Regulating the environmental impacts of container terminal developments

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Introduction
Legislation governing environmental permitting for infrastructure development projects is the norm in both developed and developing countries. The degree of assessment, transparency, public participation and discretion afforded to the approving authority varies from country to country. Hong Kong is fortunate to have in place a rigorous, transparent and pragmatic environmental permitting legislation in the form of the Environmental Impact Assessment Ordinance (EIAO). This article aims to outline the requirements of the EIAO and provide a brief overview of the key issues and potential implications on the planning, design, construction and operation of further container terminal development in Hong Kong. While written in this context, the general concepts are broadly applicable to any country or territory with a well-developed environmental permitting system.

Background on the EIAO
The EIAO came into operation on 1 April 1998 with the stated purpose to ‘Provide for assessing the impact on the environment of certain projects and proposals, for protecting the environment and for incidental matters’. The mechanism for achieving this aim is the environmental impact assessment process and environmental permit system. The EIAO is administered by the director of environmental protection with the secretary for the environment being the approving authority.

The legislative framework of the EIAO includes the separate ‘Technical Memorandum on Environmental Impact Assessment Process’ which provides guidance to the director on the administration of the EIAO including setting out the principles, procedures, guidelines, requirements and criteria for the submission and acceptance of environmental impact assessment reports and the issuance of environmental permits.

Applying the EIAO to container terminal development
Schedules two and three of the EIAO specify the criteria that define designated projects falling under the control of the EIAO. There are a number of criteria by which any significant container terminal development would be classified as a designated project under the EIAO.

In the first instance, the engineering feasibility study for the development would be classified as a designated project under schedule three as “urban development projects with a study area covering more than 20ha”. Aside from this, the construction and operation of the development would also be classified under schedule two as “a container terminal (including its container backup facility)” as well as potentially “reclamation works (including associated dredging works) more than 5ha in size” and “a dredging operation exceeding 500,000m³”.

Other criteria may or may not be met depending on the location and scale of the proposed development. What is certain is that any further container terminal development in Hong Kong would fall under the control of the EIAO. Similarly, any conditions attached to the approval of the EIA report and the environmental permit would need to be incorporated in the planning, design, construction and operation of the proposed facility. This would include any mitigation measures identified for the avoidance, minimisation and control of the identified potential environmental impacts during both the construction and operation stages of the project.

Implications for future development in Hong Kong
Potential environmental impacts associated with any substantial container terminal development may include varying degrees of impact on air quality, noise, water quality, waste management,
ecology, fisheries, landscape and visual and cultural heritage.

The majority of potential environmental impacts associated with container terminal development are likely to be localised and site specific. For instance, the magnitude of potential impacts on cultural heritage is generally dependent on the nature and past usage of the proposed site with impacts restricted to affected areas within or near to the site boundary. In this way, the majority of potential impacts can be avoided or minimised through careful selection of the site for the proposed development. However, several key environmental issues relating to air quality, water quality and waste management would have wider implications and are less dependent on the proposed site. These issues are likely to be applicable to a greater or lesser extent to any further container terminal development in Hong Kong.

Considering impacts on air quality

Improving regional air quality is one of the greatest environmental challenges facing Hong Kong and the Pearl River Delta region. The requirements of the EIAO with respect to air quality are based around a set of air quality objectives (AQO) which define limits on various air pollutants.

Container terminal operations are by nature plant and equipment intensive as well as being significant generators and attractors of road and marine traffic. The minimisation of potential emissions associated with container terminal development is likely to require the consideration of electrified or other low emissions cargo handling equipment such as electric rubber tyred gantry (RTG) cranes and liquefied natural gas or hybrid off-road tractors as well as the provision of on-shore power (also known as cold ironing) for vessels at berth.

Aside from these measures, the government of the HKSAR has recently announced proposed new AQOs which are expected to be implemented in 2014. The proposed new AQOs have been specified with reference to recommendations of the World Health Organisation (WHO) and are packaged together with various air quality improvement measures. These measures include plans to reduce marine emissions by mandating cleaner fuels for local vessels, requiring ocean-going vessels to use cleaner fuels while berthing and in the longer term, setting up an emission control area in Pearl River Delta waters.

Considering impacts on water quality

Deep water marine access and substantial land area are absolute requirements for any container terminal development. The need for dredging and reclamation is therefore inherent to a greater or lesser extent in any further container terminal development in Hong Kong. Similar to air quality, the requirements of the EIAO with respect to water quality are based around a set of water quality objectives (WQO) which define limits on various water pollutants. The key water quality issue during the construction phase is the generation of suspended solids within the water column during dredging and reclamation activities and associated impacts on water sensitive receivers and other beneficial uses, as well as nearby marine ecological and fisheries resources.

The magnitude of these potential impacts is driven primarily by the scale of dredging and reclamation works associated with the development and their proximity to sensitive receivers and other beneficial uses. Innovative engineering solutions are available that can potentially minimise the quantity of dredging required for both reclamation and the construction of sea walls eg, the cellular coffer dam construction method currently being employed for the Hong Kong-Zhuhai-Macao bridge Hong Kong border crossing facility. However, the need for dredging to provide adequate depth in navigation channels, basins and berths will remain a requirement irrespective of the methods employed for seawall and reclamation construction. Previous EIA studies have demonstrated that the generation of suspended solids during dredging and reclamation can be effectively controlled through the use of silt curtains and closed grab buckets in conjunction with the implementation of limits on production rates for dredging and filling activities.

Beyond these construction stage impacts, the reclamation configuration itself may induce impacts on the tidal flows. These potential impacts need to be modelled and quantified at an early stage and the reclamation outline optimised in order to minimise potential impacts on tidal flushing effects through the nearby waterways as well as potential impacts on water quality at existing seawater intakes and outfalls.

Waste management implications

Waste management implications in the context of further container terminal development relate primarily to the disposal of dredged sediments generated by the development. Similar to water quality impacts above, the magnitude of waste management implications associated with further container terminal development in Hong Kong relate primarily to the generation of dredged sediments associated with navigation dredging or dredging for the construction of reclamation or sea walls. The key issue in this case is the identification of suitable disposal locations for the dredged sediments. Again, these implications can be minimised through the application of innovative engineering solutions for land formation in order to minimise the quantity of dredging required.
Further requirements

In addition to the requirements of the EIAO, it is worth noting that the Protection of the Harbour Ordinance (PHO) enacted in June 1997 enshrines in law a basic presumption against further reclamation within the boundaries of the harbour as defined in schedule three of the interpretation and general clauses ordinance. The eastern limit extends across Lei Yue Mun from Siu Chau Wan Point to Ah Kung Ngam Point, whilst the western limit extends north-south from Green Island to the south eastern corner of Tsing Yi Island and thereafter extending from the north western corner of Tsing Yi Island due north to the mainland. The Court of Final Appeal handed down its judgement that the presumption against reclamation would only be rebutted where three tests are satisfied: that there is an overriding public need for reclamation; there is no reasonable alternative to reclamation; and that the proposed reclamation involves minimum impairment to the harbour. Whilst the applicability of the PHO to further container terminal development is yet to be tested, any proposal for further container terminal development within the harbour limits would need to satisfy these tests.

Conclusion

The EIAO provides Hong Kong with a rigorous, transparent and pragmatic environmental permitting system. The requirements of the EIAO with respect to key environmental issues relating to air quality, water quality and waste management associated with further container terminal development in Hong Kong can potentially be satisfied through the application of best practice terminal equipment technology, construction methods and other mitigation measures.

The requirements of the EIAO mean that such measures will need to be identified at an early stage of the project and incorporated into the planning, design, construction and operation of the proposed development.