resulting hydrodynamic and water quality would not be adversely affected by the SEKD.

16.3.3 The existing water quality in Victoria Harbour exceeds the WQO values for some parameters monitored by EPD. The background level of TIN is high. The predicted water quality condition also showed high TIN concentrations in the harbour. It is not likely that the SEKD would increase the exceedances of the WQO for TIN. In fact, the water quality in the harbour would be improved in 2016 as the pollution flows and loads entering the harbour would be reduced.

16.3.4 Diversion of flows from the KTAC to Kowloon Bay would increase the pollution loads in the Kowloon Bay area. Redistribution of pollutants from the low flushing capacity area at KTAC to the relatively high flushing capacity area at Kowloon Bay would enhance the dispersion and dilution of pollutants. The option of adopting the shortest route of the KTN diversion is not likely to cause unacceptable water quality changes in TKWTS. The proposed fall back option of diverting the flows away from TKWTS provides an alternative to further prevent deterioration of water quality in the typhoon shelter.

16.3.5 The discharges from cooling water for air-conditioning would have little impact on the nearby sensitive receivers. The area of influence as a result of the increases in water temperature and anti-fouling chemicals would be in the close proximity of the discharge point.

16.3.6 The modelling results indicated no adverse water quality impacts on the nearby water quality sensitive receivers as a result of storm and emergency overflows from KTPTW and TKWPTW.

16.3.7 Implementation of mitigation measures would minimise the water quality impacts arising from the construction and operational phases of the SEKD. With the inclusion of suitable mitigation measures in the Environmental Monitoring and Audit programme, the potential water quality impacts are expected to be within acceptable levels. There would be no insurmountable water quality impacts to the environment due to the proposed development.

16.4 Sediment Contamination Impact

16.4.1 Three reclamation options including the no dredged, dredge for ex-situ treatment and minimum dredged reclamation options have been proposed in this section. It has been demonstrated that these reclamation options are technically feasible.

16.4.2 The vertical sea wall is usually constructed with large concrete blocks, filled with sand and founded on dredged seabed. The soft materials at the base may have to be removed to ensure the stability of the sea wall. The sloping sea wall, in its simplest form, is usually constructed with quarry-run rockfill core with blocks at the seaward side for erosion protection. The marine deposits are dredged to provide a suitable foundation. In both cases, despite the removal of the soft marine deposits, stability may remain a problem due to trapped marine deposit beneath the reclamation, giving weak planes for slip surfaces; and inadequate shear strength in the alluvial clay.

16.4.3 The potential stability problems are increased with the recent Government policy to minimise the amount of dredging and consequent sea disposal of contaminated marine deposits. Ground treatment would be required if the marine deposits were to be left in place. In addition, treatment to the softer alluvium deposits may also be required.

16.4.4 Breakwater structures, unlike sea walls, do not require retaining reclamation fill. However, they are heavy structures subject to significant wave loading. Ground treatment may still be required if the structure were to be founded on the soft marine deposits or alluvium deposits.

16.4.5 Cross-sections from typical geology at Hoi Sham and KTAC have been chosen and slope stability analyses have been carried out to determine if the marine deposits will pose any stability problems. Although short-term undrained shear strength of the marine and alluvial clays were not provided in the Final Geotechnical Report of the SEKDFS, typical values were adopted using values from the Chap Lap Kok reclamation. The results show that dredging is essential to provide the required stability against slip failure during reclamation and surcharging from an engineering point of view.

16.4.6 Based on the above considerations, the use of vertical drains and surcharging is recommended for general reclamation. Full dredging will be carried out in the areas where sea wall, breakwater and tunnel will be constructed. The proposed rock bund at Hoi Sham will also be dredged to provide a stable ground condition for supporting the gas main. Ground investigation will have to be carried out in the dredged zones after reclamation to determine if full dredging has been achieved. Settlement Plates and extensometers will be installed in the reclaimed area to monitor the characteristic of the consolidation. If necessary, the surcharging design would have to be modified to achieve the design criteria.

16.4.7 Both the no dredged reclamation option with in-situ treatment and the dredged for ex-situ treatment reclamation option have been proposed to the KTAC reclamation. Treatment of sediments is recommended to reduce risk of biogas emission. Pilot tests would be carried out to determine either in-situ or ex-situ treatment is more suitable for applying to the KTAC sediments. The no-dredge reclamation is most preferable and provision of gas protection measures for development serves as a fallback option in case the trial results of both in-situ and ex-situ treatment are unfavourable.

16.4.8 The minimum dredged reclamation option has been recommended for the Kwun Tong Typhoon Shelter (KTTS) reclamation and the To Kwa Wan Typhoon Shelter reclamation. The preferred approach is to first backfill the reclamation and to apply in-situ treatment to the potential hotspots with high methane potential after the reclamation. Concurrently, methane gas monitoring would be carried out to cover the treated hotspots and the remaining reclaimed areas without treatment and to determine the existence of any additional hotspots in the reclaimed land that require treatment. Provision of protection measures serves as a backup system to deal with the residual impacts that may not be effectively reduced through in-situ treatment. Ex-situ treatment may also be required to treat the dredged sediments in the sea wall, earth bund, tunnel and breakwater locations.

16.4.9 The proposed reclamation options would minimise dredging. Sediment plume dispersion could be easily controlled in the KTAC reclamation if dredging for ex-situ treatment is to be carried out by suction dredging. Odour emission could be minimised through suction dredging and in-pipe chemical oxidation as part of the ex-situ treatment process for fully dredged and minimum dredged options. In-situ treatment would minimise the disturbance to the sediments. Therefore, odour emission is unlikely to be a critical issue. The application of in-situ or ex-situ treatment in the proposed reclamation options would not cause any significant environmental impacts to pose a constraint to the SEKD. It is anticipated that there would be no insurmountable impacts as a result of the development.