

## 2 PROJECT DESCRIPTION

### 2.1 Site Location

2.1.1 The Project is located mainly in Wan Chai North, Causeway Bay and North Point, and is demarcated by Gloucester Road and Victoria Park Road to the south, Fenwick Pier Street to the west and Tong Shui Road Interchange to the east, as shown in **Figure 1.1**.

2.1.2 The study area encompasses existing developments along the Wan Chai, Causeway Bay and North Point shorelines. Major land uses include the HKCEC Extension, the Wan Chai Ferry Pier, the ex-PCWA, the Royal Hong Kong Yacht Club (RHKYC), the Police Officers' Club, the CBTS and commercial and residential developments.

### 2.2 EIA Study Area

2.2.1 The following definitions of the study areas have been adopted with reference to the EIA Study Brief registered under the EIAO:

- Air Quality Impact: the assessment area should include the area within 500 m from the boundary of the Project;
- Noise Impact Assessment: the assessment area should include the area within 300 m from the boundary of the Project;
- Water Quality Impact Assessment: the assessment area should include the areas within and 300m extended beyond the boundary of the Project, plus the Victoria Harbour Water Control Zone (WCZ), the Eastern Buffer WCZ and the Western Buffer WCZ as declared under the Water Pollution Control Ordinance;
- Waste Management: the assessment will focus on areas within the boundary of the Project;
- Land Contamination: the assessment area for land contamination impact will include the A King Shipyard at the CBTS and any other potentially contaminated sites identified in this EIA;
- Landscape and Visual Impact: the area for landscape impact assessment should include all areas within 100 m extended from the boundary of the Project, while the assessment area for the visual impact assessment should be defined by the visual envelope from the Project and associated works;
- Marine Ecology: the assessment for marine ecological impact will focus on the area within the Project boundary; and
- Cultural Heritage Impact: the assessment for cultural heritage impact will focus on the area within the Project boundary.

## 2.3 Review of Previous EIAs

### *Description of Project Details*

- 2.3.1 Under the Project, permanent reclaimed land will be formed along the existing Wan Chai and North Point shorelines for the construction of the Trunk Road. At the same time, an attractive waterfront with a new public promenade will be provided. A total reclamation area of 12.7 ha is envisaged, with the newly reclaimed land forming a narrow strip of land along the existing Wan Chai shoreline from the interface with the CRIII project west of the HKCEC Extension, along the Wan Chai shoreline up to the west of the ex-PCWA basin, and along the North Point shoreline from the east of the CBTS to the west of City Garden (**Figure 1.1**). The Project will also include roads, pedestrian links to the waterfront, including footbridges and landscape decks, a new cross-harbour water mains from Wan Chai to Tsim Sha Tsui and a new sewage outfall from the Wan Chai East Sewage Screening Plant, reprovisioning of affected facilities including drainage outfalls, cooling water intakes, WSD's salt water pumping station, ferry pier, helipad, etc, and waterfront promenade landscaping. During the Trunk Road construction, temporary reclamation will be required in the ex-PCWA basin and the CBTS to facilitate cut-and-cover tunnel construction of the Trunk Road. Existing moorings in the CBTS will need to be relocated temporarily outside the CBTS. After construction of the Trunk Road, the temporary reclamation will be removed and the ex-PCWA basin and the CBTS will be reinstated.
- 2.3.2 In reviewing the change of scope and extent of the elements of the Project from what was originally proposed, and which was covered by the approved WDIICFS and CWB&IECL EIA Reports under the EIAO in 2001, the changes are confined to the nature and extent of the Trunk Road and associated ground level roads, Road P2, and the extent of reclamation. As the original schemes for the cross-harbour water mains and the sewage outfall have not changed materially, the related EIA assessments of the approved EIA Report for the WDIICFS for these works remain valid. This EIA study focuses mainly on those elements of the Project that have changed significantly from the schemes as presented in the approved EIA Reports. For the dredging for the cross-harbour water mains and the sewage outfall, this EIA Study has still included the cumulative impact assessment, updated the assessment assumptions and the corresponding mitigation measures.
- 2.3.3 The extent of the Trunk Road covered by the approved EIA Report on the CWB & IECL includes the Central Interchange in Central Reclamation Phase I (CRI), the Trunk Road tunnel that runs through CRIII and partly through WDII (extending to the location of the ex-PCWA basin), and the IECL through WDII connecting the Trunk Road tunnel to the IEC at the eastern end of the CBTS. It should be noted that it is only the section of the Trunk Road through WDII that is subject to change under the WDII Review. As the original scheme for the Trunk Road through CRI and CRIII has not changed, findings and recommended mitigation measures of the approved EIA Report for the Trunk Road within the CRI and CRIII areas remain valid. The relevant environmental findings and recommended mitigation measures are captured from the approved EIA Report and summarised below.
- 2.3.4 This EIA study is confined to the elements that have changed significantly from the scheme as presented in the approved EIA Report for the CWB&IECL, viz. the Trunk Road tunnel through WDII and its connection to the existing IEC (**Figure 1.1**). A comparison table comparing the original scheme of WDII and CWB under the approved EIA Report on Wan Chai Development Phase II (Application No. EIA-058/2001) and on the Central-Wan Chai Bypass and Island Eastern Corridor Link (Application No. EIA-057/2001) and the present scheme under the EIA Study for WDII & CWB projects (EIA Study Brief No. ESB-153/2006) is given in **Appendix 2.1**.

### *Review of Previously Approved CWB&IECL EIA Report*

- 2.3.5 The previous key EIA findings, impact predictions and recommendations as stipulated in the approved CWB&IECL EIA Report are considered valid for the Central Interchange in CRI and the Trunk Road tunnel that runs through CRIII. The relevant implementation schedule of the proposed mitigation measures for the CWB within CRI and CRIII as extracted from the approved CWB&IECL EIA Report is given in **Appendix 2.2**.
- 2.3.6 The construction activities at Central Interchange and CRIII remain the same as those given in the approved CWB&IECL EIA Report. There will be tunnel, bridge, tunnel building construction and demolition of part of Rumsey Street Flyover at Central Interchange area. There will be CWB tunnel construction at the CRIII area. The preliminary design of the West Ventilation Building (including minimum discharge height, exhaust directions, handling capacity and exit velocity) as given in the approved CWB&IECL EIA Report remains materially unchanged. The related EIA assessments of the approved CWB&IECL EIA Report for these works therefore remain valid.
- 2.3.7 The sensitive receivers from Sheung Wan through Central as identified in the approved CWB&IECL EIA Report are unchanged.
- 2.3.8 The existing air sensitive receivers from Sheung Wan through Central will be protected from adverse construction air quality impact by the recommended dust control measures during construction phase. The recommended mitigation measures for dust control include:
- strictly limit the truck speed on site to below 10km per hour and water spraying to keep the haul roads in wet condition;
  - twice daily watering of the work site with active operations when the weather and the work site are dry;
  - watering during excavation and material handling;
  - provision of vehicle wheel and body washing facilities at the exist points of the site, combined with cleaning of public roads where necessary; and
  - tarpaulin covering of all dusty vehicle loads transported to, from and between site locations.
- 2.3.9 With no increase in the proposed tunnel portals and ventilation building emissions, and the same traffic pattern at the Central Interchange area, the air quality assessment from the previous CWB&IECL approved EIA is still valid for the operation phase. No adverse operational air quality impacts at the existing and planned air sensitive receivers from Sheung Wan to Central are predicted and mitigation measures are not considered necessary. For the air pollution within the tunnel section in CRIII, monitoring of tunnel air quality will be required to ensure the acceptability of the tunnel air quality criteria.
- 2.3.10 The existing noise sensitive receivers from Sheung Wan through Central, including Korea Centre, City Hall and PLA Headquarters, will be protected from adverse construction noise impact by the recommended noise mitigation and control measures during construction phase. The mitigation measures during construction phase include:
- The use of silenced powered mechanical equipment (PMEs) for the following construction tasks:
    - piling, tunnel and deck construction at Mass Transit Railway tunnel crossing area;
    - west ventilation building; and
    - demolition of downramp of Rumsey Street.

- 2.3.11 For the operation phase, no direct noise mitigation measures are required from Sheung Wan to Central for the three noise sensitive receivers, Korea Centre, City Hall and PLA Headquarters for the new trunk road and slip roads at Central Interchange. The Trunk Road in CRIII is in tunnel and no direct mitigation measures are required. The findings and recommendations of the approved CWB&IECL EIA Report in respect of noise are still valid.
- 2.3.12 As no reclamation will be undertaken directly for the CWB at the Central Interchange (reclamation for the CWB through CRIII is addressed in the approved CRIII EIA Report), the primary concern with regard to water quality will be the control of runoff during construction. This could potentially contain elevated concentrations of suspended solids (SS), and could impact upon the flushing and cooling water intakes located along the Victoria Harbour waterfront, identified as potential sensitive receivers. However, the potential water quality impacts could be controlled to comply with the WPCO standards by implementing the recommended implementation measures, including provision of drainage facilities, oil and silt removal facilities and good site practices. No unacceptable residual water quality impact is anticipated.
- 2.3.13 Mitigation measures, including road drainage with silt traps and petrol interceptors, are also recommended to remove oil and grease from the road runoff during operation. No unacceptable residual water quality impact is expected. The findings and recommendations of the approved CWB&IECL EIA Report in respect of water quality are still valid.
- 2.3.14 Provided that waste arising from the construction of the CWB at Central Interchange and CRIII areas are handled, transported and disposed of using approved methods as recommended in the approved CWB&IECL EIA Report, and that no solid or liquid wastes enter nearby marine waters, no unacceptable environmental impacts are envisaged. These recommended methods include segregation of wastes, water minimization, and good site practices for storage, collection and transport of waste during construction. The estimated quantity of excavated material from the Central Interchange and west tunnel building are unchanged. The mitigation measures recommended in the approved CWB&IECL EIA Report should be incorporated into contract specifications to ensure that environmental nuisance will not arise from the storage, transport and disposal of various types of waste arising from the construction of the CWB project. These recommendations should form the basis of the site Waste Management Plan to be developed by the Contractor at the construction stage. The findings and recommendations of the approved CWB&IECL EIA Report in respect of waste management are still valid.
- 2.3.15 Key issues relating to the impact on the landscape and visual context of the proposed road include the loss of existing vegetation, the addition of infrastructure associated facilities (west ventilation building), associated works (portals, wing walls and abutments), and elevated road sections at Central Interchange and CRIII areas.
- 2.3.16 The potential impacts during the construction phase are:
- Moderate adverse residual landscape impacts would occur through vegetation removal at the western above-ground sections of CWB.
  - Significant adverse residual visual impacts would occur along the CWB from buildings with a harbour outlook around the Central Interchange and CRIII areas. Moderate adverse impacts on visually sensitive receivers with distant views from Tsim Sha Tsui waterfront.

2.3.17 The potential impacts during the operational phase are:

- The extended Rumsey Street Flyover and its associated elevated slip road are located further west from the proposed Central waterfront promenade. Thus, they have negligible residual landscape impact to the planned waterfront promenade.
- The Central area will have significant adverse residual visual impact at residential units at Shun Tak Centre. Moderate / significant adverse residual visual impact would occur at the Airport Railway Hong Kong Station Northern Site Development (the IFC and Four Seasons Hotel) due to the close view of the elevated road structures.

2.3.18 The overall residual landscape and visual impact after the implementation of the recommended mitigation measures will be moderate adverse. In the context of Annex 10 of the EIAO-TM, the landscape and visual impacts are considered acceptable with mitigation measures. The findings and recommendations in the approved CWB&IECL EIA Report in respect of landscape and visual impacts are still valid.

2.3.19 In summary, the relevant findings and recommendations of the approved CWB&IECL EIA Report for the CWB within the Central Interchange and CRIII areas have been reviewed and are found to be still valid.

***Review of Previously Approved WDIICFS EIA Report***

2.3.20 The previously approved WDIICFS EIA Report covers a Schedule 3 DP for an engineering feasibility study of an urban development project with a study area covering more than 20ha and five individual Schedule 2 DPs as summarised below:

- Reclamation works including associated dredging works
- WDII major roads (including Road P2)
- Wan Chai East Sewage Outfall
- Kellet Island Marina
- Dredging for the Cross-harbour Water Mains from Wan Chai to Tsim Sha Tsui

2.3.21 As the original schemes for the sewage outfall and cross-harbour water mains from Wan Chai to Tsim Shai Tsui have not changed, the related EIA assessments of the approved EIA Report for the WDIICFS for these works are therefore considered to remain valid.

2.3.22 The reclamation works and the WDII major road works have changed significantly since the WDIICFS. The EIA assessments for these works shall therefore refer to this current WDII&CWB EIA Report.

2.3.23 The cumulative impacts of the sewage outfall, the cross-harbour water mains, the reclamation works and major road works have also been reassessed in this current WDII&CWB EIA.

2.3.24 There is no Kellet Island Marina in the current scheme and hence it is not included in this WDII&CWB EIA Report.

2.3.25 As presented in paragraph 1.6 above, this WDII&CWB EIA Report covers the Schedule 3 DP for an engineering feasibility study of an urban development project with a study area covering more than 20ha, while the individual Schedule 2 DPs have been updated as below:

- Central-Wanchai Bypass including its road tunnel and slip roads
- Road P2 and other roads which are classified as primary/district distributor roads
- Reclamation works including associated dredging works
- Temporary typhoon shelter
- Wan Chai East Sewage Outfall
- Dredging for the Cross-harbour Water Mains from Wan Chai to Tsim Sha Tsui

2.3.26 During reclamation, filling and surcharging were identified as the major dust sources and entrusted works of the CWB tunnel section would also cause potential dust nuisance during excavation and backing as stated in the WDIICFS EIA Report. This will also be the case for the revised scheme as identified in the WDII&CWB EIA Report and is incorporated in the air quality assessment in Section 3 of this report.

2.3.27 In order to achieve the air quality objectives, the following dust suppression measures were suggested in the WDIICFS EIA Report:

- strictly limit the truck speed on site to below 10 km per hour and water spraying to keep the haul roads in wet condition;
- twice daily watering of the work site with active operations when the weather and the work site are dry;
- watering during excavation and material handling;
- provision of vehicle wheel and body washing facilities at the exit points of the site, combined with cleaning of public roads where necessary; and
- tarpaulin covering of all dusty vehicle loads transported to, from and between site locations.

The air quality assessment of the WDII&CWB EIA Report has considered the above recommendations and they are incorporated as mitigation measures to suppress dust during the construction phase where appropriate.

2.3.28 No adverse cumulative air quality impacts were predicted at the air sensitive areas for the operation phase in the WDIICFS EIA Report, after considering the background pollutant levels within and adjacent to WDII, vehicle emissions from open road networks, tunnel portal and ventilation building emissions from the CWB, tunnel portal emissions from the Cross Harbour Tunnel, and portal emissions from existing underpasses and planned deckovers. No mitigation measures were required under the WDIICFS EIA Report.

2.3.29 Air quality impacts are updated in the WDII&CWB EIA Report, which also considers on the background pollutant levels, vehicle emissions from open road networks, tunnel portal and ventilation building emissions from CWB, tunnel portal emissions from existing tunnels, underpasses and planned deckovers with updated and latest available data in assessing the cumulative air quality impacts. Findings of the air quality assessment are given in Section 3 of this report.

2.3.30 WDII construction noise impacts were predicted taking into account other concurrent projects including the CRIII and CWB&IECL projects and the Causeway Bay Flyover project in the WDIICFS EIA Report. As the Causeway Bay Flyover project has already been completed, the current WDII&CWB EIA Report has not included the Causeway Bay Flyover project as a concurrent project.

- 2.3.31 It was given in the WDIICFS EIA Report that, with the use of silenced equipment and movable barriers for WDII construction tasks and implementation of the noise mitigation measures proposed in the CRIII and CWB&IECL EIA Reports, the noise levels at all residential noise sensitive receivers (NSRs) would comply with EIAO-TM construction noise criteria during normal daytime working hours, with mitigated noise levels being in the range of 60 to 75 dB(A). Some noise exceedences of 4 to 7 dB(A) were still predicted at the Performing Art Centre and at the HKCEC Extension. However, these NSRs are equipped with central air-conditioning systems and good noise insulation facilities, and they do not rely on openable windows for ventilation. No adverse noise impacts were therefore expected for the indoor environments of these NSRs.
- 2.3.32 An indicative assessment was undertaken in the WDIICFS EIA Report for possible construction activities during restricted hours (1900 to 2300) associated with the reclamation works of the Project. With the reduction of plant numbers, adoption of quiet plant and reduction of on-time percentage for some equipment, the predicted noise levels at all representative residential NSRs would comply with the construction noise criterion of 65 dB(A). Noise exceedences of the 65 dB(A) criterion at HKCEC were still predicted at certain periods, for plant working close to the HKCEC Extension. The results of the construction noise impact assessment for restricted hours (1900 to 2300) were for indicative purposes; the Noise Control Authority will process any CNP application, based on the NCO and the relevant technical memoranda in addition to considering the contemporary situations / conditions.
- 2.3.33 The construction noise impact assessment has been updated for the revised scheme. The current WDII&CWB EIA follows similar principles adopted in the WDIICFS EIA Report and reduction of plant numbers, adoption of quiet plant and reduction of on-time percentage for some equipment are also adopted in the WDII&CWB EIA. Findings of the updated construction noise impact assessment for the WDII&CWB EIA are given in Section 4 of this report.
- 2.3.34 In the WDIICFS EIA Report, the potential road traffic noise impacts were assessed for the worst-case traffic flows in 2027. No adverse traffic noise impacts were expected and no operational mitigation measures were proposed for the WDII roads. No adverse impact from helicopter noise and fixed noise sources including ventilation shaft noise from the CWB ventilation buildings were anticipated at the existing and planned NSRs.
- 2.3.35 In the WDII&CWB EIA Report, the potential road traffic noise impacts are assessed for the worst-case traffic flows in 2031 in accordance with the updated programme for the WDII and CWB projects. The operation noise impact assessment and the recommended operation noise mitigation measures for the WDII&CWB EIA are given in Section 4 of this report, including the considerations on the helicopter noise and ventilation shaft noise from the CWB ventilation buildings.
- 2.3.36 The water quality impacts during the reclamation of WDII were quantitatively assessed by numerical modelling in the WDIICFS EIA Report. Suspended sediment was identified as the most significant water quality parameter during the reclamation. The worst-case scenarios during reclamation, taking into account the anticipated reclamation stages and possible overlapping dredging and filling activities, were assessed. The assessment also took into account the cumulative effects that arise from the adjacent CRIII reclamation and other concurrent reclamation works in the harbour. It was predicted that potential water quality impacts could occur at seawater intakes along the Central and Wan Chai shorelines and in the CBTS, with a maximum concentration of suspended solids (SS) at the surface layer up to 263 mg/l. However, the water quality impacts at the seawater intakes can be effectively minimised with the implementation of proposed mitigation measures, which include silt curtains around the dredging operations, silt screens at the intakes and bulk filling behind constructed seawalls. Maximum

surface SS levels at the seawater intakes would be less than 30 mg/l after the implementation of these measures and there would be no residual adverse water quality impacts due to the WDII reclamation and due to the cumulative effects from other concurrent reclamation activities.

- 2.3.37 Suspended sediment is still identified as the most significant water quality parameter during the reclamation in the WDII&CWB EIA Report and numerical modelling is also adopted for the quantitative assessment for water quality impacts during reclamation of WDII. Similar mitigation measures, including silt curtains around the dredging operations and silt screens at the intakes, will be applicable for the WDII&CWB EIA Report. The construction phase water quality assessment based on the updated reclamation sequence and concurrent reclamation works at the harbour for the WDII&CWB EIA is given in Section 5 of this report.
- 2.3.38 Water quality impacts from land-based construction, including road works, waterfront facilities and public utilities, are associated with the surface runoff, effluent discharge from the site and sewage from on-site construction workers. Impacts can be controlled to comply with statutory standards by implementing mitigation measures such as on-site drainage and sediment traps to control run-off. No unacceptable impact on land-based water quality impact was anticipated in the WDIICFS EIA Report. The water quality impacts from land-based construction would be similar for both the WDIICFS EIA Report and the WDII&CWB EIA Report. Findings of the WDII&CWB EIA Report shall refer to Section 5 of this report.
- 2.3.39 An assessment of the hydrodynamic impact due to the WDII reclamation, including the adjacent CRIII reclamation, was undertaken for the coastline configuration in the WDIICFS EIA Report. Potential impacts to tidal flows were assessed by comparing the baseline and operation phase conditions. It was concluded in the WDIICFS EIA Report that the WDII reclamation will have minimal impact on the hydrodynamic regime in the study area. With the extent of reclamation substantially reduced, the impact on hydrodynamic regime for the WDII&CWB EIA would be minimal as compared to WDIICFS EIA. Assessment of the hydrodynamic impact due to the latest coastline configuration is included in the WDII&CWB EIA Report and the findings are presented in Section 5 of this report.
- 2.3.40 An assessment of the water quality impacts during the operation of WDII was also undertaken in the WDIICFS EIA Report. Comparison between the baseline and operational water quality modelling results suggested that the levels of pollutants near Wan Chai and the neighbouring areas were similar under both baseline and operational scenarios. No unacceptable impacts associated with the operation of WDII upon the water quality in Victoria Harbour were envisaged. Operation phase mitigation measures were not considered necessary in the WDII CFS EIA Report. Similar findings would be expected for the revised scheme, nevertheless, assessment of water quality impacts during the operation of WDII based on the latest discharge locations and shoreline configuration for both baseline and operational scenarios are undertaken in the WDII&CWB EIA Report and presented in Section 5 of this report.
- 2.3.41 In the WDIICFS EIA Report, the total volume of dredged sediment for the WDII reclamation was estimated to be approximately 0.99 Mm<sup>3</sup> and some 0.6 Mm<sup>3</sup> of the marine sediments would be classified as Category H. With the implementation of mitigation measures in accordance with the requirements of WBTC No. 3/2000, and disposal to the contaminated mud pits, no residual adverse impact was predicted. In the CBTS, Category H sediments with high pollutant concentrations were identified. Containment of the contaminated sediments in geosynthetic containers before disposal at the contaminated mud pits was proposed to minimise release of material to the marine environment. Field trials were recommended to establish the optimum handling method for this approach.



- 2.3.42 For the revised scheme, the total volume of dredged sediment, including the quantities of Category H contaminated sediments, is updated and presented in Section 6 of this report. The use of geosynthetic containers for containment of the contaminated sediments before disposal at the contaminated mud pits are also proposed in the WDII&CWB EIA Report. The field trials as recommended in the WDIICFS EIA Report have already been completed and the findings are incorporated in Section 6 of the WDII&CWB EIA Report.
- 2.3.43 According to the WDIICFS EIA Report, wastes generated by construction activities would include construction and demolition (C&D) materials (including excavated material), general refuse and chemical waste. Provided that these identified waste arisings would be handled, transported and disposed of using approved methods and that the recommended good site practices as identified in the WDIICFS EIA Report were strictly followed, adverse environmental impacts were not anticipated. The C&D material should be sorted on-site into inert C&D material (ie public fill), for reuse in the reclamation, and C&D waste for recycling or disposal. The type of waste generated from the revised WDII and CWB projects would be similar to those of the WDIICFS but the quantities are updated with the increase in tunnel length. The updated assessment on waste management for the WDII&CWB EIA is given in Section 6 of this report.
- 2.3.44 The land contamination assessment in the WDIICFS EIA Report included a review of site history and existing environmental information, and a preliminary site inspection. Two possible contaminated land sites were identified: the A. King Marine shipyard in the CBTS and the boatyard area of the RHKYC. Potential contaminants arising from shipyard operations and the yacht club were identified, however, based on available information, the potential for land contamination in these areas was not considered to be insurmountable. It was proposed in the WDIICFS EIA Report that site investigation should be conducted prior to the commencement of site clearance / construction works.
- 2.3.45 For the new Trunk Road layout now proposed, the boatyard area of RHKYC will not be affected and it is no longer identified as a possible contaminated site in the WDII&CWB EIA Report. The site investigation at A King Shipyard as proposed in the WDIICFS EIA Report has been carried out and the findings are included in the WDII&CWB EIA Report. The updated land contamination assessment for the WDII&CWB EIA is given in Section 7 of this report.
- 2.3.46 The ecological assessment in the WDIICFS EIA Report indicated that the marine ecological resources within the WDII area were considered to be of low ecological value. The dredging and reclamation works would result in the permanent loss of approximately 28.5 hectares of soft bottom benthic habitat. Approximately 1,110m of rock armoured sloping seawall and 440m of sloping seawall (with granite facing) would be permanently lost due to reclamation or removal of existing breakwaters. Approximately 2,800m of existing vertical seawall would also be lost during the reclamation, but some 1.5 km of new caisson wave energy absorbing seawall and 1.3 km of new blockwork seawall would be constructed. These seawalls were expected to provide habitat of similar ecological value to that of the existing blockwork seawalls that constitutes the main part of the reclaimed intertidal habitat. Since the benthic community and intertidal community in the study area are of low ecological value, only minor impacts were anticipated from the reclamation works in the WDIICFS EIA Report.
- 2.3.47 With the reduction in extent of reclamation, the permanent loss of soft bottom benthic habitat and artificial intertidal habitat under the WDII&CWB EIA are expected to be less than the WDIICFS EIA. Nevertheless, the marine ecological assessment has been updated under the WDII&CWB EIA and is given in Section 9 of this report.

2.3.48 In the WDIICFS EIA Report, organically enriched marine bottom sediment was planned to be left in-situ at the WDII reclamation within the western and eastern corners of the CBTS. As methane gas could be generated under anaerobic conditions, there was a potential for this gas to be released either during construction or after development of the reclaimed area. Assessment on impact of biogas emissions was included in the WDIICFS EIA Report, which concluded that with the incorporation of the recommended gas protection measures in the design of the developments and precautionary measures during construction activities, the risk to people and property due to biogas emissions from the WDII reclamation is considered to be low. However, as a fully dredged approach is adopted for the current project proposals and no more organically enriched marine bottom sediment is planned to be left in-situ at the WDII reclamation, assessment on biogas emissions is not included in the WDII&CWB EIA Report.

2.3.49 A landscape and visual impact assessment (LVIA) was conducted in the WDIICFS EIA Report to assess the impacts of the proposed developments within WDII, for both the construction and operation phases, on the surrounding area. Landscape and visual mitigation measures would be achieved principally through the realisation of a Master Landscape Plan encompassing the following objectives:

- the establishment of a network of open spaces providing for a range of functions including pedestrian circulation and as a venue for community events;
- the creation of major landscape spaces forming pedestrian arteries linking the waterfront with existing open spaces, proposed and existing adjacent developments and other areas of the city;
- the establishment of an integrated, pedestrian oriented streetscape which will enhance pedestrian movement, integrate the proposed and existing developments within an overall landscape framework and generally improve the quality of the public environment;
- the provision of green buffer areas to mitigate negative environmental conditions associated with transport corridors, especially for the proposed IECL;
- the development of an integrated, fully co-ordinated design, incorporating all foreseeable functional requirements such as utilities, drainage reserves, and pumping stations;
- the creation of a high quality Waterfront Park which will reflect and integrate with that proposed for the Central Reclamation development;
- the provision of open space linkage between the Central Reclamation and HKCEC in the west, the RHKYC, Victoria Park and stretching to North Point to the east.

In the WDII&CWB EIA Report, the above objectives for landscape and visual mitigation have been considered in the development of the Concept Plan, RODP and Master Landscape Plan for the new project proposals.

2.3.50 As mentioned in the WDIICFS EIA Report, the ability to create a world-class harbour frontage, in respect of visual and landscape impacts, was somewhat constrained in the area adjacent to the IECL. This was due to the dominating visual presence of the IECL running through the reclaimed CBTS and also because a large landscape area would lie under the IECL at the newly formed land over the CBTS. However, in the WDII&CWB EIA Report, the Trunk Road will be below the existing seabed of the CBTS and the existing CBTS will be retained. There is no IECL running through the CBTS. The previous findings of the visual and landscape impacts of the IECL through the CBTS no longer apply; these are updated in the WDII&CWB EIA Report.

2.3.51 During the construction phase, the potentially most significant landscape and visual impacts identified in the WDIICFS EIA Report were:

- Substantial landscape impacts on street tree planting in Wan Chai North and on the landscape character of the streets and open spaces in Wan Chai North and Causeway Bay. The HKCEC promenade, Convention Avenue, RHKYC and CBTS areas would be particularly affected. The total number of trees affected was in the order of 420.
- Substantial visual impacts on the majority of buildings in Wan Chai, Wan Chai North and Causeway Bay that have a harbour outlook. The RHKYC and Police Officers' Club would be surrounded by the various developments, which would create a large magnitude of change in views during construction. Substantial impacts on some of the public open spaces in Wan Chai North and Causeway Bay. The areas of permanent and temporary loss of the public open spaces were approximately 1.05 ha and 0.2 ha respectively.

2.3.52 For the operation phase, the WDIICFS EIA found that, after all mitigation measures have been implemented and have matured over 10 years, there would still be some residual adverse landscape and visual impacts, the most significant impacts being:

- Substantial visual impacts on the buildings in Wan Chai North which would have their harbour views blocked by the proposed CDA development, on buildings along Gloucester Road in Causeway Bay which would have their harbour views partially obscured by the proposed hotel / commercial development and which would also have clear views of the IECL, and on the Police Officers' Club which would be visually dominated by the IECL and the proposed hotel / commercial development.

2.3.53 However, for the new WDII and CWB project proposals, the Trunk Road will be in tunnel through the CBTS and no new major developments are proposed. Landscape and visual impacts are therefore substantially reduced. The revised LVIA for the new scheme is presented in Section 10 of this report.

#### ***Review of Previously Approved CRIII EIA Report***

2.3.54 Apart from the two EIA Reports for the WDIICFS and CWB&IECL mentioned above, there are also previous EIAO submissions, either associated with projects within the current Project boundary or that contain information relevant to the previous or current development schemes for the Project. The previously approved EIA for CRIII – Studies, Site Investigation, Design and Construction (Application No. EIA-055/2001) is one of the identified relevant EIA reports.

2.3.55 The previously approved CRIII EIA Report includes four Schedule 2 DPs with Environmental Permit (EP-122/2001) issued prior to commencement of construction. The relevant Schedule 2 DP is for the construction of the CWB within the CRIII area. As the original scheme for the CWB within CRIII has not changed, the EIA assessments of the approved CRIII EIA Report and the EP issued for the construction of the CWB within the CRIII area remain valid.

2.3.56 Some of the CRIII works will take place concurrently with the WDII and CWB works. With respect to the assessment of environmental impacts, the key indicators of air and noise will be influenced by the cumulative effects of the overlapping construction works. The concurrent activities and the cumulative environmental impacts have been assessed in the current WDII&CWB EIA Report.

- 2.3.57 The concurrent dusty construction activities undertaken within 500m from the boundary of the WDII area and within the CRIII area are included in the air quality impact assessment for the WDII&CWB EIA and summarised in Section 3 of this report.
- 2.3.58 The concurrent construction activities in CRIII that have been included in the noise impact assessment for the WDII&CWB EIA are given in Section 4.5 of this report.
- 2.3.59 All the marine dredging activities for CRIII will be completed before the construction of WDII. No concurrent dredging activities for CRIII that will affect the water quality impact assessment of the WDII&CWB EIA are identified.
- 2.3.60 With regard to solid waste management, provided that the recommendations put forward in the previously approved CRIII EIA Report relevant to the construction of the CWB tunnel within CRIII are conscientiously acted upon, the storage, handling, collection, transport, and disposal of wastes arising from the construction of the CWB tunnel within CRIII will be in full compliance with the regulatory requirements.
- 2.3.61 The CWB tunnel will be entirely below ground for the section within CRIII. The CRIII EIA found that both the landscape and visual impacts within CRIII are acceptable with mitigation measures as described in category (c) of Annex 10 of the EIA-TM. The key mitigation measures recommended in the approved CRIII EIA Report are mainly for the open spaces and above ground structures, which will be implemented under the CRIII project. The findings and recommendations of the approved CRIII EIA Report in respect of landscape and visual impacts associated with the CWB within CRIII are still valid.

***Review of Previously Approved HKCEC Atrium Link Extension EIA Report***

- 2.3.62 The previously approved HKCEC Atrium Link Extension (ALE) EIA Report (Application No. EIA-120/2006) is also relevant to the current WDII&CWB EIA.
- 2.3.63 Some of the ALE works will take place concurrently with the WDII and CWB works. With respect to the assessment of environmental impacts, it is the key indicator of noise that will be influenced by the cumulative effects of the overlapping construction works. The concurrent activities and the cumulative environmental impacts have been assessed in the current WDII&CWB EIA Report.
- 2.3.64 The concurrent construction activities under the ALE project that have been included in the noise impact assessment for the WDII&CWB EIA are given in Section 4 of this report.
- 2.3.65 During the operation phase of the WDII&CWB projects, the ALE will be in operation. The impact assessment for the operation phase of the WDII and CWB projects has taken into consideration the completed ALE.

## 2.4 Project Requirements, Scope and Benefits

### *Project Requirements*

- 2.4.1 The basis of the WDII project and the core transport infrastructure for which the project provides is the Trunk Road. The Trunk Road is defined from the connection with the existing Rumsey Street Flyover in Central, through to a connection with the existing IEC to the east of the Causeway Bay Typhoon Shelter. At the Rumsey Street Flyover connection, a Central Interchange will provide connections into the Central area, and then the Trunk Road will drop down into tunnel and run along the Central shoreline, through CRIII, to the WDII project area. In WDII, the Trunk Road will continue in tunnel until it needs to rise onto elevated flyover structure to connect with the elevated IEC. The section of the Trunk Road that runs in tunnel through CRIII and WDII is also known as the CWB, whilst the section of the Trunk Road on flyover, for the connection with the IEC, is also known as the IECL.
- 2.4.2 The Trunk Road will form an east-west strategic route through Central and Wan Chai. The Trunk Road is an essential element of Government's strategic transport planning for Hong Kong; it is the "missing link" in the strategic highway running along the northern part of Hong Kong Island. The Trunk Road is required to provide relief to the existing main east-west route (Connaught Road Central – Harcourt Road – Gloucester Road).
- 2.4.3 The Trunk Road was originally proposed under the Central and Wanchai Reclamation Feasibility Study, completed in 1989, where its feasibility was established. The need for the Trunk Road was reaffirmed in the WDIICFS, completed in 2001, which demonstrated an urgent need for the link to be put in place in order to relieve the existing and growing congestion along the east-west corridor of Hong Kong Island North. A number of strategic traffic studies have also confirmed the need to improve the flow of the east-west traffic through Central and Wan Chai, including the Long Term Road Study completed in 1968 and the First, Second and Third Comprehensive Transport Studies (CTS) completed in 1976, 1989 and 1999 respectively. A recent rerun of the CTS-3 transport model also confirmed the need for the CWB despite changes in land use planning assumptions and population projections.
- 2.4.4 Following the 9 January 2004 CFA ruling on compliance with the PHO, the compelling and present need for the Trunk Road to meet the transport needs of the community within a reasonable and definite planning time frame, and to meet the social and economic needs of the community, was established under the CRIII project, and is presented in "A Review of Central Reclamation Phase III by applying the Court of Final Appeal's "Overriding Public Need Test" April 2004".
- 2.4.5 Under the WDII project, the compelling and present need for the Trunk Road has also been confirmed. Reference can be made to the "Report on Cogent and Convincing Materials to Demonstrate Compliance with the Overriding Public Need Test" (the CCM Report). The CCM Report can be viewed at the website: <http://www.devb-plb.gov.hk/reclamation/eng/ccm/cogent.htm>.
- 2.4.6 Apart from providing land for key transport infrastructure and reprovisioned waterfront facilities, the Project can also create a coherent pattern of land use and provide for the development of an appropriate waterfront 'edge' to the existing urban area.

### ***Project Scope***

2.4.7 The scope of the Project comprises:

- (i) Land formation for key transport infrastructure and facilities, including the Trunk Road (i.e. CWB) and the associated slip roads for connection to the Trunk Road and for through traffic from Central to Wan Chai and Causeway Bay. The land formed for the above transport infrastructure will provide opportunities for the development of an attractive waterfront promenade for the enjoyment of the public.
- (ii) Reprovisioning / protection of the existing facilities and structures affected by the land formation works.
- (iii) Extension, modification, reprovisioning or protection of existing storm water drainage outfalls, sewerage outfalls and watermains affected by the revised land use and land formation works.
- (iv) Upgrading of hinterland storm water drainage system and sewerage system, which would be rendered insufficient by the land formation works.
- (v) Provision of the ground level roads, flyovers, footbridges, necessary transport facilities and the associated utility services.
- (vi) Construction of the new waterfront promenade, landscape works and the associated utility services.
- (vii) The Trunk Road (i.e. CWB) within the study area and the associated slip roads for connection to the Trunk Road.

### ***Project Benefits***

2.4.8 The Project provides essential land for the construction of key transport infrastructure including the Trunk Road and the NIL and SCL. The road and rail routes are required to relieve congestion on the strategic east-west routes through Central, Wan Chai and Causeway Bay and on the public transport system, and their implementation is a core element of Government's transport planning strategy.

2.4.9 The Project also provides opportunity to create an attractive waterfront for the enjoyment of the public. At present, large parts of the Wan Chai, Causeway Bay and North Point waterfront are inaccessible to the public or are difficult to access. The land formed through this Project will be used to regenerate the waterfront into an attractive public resource that could be used for a wide range of recreational and tourism-related uses and functions, with easy access from the urban hinterland. In so doing, the waterfront will become, as it should, an integral element of the public asset currently provided by the harbour.

2.4.10 Environmental benefits of the project have been discussed in paragraph 2.4.18 below and are summarised in Section 15.2 of this EIA Report.

### *Consequences of Not Proceeding with the Project*

(i) Not able to meet the need for the Trunk Road

- 2.4.11 The need to provide a strategic trunk road along the northern shore of Hong Kong Island has long been identified. The Trunk Road is the missing link required to complete this strategic route. The Trunk Road is needed to divert through traffic away from the Central Business District and from the existing east-west traffic corridor of Connaught Road Central – Harcourt Road – Gloucester Road. It is also needed to cater for the anticipated natural growth of traffic and to alleviate the already existing congestion on the road networks. Without the Trunk Road, there will not be sufficient capacity to serve the heavy demands at both the strategic and local levels.
- 2.4.12 The existing east-west corridor (Connaught Road Central – Harcourt Road – Gloucester Road) serving the CBD on Hong Kong Island is already operating beyond its capacity, as can be observed on site. Previous and recent strategic transport studies have predicted further increase in traffic demand along the east-west corridor, and confirmed the need for a parallel east-west Trunk Road to avoid more extensive and frequent traffic congestion, and even gridlock, on the road network.
- 2.4.13 A district traffic study has confirmed that a dual 3-lane Trunk Road (or Central-Wan Chai Bypass), together with intermediate slip roads, is required to divert traffic away from the existing east-west corridor and to provide adequate relief to the corridor and the local road network.
- 2.4.14 Traffic management and fiscal measures are already in place to maximise the capacity of the existing road network and suppress traffic demand. Further measures including ERP have also been considered. However, all these existing and proposed measures, alone, cannot resolve the traffic congestion problem along the east-west corridor. In other words, the Trunk Road is essential, and ERP can complement the Trunk Road but cannot replace it.
- 2.4.15 The need for the Trunk Road has also been confirmed by the Expert Panel on Sustainable Transport Planning and Central-Wan Chai Bypass, comprising leading independent local and overseas transport planning experts. The Expert Panel supports the construction of the CWB to improve the reliability of the road network and to enhance multi-modal public transportation in the Connaught Road Central – Harcourt Road – Gloucester Road corridor. The Expert Panel agrees that the inability of the present infrastructure capacity to cope with the present and future travel demand would persist even if development in the Central reclamation area were stopped and territory-wide car ownership held unchanged from now until 2016, and therefore recommends the construction of the Trunk Road as a medium term solution to tackle the problem of deteriorating traffic congestion in the Central and Wan Chai area. The Expert Panel further supports the provision of the planned slip roads at the HKCEC area and at the Victoria Park Road / Gloucester Road / Hing Fat Street passageway, to magnify the benefits of the CWB. The Expert Panel also recognises the need for Road P2 both in the longer term and as an important ad interim measure in addressing traffic congestion in the Central reclamation area even before the CWB is implemented.

(ii) NIL and SCL

- 2.4.16 Land formed under the Project, in addition to providing for the construction of the Trunk Road, also provides for the construction of the NIL and the SCL. Should the Project not proceed, implementation of these rail routes will be severely constrained. This will have consequential adverse impacts on the planning and provision of public transport infrastructure.

(iii) No improvement of the waterfront

2.4.17 Should the Trunk Road not be implemented the requirement for land formation will fall away and opportunities to improve the existing waterfront would be limited. The following scenarios are likely:

- no new land will be available to upgrade and improve the waterfront;
- it will be difficult to realise the Town Planning Board's objectives stipulated in the Vision and Goals for Victoria Harbour to make the harbour attractive, vibrant, accessible and symbolic of Hong Kong;
- it will also be difficult to achieve the harbour-planning principles established by the HEC, including, amongst others, sustainable development, proactive harbour enhancement, vibrant harbour, accessible harbour and public enjoyment.

2.4.18 In environmental terms, the likely conditions in the absence of the project are:

- The existing odour nuisance at the CBTS would persist and no improvement of the situation would be expected. The Project will provide opportunities to remove the potential sources of odour nuisance within the CBTS so as to alleviate this existing environmental problem as well as to provide an acceptable environment for the future land uses within the project area.
- In the absence of project, similar air quality conditions along the northshore areas of Wan Chai, Causeway Bay and North Point as currently exist would be expected to continue. There would be no opportunity to improve air quality condition by diverting traffic underground. With the project, air quality at the east tunnel portal area of the proposed Trunk Road would be enhanced by the introduction of an electrostatic precipitator system<sup>1</sup> into the tunnel ventilation exhaust system and zero portal emission design<sup>2</sup> of the East Tunnel Portal.

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<sup>1</sup> **Electrostatic Precipitation**

The polluted tunnel air extracted from the eastern tunnel portal will be filtered by electrostatic precipitator installed at the East Ventilation Building to filter about 80% of the emitted RSP. The electrostatic precipitator filter is a well developed technology which has been widely used in Japan and some European countries. This will be the first application in Hong Kong under the CWB project. The filtered tunnel air will then be conveyed to the exhaust vent shaft. The current ventilation scheme aims at enhancing the air quality of the tunnel portal areas.

<sup>2</sup> **Zero Portal Emission Design**

For a typical unidirectional tunnel, tunnel traffic will create piston effect which will draw outside air from entry portal and drives the induced air to exit portal. Tunnel ventilation system will induce additional outside air to satisfy minimum air quality standard inside the tunnel in the event that piston effect alone is not able to induce adequate outside air to ventilate the tunnel. The tunnel air both induced by tunnel traffic and brought by tunnel ventilation system will escape through exit portal if no extraction system is provided upstream of the exit portal. If a powerful extraction system is provided upstream of the exit portal to extract all the polluted air, it is possible to have a system with "zero portal emission". The amount of air flow into the tunnel induced by traffic piston effect can be predicted by using the SES (subway environmental simulation) programme under all modes of traffic conditions. The portal extraction system will be designed with over capacity (about 20%) to cover the worst traffic scenario to ensure that no polluted tunnel air will escape through the exit portal. The extraction system will operate at reduced capacity to cover other scenarios when the emission rate of traffic induced air to exit portal is less than the maximum.

The current ventilation system proposed for the CWB project consists of three extraction fans for the eastern tunnel portal. Two fans will be adequate to extract all polluted air from the upstream tunnel section of the exit portal. The third fan would be used as standby in case one fan is under maintenance or out of order. Airflow direction sensor will be installed at the exit portal to monitor the airflow direction of the tunnel. This sensor will be used to control the operation of tunnel portal extraction system to ensure that the target of "zero portal emission" will be met. For reference, similar "zero portal emission" design has been adopted in Sydney M5 East Tunnel.



- In the absence of the project, the noise environment of the project area would be increased due to the natural growth of traffic. In the presence of the project, it would help lessen the traffic burden on Gloucester Road by diverting traffic to the proposed Trunk Road tunnel. There would be an improvement of the noise environment alongside Gloucester Road. Besides, the project would provide an opportunity to alleviate the noise impact at noise sensitive receivers along IEC at North Point area by installing the proposed landscaped deck at the east tunnel portal area of the Trunk Road and direct noise mitigation measures on the reconstructed IEC. In this regard, it is anticipated that the future noise environment would be improved in the presence of the project.
- No improvement of the existing landscape and visual conditions of the waterfront would be expected. With the implementation of the Project, there will be substantial to moderate positive landscape and visual impact along the new waterfront as the landscape and visual amenity are generally enhanced and strengthened.
- Water quality at Victoria Harbour would be similar for both the situations with and without the Project.

## 2.5 Consideration of Alternatives and Development of Preferred Option

### *Introduction*

- 2.5.1 Having established the need for the Trunk Road, any reasonable alternative to reclamation that may meet this overriding need must be determined. In other words, can an alternative alignment or form of construction for the Trunk Road be adopted that will obviate the need for reclamation? If there is a feasible “no reclamation” option, then it should be pursued. Only if the need for reclamation can be demonstrated to be necessary will scenarios involving minimum reclamation be contemplated.
- 2.5.2 A detailed examination of Trunk Road needs and constraints, including an exhaustive investigation into the need for reclamation for the Trunk Road construction and of alternative schemes that might do away with reclamation or, at least, minimise reclamation, has been carried out. A “Report on Trunk Road Alignments and Harbour-front Enhancement, April 2006” was submitted to the HEC Sub-committee on WDII Review, which set out the findings of these investigations and the conclusions regarding the need for reclamation and the minimum extent of reclamation. A copy of the report is given in Annex G of the CCM Report which can be viewed on the website at: [http://www.harbourfront.org.hk/eng/content\\_page/reportTRA.html?s=1](http://www.harbourfront.org.hk/eng/content_page/reportTRA.html?s=1).

### *Alternative Trunk Road Alignments and Construction Methods*

#### *Alignment Constraints*

- 2.5.3 In assessing the alignment of the Trunk Road through the WDII project area, the following constraints have to be considered:
- at the western end, connection to the Trunk Road tunnel to be constructed under the CRIII project is required;
  - at the eastern end, the Trunk Road needs to connect to the existing elevated IEC flyover structure;
  - provision of slip road connections in Wan Chai North and at Causeway Bay;
  - avoid affecting the MTR Tsuen Wan Line tunnel structure;
  - avoid affecting the Cross Harbour Tunnel (CHT) or conflicting with the rock anchors at the CHT tunnel portal;

- allow for proposed rail infrastructure: SCL and NIL; and
- avoid affecting existing services infrastructure such as electricity sub-stations and sewage treatment plants and the basement or piled foundations of existing developments along Wan Chai North, such as the HKCEC Extension, Grand Hyatt Hotel, Wan Chai Towers, Central Plaza, Renaissance Harbour View Hotel, Great Eagle Centre, Harbour Centre, China Resources Building and Sun Hung Kai Centre, etc.

#### *Trunk Road Route Assessment*

- 2.5.4 Alternative routeings for the Trunk Road along offshore, inland and foreshore corridors have been examined to determine practicable and feasible Trunk Road alignments. Trunk Road alignments are, however, constrained by existing development along the Wan Chai and Causeway Bay northshore area, existing cross harbour tunnels, proposed rail infrastructure and essential services infrastructure.
- 2.5.5 Offshore alignments are obstructed by the HKCEC Extension, will pose unacceptable risk to the Cross Harbour Tunnel when tunnelling beneath it, and cannot provide the necessary slip road connections. Due primarily to the physical conflict with the HKCEC Extension, Trunk Road offshore alignments are found to be not feasible.
- 2.5.6 Inland alignments are obstructed by existing development in Wan Chai North, including the HKCEC Phase I, Grand Hyatt Hotel, Great Eagle Centre and Sun Hung Kai Centre. Trunk Road inland alignments will also conflict with the proposed NIL and SCL rail infrastructure, and existing road and services infrastructure. Due to these physical conflicts, Trunk Road inland alignments are also found to be not feasible.
- 2.5.7 The feasible Trunk Road routeing is along the foreshore of Wan Chai and Causeway Bay. After crossing over the MTR Tsuen Wan line, the Trunk Road will run in shallow tunnel through the HKCEC water channel and along the Wan Chai shoreline. Thereafter, the Trunk Road can pass either below the Cross Harbour Tunnel portal in tunnel or over the top of the Cross Harbour Tunnel portal as flyover, continuing as either tunnel or flyover through the Causeway Bay Typhoon Shelter to a connection with the existing elevated IEC to the east of the typhoon shelter.
- 2.5.8 However, foreshore alignments do require reclamation for Trunk Road tunnel construction at the western end of WDII where the Trunk Road tunnel crosses over the MTR Tsuen Wan Line, and at the eastern end of WDII where the Trunk Road tunnel must rise to ground level for the connection with the elevated IEC, at least.

#### *Alternative Trunk Road Ideas*

- 2.5.9 The following alternative Trunk Road ideas, including suggestions received from the public through the Envisioning Stage public engagement exercise, have been examined to determine if they would constitute a feasible “no reclamation” option, or result in an avoidance of reclamation:
- deep bored tunnel
  - double-decking over Gloucester Road
  - full flyover idea
  - total offshore idea
  - shallow water idea.

- 2.5.10 All the alternative Trunk Road ideas that have been proposed to avoid reclamation are found either to be not feasible, or result in an even greater area of reclamation or affected area of the harbour than a foreshore alignment constructed as cut-and-cover tunnel and flyover.

#### *Alternative Construction Methods*

- 2.5.11 For the feasible Trunk Road routeing along the foreshore of Wan Chai and Causeway Bay, the Trunk road will start in tunnel at the connection with CRIII, crossing over the MTR Tsuen Wan line, and staying in shallow tunnel through the HKCEC water channel and along the Wan Chai shoreline. Thereafter, the Trunk Road can pass either below the CHT portal in tunnel or over the top of the CHT portal as flyover, continuing through the CBTS to a connection with the existing elevated IEC to the east of the typhoon shelter.
- 2.5.12 For tunnel options, cut-and-cover tunnel construction is considered to be a technically feasible form of construction for implementation of the Trunk Road.
- 2.5.13 Whilst there is broad support from the public for a tunnel option, especially where this can incorporate suggested harbour-front enhancement ideas while at the same time provide for the functional requirements of the Trunk Road, a flyover option is also technically feasible. This option has therefore also been considered, in particular as it represents a scheme requiring a lesser area of new land formation. At issue, though, is which option, tunnel or flyover, would comply with the PHO.
- 2.5.14 At-grade Trunk Road options are not acceptable as they would require extensive reclamation in the CBTS, thus not complying with the PHO, and the reclaimed land would be used mainly for roads, leaving little opportunity for harbour-front enhancement.

#### *Comparison of Feasible Trunk Road Options*

##### *Tunnel Option*

- 2.5.15 For the tunnel option for constructing the Trunk Road, three variations have been considered. These three variations are illustrated in **Figures 2.1 to 2.3**. Key features of the three variations are briefly described as follows:

##### Variation 1

- 2.5.16 The Trunk Road tunnel to be constructed under CRIII will be extended eastward to pass underneath the existing rock anchors of the CHT portal structure, and continues the tunnel to the east of the Causeway Bay Typhoon Shelter (CBTS) and connects to the northern side of the existing IEC.

##### Variation 2

- 2.5.17 The Trunk Road tunnel to be constructed under CRIII will be extended eastward to pass underneath the CHT at a position to the south of that in Variation 1 to avoid the rock anchor zone, and continues the tunnel to the east of the CBTS and connects directly into the IEC by reconstructing a section of the existing IEC. For widening the harbour-front promenade adjoining the CBTS and provision of a wide landscaped deck for extending Victoria Park to the harbour-front, the Victoria Park Road and associated connecting roads would be realigned inland.

### Variation 3

- 2.5.18 Except that the tunnel passes underneath the rock anchors of the CHT portal as in Variation 1, other arrangements will be similar to Variation 2.

#### *Flyover Option*

- 2.5.19 Under the flyover option, the tunnel to be constructed under CRIII will be extended eastward, and will rise up onto an elevated road structure at the waterfront opposite to the Wan Chai Sports Ground. **Figure 2.4** illustrates this option.
- 2.5.20 The PHO requires the Harbour to be protected and preserved as a special public asset and a natural heritage of Hong Kong people. Therefore, when examining options for the Trunk Road, the one that may serve best to protect and preserve the Harbour should be identified. For the flyover option, the land formation by physical reclamation together with the water areas of the Harbour affected by flyover structures should be taken into account.

#### *Comparison of Trunk Road Tunnel Variations*

- 2.5.21 **Table 2.1** provides a comparison between the Trunk Road Tunnel Variations 1, 2 and 3, in broad terms, in respect of key indicators: area of reclamation, impacts to existing traffic, technical highway concerns and impacts to existing highway structures, impacts to existing development, planning and land use considerations, environmental concerns, time for construction and costs.
- 2.5.22 The following major issues are highlighted as being of particular concern:
- more reclamation due to filling in of the corners of the Causeway Bay Typhoon Shelter (south-east and south-west corners for Variation 2, south-east corner for Variation 3);
  - major road diversions and traffic impacts during construction (particularly for Variations 2 and 3);
  - intrusion into and demolition of Victoria Park for the construction of the realigned Victoria Park Road (both Variations 2 and 3);
  - need for the reconstruction of major existing highway structures, including the IEC, Gloucester Road Flyover and the newly constructed Causeway Bay Flyover (both Variations 2 and 3);
  - demolition of the Police Officers' Club (Variation 2);
  - air quality concern at the tunnel portal, due to close proximity of residential units (all tunnel variations, but more so for Variations 2 and 3).
- 2.5.23 It should be noted that the areas of reclamation given in **Table 4.1** are the areas of permanent reclamation, and include a notional allowance for reprovisioning requirements (for ferry pier, salt water pumping station, cooling water pumping stations, etc) associated with each of these tunnel variation options.

**Table 2.1 Comparison of Trunk Road Tunnel Variations**

	<b>Tunnel Variation 1</b>	<b>Tunnel Variation 2</b>	<b>Tunnel Variation 3</b>
Area of permanent reclamation	15 ha	18.5 ha	16.5 ha
Impact to existing traffic	<ul style="list-style-type: none"> <li>Some disruption at new tie-in to IEC</li> </ul>	<ul style="list-style-type: none"> <li>Major disruption due to demolition of IEC and new tie-in to IEC</li> <li>Major disruption due to reconstruction of Victoria Park Road, Causeway Bay Flyover and Gloucester Road Flyover</li> <li>Major disruption at CHT approach roads due Trunk Road tunnel construction</li> </ul>	<ul style="list-style-type: none"> <li>Major disruption due to demolition of IEC and new tie-in to IEC</li> <li>Major disruption due to reconstruction of Victoria Park Road, Causeway Bay Flyover and Gloucester Road Flyover</li> </ul>
Other technical concerns (impacts to highways structures, etc.)	<ul style="list-style-type: none"> <li>Localised reconstruction of existing IEC at City Garden for merging with the Trunk Road</li> </ul>	<ul style="list-style-type: none"> <li>Reverse curves at the CHT area: undesirable for Trunk Road in tunnel</li> <li>Reconstruction of Victoria Park Road and associated connections and Causeway Bay Flyover and Gloucester Road Flyover</li> <li>Demolition of existing IEC from Victoria Park Road to City Garden</li> </ul>	<ul style="list-style-type: none"> <li>Reconstruction of Victoria Park Road and associated connections and Causeway Bay Flyover and Gloucester Road Flyover</li> <li>Demolition of existing IEC from Victoria Park Road to City Garden</li> </ul>
Impacts to existing development	Existing development not affected	POC needs to be demolished	Existing development not affected

		<b>Tunnel Variation 1</b>	<b>Tunnel Variation 2</b>	<b>Tunnel Variation 3</b>
Planning and land use concerns	Along Wan Chai shoreline	Land formed can be used for harbour-front enhancement and pedestrian access to the waterfront	Land formed can be used for harbour-front enhancement and pedestrian access to the waterfront	Land formed can be used for harbour-front enhancement and pedestrian access to the waterfront
	PCWA basin	PCWA basin can be developed into a vibrant marine recreational facility	PCWA basin can be developed into a vibrant marine recreational facility	PCWA basin can be developed into a vibrant marine recreational facility
	Northern side of Victoria Park	Victoria Park can be extended to the harbour-front via a landscaped deck over the ground level roads	Victoria Park is reconstructed with a wide landscaped deck over the ground level roads, to a widened promenade	Victoria Park is reconstructed with a wide landscaped deck over the ground level roads, to a widened promenade
	CBTS	The existing CBTS is preserved as far as possible	Filling in the corners of the CBTS can be used for additional waterfront uses	Filling in the south-east corner of the CBTS can be used for additional waterfront uses
Environmental concerns	Noise & Air	<ul style="list-style-type: none"> <li>• (Lesser) air quality concern at tunnel portal</li> <li>• Noise at tie-in to IEC (short 'new road' section)</li> </ul>	<ul style="list-style-type: none"> <li>• Air quality concern at tunnel portal</li> <li>• Noise along reconstructed IEC (long 'new road' section)</li> </ul>	<ul style="list-style-type: none"> <li>• Air quality concern at tunnel portal</li> <li>• Noise along reconstructed IEC (long 'new road' section)</li> </ul>
	Water Quality	No major operational impacts due to the scheme	No major operational impacts due to the scheme	No major operational impacts due to the scheme
	Visual	No significant visual impacts	No significant visual impacts	No significant visual impacts
Time for construction		7 years	8 years	8 years
Costs (incl WDII works & CWB in WDII)	Total Construction	HK\$20B	HK\$28B	HK\$25B
	Total Annual Recurrent	HK\$110M	HK\$125M	HK\$123M

- 2.5.24 It should also be noted that there will be a requirement for temporary works (including temporary reclamation) to facilitate cut-and-cover tunnel construction and for temporary traffic diversions. These temporary works will be required in the ex-PCWA basin and in the Causeway Bay Typhoon Shelter. In the Causeway Bay Typhoon Shelter, the extent of the temporary works, for all three tunnel variations, will be such that the existing moorings will need to be relocated outside the typhoon shelter during the construction period.
- 2.5.25 As can be seen, neither Tunnel Variation 2 nor 3 perform as well as the Trunk Road Tunnel Variation 1. The major drawbacks of Tunnel Variations 2 and 3 include additional reclamation for filling in of the corners of the Causeway Bay Typhoon Shelter, major traffic disruption, demolition of a large part of Victoria Park, demolition and then reconstruction of major highway structures, and air quality concerns at the tunnel portal area in North Point.
- 2.5.26 The reclamation issue is particularly important in respect of the PHO. The Trunk Road Tunnel Variation 1 requires a lesser extent of reclamation than that associated with the Tunnel Variations 2 and 3.

*Comparison of Tunnel and Flyover Options*

- 2.5.27 **Table 2.2** provides a comparison between the tunnel and flyover options in broad terms, in respect of key indicators: affected area of the Harbour, impacts to existing traffic, technical highway concerns and impacts to existing highway structures, planning and land use considerations, environmental concerns, time of construction, and costs. Trunk Road Tunnel Variation 1 is used as the basis of tunnel option comparison. The key issue that is of concern in respect of the PHO is the area of the Harbour that will be affected by the tunnel and flyover options.
- 2.5.28 The PHO requires the Harbour to be protected and preserved as a special public asset and a natural heritage of the Hong Kong people, and establishes a presumption against reclamation in the Harbour. Notwithstanding that there is an overriding need for reclamation for the project, it is essential to find the option that will best serve to protect and preserve the Harbour, with the minimum area of the Harbour affected by reclamation. In this regard, the area of the Harbour affected by the alternative Trunk Road tunnel and flyover options is of concern. The flyover structures over water will impinge upon the water area of the Harbour and their visual impacts do not promote the protection and preservation of the Harbour. Moreover, where the marine use of existing water areas is restricted due to the presence of highway structures and the like, these affected water areas may not be regarded as “protected” or “preserved” for the purposes of the PHO.
- 2.5.29 Therefore, when examining Trunk Road options, and especially when examining the flyover option, the land formation by physical reclamation is taken into account together with the water areas of the Harbour affected by flyover structures in order to determine which option may serve best to protect and preserve the Harbour.

**Table 2.2 Comparison of Tunnel and Flyover Options**

		<b>Tunnel Option (Tunnel Variation 1)</b>	<b>Flyover Option</b>
Affected area of the Harbour:			
(a) Land formed		15 ha	11.5 ha
(b) Flyover structures over water		0.5 ha	3 ha
(c) Affected water area		-	4 ha
Impact to existing traffic		Some disruption at new tie-in to IEC	<ul style="list-style-type: none"> <li>Major disruption at new tie-in to IEC</li> <li>Major disruption due to reconstruction of Victoria Park Road connections</li> </ul>
Other technical concerns (impacts to highways structures, etc)		Localised reconstruction of existing IEC at City Garden for merging with the Trunk Road	Reconstruction of existing IEC from Victoria Park Road to Victoria Centre
Planning and land use considerations	Along Wan Chai shoreline	Land formed can be used for harbour-front enhancement and pedestrian access to the waterfront	Land formed is partly occupied by the tunnel portal which constrains the extent of area for harbour-front enhancement and pedestrian access to the waterfront
	PCWA basin	PCWA basin can be developed into a vibrant marine recreational facility	Highway bridge piers and the low headroom clearance of the flyover restrict the development of the PCWA basin as a recreational facility
	Northern side of Victoria Park	Victoria Park can be extended to the harbour-front via a landscaped deck over the roads	With the flyover running along the northern side of Victoria Park, the landscaped deck over Victoria Park Road and extension of Victoria Park are impractical
	CBTS	The existing CBTS is preserved as far as possible	Part of the water area and the existing promenade will be occupied by bridge piers
	North Point	Seaward portions of existing and planned developments from Hing Fat Street to Oil Street are affected. Part of land formed can be used for harbour-front enhancement and pedestrian access	No major impact on existing and planned developments



		<b>Tunnel Option (Tunnel Variation 1)</b>	<b>Flyover Option</b>
Environmental concerns	Noise & Air	<ul style="list-style-type: none"> <li>Air quality concern at tunnel portal</li> <li>Noise at tie-in to IEC (short 'new road' section of IEC)</li> </ul>	Significant air and noise impacts along flyover section in Causeway Bay and reconstructed IEC at North Point ('new road')
	Water Quality	No major operational impacts due to the scheme	No major operational impacts due to the scheme
	Visual	No significant visual impacts	Significant impacts in Wan Chai and (especially) in Causeway Bay (flyover along part of Wan Chai shoreline and through CBTS)
Time for construction		7 years	6 years
Costs  <i>(including WDII works &amp; CWB in WDII)</i>	Total Construction	HK\$20B	HK\$11B
	Total Annual Recurrent	HK\$110M	HK\$75M

2.5.30 In most respects, it is found that the Trunk Road tunnel option (Tunnel Variation 1) performs better than the flyover option. The tunnel option:

- will result in a lesser affected area of the Harbour;
- will cause less traffic disruption during construction;
- will not require any major reconstruction of existing highway structures;
- will have more opportunities for harbour-front enhancement and providing access to the waterfront;
- will cause less extensive air and noise impacts (although air quality at the tunnel portal will need to be carefully addressed);
- will have no significant visual impacts (the flyover, on the other hand, will have significant visual impacts along the harbour-front).

2.5.31 Only in respect of time for construction and costs can the flyover option be seen as performing better than the tunnel option.

2.5.32 The key issue of concern is which option would serve best to protect and preserve the Harbour. In addressing this concern, the area of the Harbour that is affected by the Trunk Road options should be taken into account, including not only land formed by reclamation but also the impingement of highway structures on the existing water areas and the restricted use of water areas due to the presence of the highway structures (ie the areas where the functionality of the Harbour is adversely affected). In addition, the visual aspects of the flyover option (viewed in terms of "preserving the Harbour") should be considered. In these respects, the Trunk Road tunnel option is clearly the option that would serve best to protect and preserve the Harbour.

### *Conclusion of the Comparison of Trunk Road Options*

- 2.5.33 Comparing the tunnel variations, Tunnel Variation 1 is found to require the least extent of reclamation, would cause the least disruption to traffic during construction, has the least impacts to existing highway infrastructure and the least impacts to Victoria Park. It should be noted that, when considering Trunk Road variations having similar functional/traffic performance (ie in meeting the overriding need), the CFA ruling on the PHO requires that the one with the least amount of reclamation (in this case Tunnel Variation 1) should be selected. Therefore, of these tunnel variations, Trunk Road Tunnel Variation 1 is recommended, in compliance with the requirements of the PHO.
- 2.5.34 Although both capital and annual recurrent costs would be higher for the Tunnel Option when compared with the Flyover Option, the Tunnel Option is recommended, in compliance with the requirements of the PHO, primarily because the affected area of the Harbour would be smaller and it would cause less visual impact than the Flyover Option.
- 2.5.35 Trunk Road Tunnel Variation 1 affects the minimum area of the Harbour and serves best to protect and preserve the Harbour, among all the options that have been assessed.

### *Public Views*

- 2.5.36 The first stage of the HER project, the Envisioning Stage, had as its purpose the engagement of the community at an early stage to solicit their visions on the need for and the form of Trunk Road as well as the types of harbour-front developments they aspire for at Wan Chai, Causeway Bay and the adjoining areas. Five public forums and two community design charrettes were convened during May to July 2005, and opinion surveys were carried out. These public engagement activities were well received by the public, in particular by the key stakeholders, as providing a platform for thorough exchange of views, rational discussions and consensus building.
- 2.5.37 The public's views collected and findings of the Envisioning Stage are presented in a Public Engagement Report, March 2006. The report can be viewed on the HEC website at: [http://www.harbourfront.org.hk/eng/content\\_page/doc/engagement\\_report/Main\\_Report.pdf](http://www.harbourfront.org.hk/eng/content_page/doc/engagement_report/Main_Report.pdf).
- 2.5.38 In addition, discussions with the Town Planning Board, Legislative Council (LegCo), District Councils and relevant statutory and advisory bodies have also been held, as part of an on-going and continuous process of public engagement for seeking consensus on the project proposals. In particular, the Town Planning Board, relevant District Councils, LegCo Planning Lands and Works (PLW) Panel, Transport Advisory Committee and professional institutions were further engaged from April to May 2006 on the findings regarding alignments and construction forms for the Trunk Road and harbour-front enhancement ideas.
- 2.5.39 The general sentiment of the public, in respect of the Trunk Road ideas and aspirations for harbour-front enhancement, expressed through the Envisioning Stage consultation, includes:
- a preference for having the Trunk Road in tunnel;
  - generally, an acceptance of the need for reclamation for shallow tunnel construction at the HKCEC and along the Wan Chai shoreline;
  - but, rather have tunnel options that do not result in reclamation in the Causeway Bay Typhoon Shelter.

- 2.5.40 Overall, Trunk Road Tunnel Variation 1 is seen as the best option in complying with the PHO, and this Trunk Road option has clearly expressed support as the preferred Trunk Road scheme.

### *Alternative and Preferred Development Scheme*

#### *Preferred Trunk Road Option*

- 2.5.41 The preferred Trunk Road Option, Trunk Road Tunnel Variation 1, provides for the necessary functional requirements of the Trunk Road, in meeting the overriding need for the Trunk Road, as well as resulting in the least affected area of the Harbour, in conformance with the PHO.
- 2.5.42 A detailed examination of Trunk Road needs and constraints, including an exhaustive investigation into the need for reclamation for the Trunk Road construction and of alternative schemes that might do away with reclamation or, at least, minimise reclamation, as well as review of harbour-front enhancement suggestions put forward by the public and the consolidation of these with the Trunk Road ideas, has been carried out. These have been described briefly above; more details on these assessments can be found in the “Report on Trunk Road Alignments and Harbour-front Enhancement”. After due consideration of these investigations, the HEC Sub-committee on WDII Review agreed at their meeting on 13 June 2006 to endorse Trunk Road Tunnel Variation 1 as the basis for proceeding to the next stage of the WDII Review, the preparation of the Concept Plan.

#### *Alternative Development Options*

- 2.5.43 At the Envisioning Stage, alternative development options with different land uses for the harbour-front area have been proposed, such as proposals for lots of water sports and tourism activities along the water front, proposals for an informal waterfront along the study area as compared to a formal waterfront along Central waterfront, proposals for berthing facilities for visiting vessels with floating piers, openable footbridge link to the breakwater, urban beach at Causeway Bay Typhoon Shelter, extending Victoria Park to the waterfront, develop a lively harbour-front area at ex-PCWA, etc.
- 2.5.44 A Consolidation Forum was convened on 12 November 2005 to share with the public the comments and the different proposals received during the public enhancement activities held from May to July 2005 for the Envisioning Stage, and to involve the public in consolidating these views before proceeding with the preparation of the Concept Plan for the development and enhancement of the harbour-front area.
- 2.5.45 Details of the different development options proposed and the outcome of the Consolidation Forum at the Envisioning Stage are given in the Public Engagement Report, March 2006. The report can be viewed on the HEC website at: [http://www.harbourfront.org.hk/eng/content\\_page/doc/engagement\\_report/Main\\_Report.pdf](http://www.harbourfront.org.hk/eng/content_page/doc/engagement_report/Main_Report.pdf). The outcomes of the Envisioning Stage on the development options and harbour-front enhancement then formed the basis of the preparation of the Concept Plan in the Realization Stage. The consolidated ideas for the preparation of Concept Plan are given below.

*Concept Plan for the Proposed Development Scheme*

2.5.46 At the Envisioning Stage, there were many common land use concepts proposed for the harbour-front to enhance its vibrancy and attractiveness. These are mainly reflected in the following activity nodes:

- a Cultural Node at the Hong Kong Convention and Exhibition Centre (HKCEC) area;
- a Green Leisure Zone at the Wan Chai waterfront; provision of water features has also been proposed;
- a Water Sports/Activity Node at the ex-Public Cargo Working Area (PCWA) basin;
- a Heritage Zone at the CBTS;
- a Green Leisure Zone at the North Point waterfront.

2.5.47 These harbour-front suggestions have been consolidated with the Trunk Road Tunnel Variation 1 option, together with appropriate waterfront land use and landscape treatment. Harbour-front enhancement themes (arts, culture and heritage, leisure and recreation) are used to reinforce identity and provide variety and interest along the waterfront. The Concept Plan, as illustrated in **Figure 2.5**, that has been developed presents five “character precincts” as follows:

- an “arts and culture precinct” to the west of the HKCEC, for arts and cultural fairs, outdoor performance venues, an expo promenade, etc;
- a “water park precinct” along the Wan Chai shoreline, with landscaped recreational areas incorporating water features and alfresco dining (outdoor cafes, etc) to add vibrancy to the waterfront;
- a “water recreation precinct” at the ex-PCWA basin for water sports and recreation, berthing for visiting ships or yachts, and with a water sports centre and harbour education centre;
- a “heritage precinct” at the CBTS, preserving the existing typhoon shelter and taking advantage of the floating Tin Hau Temple, Noonday Gun, etc, and with a landscaped deck providing an extension of Victoria Park to the waterfront;
- a “leisure and recreation precinct” at the North Point new waterfront providing a waterfront park, with landscaped recreational areas.

2.5.48 The Concept Plan, for the development and enhancement of the harbour-front under the ambit of the WDII Review, has been prepared for evaluation and consensus building by the public in the Realization Stage. At a Consensus Building Town Hall meeting on 16 December 2006, there was general agreement with the proposals put forward by the Concept Plan, in respect of the Trunk Road proposal and the envisaged land uses. There was a consensus that the Concept Plan would form the basis to proceed with the Detailed Planning Stage. The Recommended Outline Development Plan (RODP) as illustrated in **Figure 2.5a**, which sets out detailed land use proposals, has been prepared based on the Concept Plan. The RODP can be viewed on the HEC website at: [http://www.harbourfront.org.hk/eng/content\\_page/doc/RODP.pdf](http://www.harbourfront.org.hk/eng/content_page/doc/RODP.pdf).

2.5.49 The public’s views collected on the Concept Plan and findings of the Realization Stage are presented in a Public Engagement Report, April 2007. The report can be viewed on the HEC website at: [http://www.harbourfront.org.hk/eng/content\\_page/engage.html?s=2](http://www.harbourfront.org.hk/eng/content_page/engage.html?s=2).

### *Alternative Slip Road 8 Alignments*

- 2.5.50 Slip Road 8 will encroach into Victoria Park, affecting existing trees, recreational facilities and open spaces. Alternative alignments have been thoroughly examined with a view to minimising these impacts. A discussion paper that explains the considerations in examining the alignment of Slip Road 8 and associated at-grade road layout has been prepared and is attached in **Appendix 2.4**.
- 2.5.51 With reference to this discussion paper, amongst the different options of Slip Road 8 alignments, Option 1B, which has no encroachment into the North Pavilion Garden of Victoria Park, has been adopted. The final layout of Slip Road 8 and associated at-grade roads is given in **Appendix 2.4**.
- 2.5.52 Although the existing facilities and trees at the North Pavilion Garden will not be affected, Slip Road 8 will affect part of the bowling green and the nursery compound at the north of the Victoria Park. The reprovisioning of affected facilities at Victoria Park is given in Annex A of **Appendix 2.4**.

### *Alternative Tunnel Portal Locations*

- 2.5.53 The location of tunnel portal is directly related to the alignment of the Trunk Road, including both the vertical and horizontal alignments. The preferred Trunk Road Option, Trunk Road Tunnel Variation 1, provides for the necessary functional requirements of the Trunk Road, in meeting the overriding need for the Trunk Road, as well as resulting in the least affected area of the Harbour, determined as described above. The location of tunnel portal follows the alignment for Trunk Road Tunnel Variation 1.
- 2.5.54 Alternative tunnel locations have been included in the examination of alternative Trunk Road alignments and forms of construction, for example a portal location at Wan Chai North (flyover option) and further east along the North Point shoreline (deep bored tunnel option). Alternative tunnel portal locations, such as extending the tunnel and portal eastward, would result in more affected area of the Harbour as compared to the Trunk Road Tunnel Variation 1 and would not be in compliance with the PHO. These alternative tunnel portal locations are not recommended, nor are they permitted under the PHO.
- 2.5.55 Although the location of the tunnel portal is driven by the Trunk Road scheme with the minimum extent of reclamation and the least affected area of the Harbour, opportunity has been explored to enhance the east tunnel portal area. A landscaped deck has been proposed over the east tunnel portal area as shown in the Concept Plan (**Figure 2.5**) and the RODP (**Figure 2.5a**).

### *Alternative locations of Ventilation Buildings and Administration Building*

- 2.5.56 The location of the Central Ventilation Building is determined by the available area along the Trunk Road tunnel box in the Wan Chai north area, and is constrained by existing development and road and railway reserves. The proposed location at the west of the HKCEC and adjacent to the proposed landscaped deck is off the waterfront area and would not compromise the area for a promenade along the waterfront. The location of the Central Ventilation Building is shown in both the Concept Plan (**Figure 2.5**) and the RODP (**Figure 2.5a**). Alternative locations such as the open spaces next to the HKAPA Extension or even the waterfront open spaces at the east of HKCEC are not recommended as these locations would sacrifice the use of areas for other beneficial land uses, in particular, waterfront enhancement.

- 2.5.57 The location of the East Ventilation Building is determined by the available area along the Trunk Road tunnel box in the Causeway Bay and North Point areas. The proposed location at the north of the FEHD Whitfield Depot, at the west end of the North Point reclamation area, has been selected in order to increase the distance to the nearby residents as far as practicable. The building height has been minimised by placing some E&M equipment in a basement. The overall height of the building will be lower than the adjacent existing IEC elevated road.
- 2.5.58 During the Realization Stage of the HER public engagement activities, there were public views and suggestions on the location of East Ventilation Building proposed in the Concept Plan (**Figure 2.5**). The feasibility of separating the exhaust vent shaft further away from the ventilation building has consequently been considered. The enhanced proposal with the vent shaft separated from the East Ventilation Building and extended to the tip of the eastern breakwater of the CBTS has been incorporated in the RODP (**Figure 2.5a**). The air quality impact assessment presented in Section 3 of this EIA Report indicates that the predicted air quality at the air sensitive receivers (ASRs) would comply with the air quality objectives (AQOs).
- 2.5.59 Alternative locations of the vent shaft at the northern breakwater or the western breakwater of the CBTS have also been explored. In view of the small contribution of the exhaust from the vent shaft to the overall air quality, moving the vent shaft at the eastern breakwater of CBTS to the northern breakwater or the western breakwater of the CBTS would not result in any significant improvement of the predicted air quality at ASRs in North Point. From the perspective of noise impact, no difference is anticipated as the noise source is from the fixed plant of the ventilation fans installed inside the East Ventilation Building, instead of the vent shaft. The alternative locations will also have low energy efficiency as the tunnel emission will be required to be extracted from the East Ventilation Building to the northern breakwater or western breakwater through a much longer air ventilation duct than the one at the eastern breakwater. In addition, the location of the vent shaft at the northern breakwater or western breakwater is considered practically not feasible due to the following technical constraints:
- there are two major infrastructures located on both sides of the western breakwater namely the cross harbour gas main (about 30m west of the western breakwater) and immersed tube section of the CHT (about 60m east of the western breakwater). Any damage to these two major infrastructures would cause profound disruption to the gas supply and operation of the CHT. The construction of the air ventilation duct and vertical shaft in close proximity to these two infrastructures is extremely risky;
  - if the exhaust vent is located at the western breakwater, the air duct will go alongside the mainline tunnel of the CWB in order to reduce the construction difficulty and potential risk of being damaged. As the mainline tunnel will run below the CHT at around -30mPD, there will be substantial level difference of about 30m between the air ventilation duct and the ground level at the western breakwater. Only limited underground space in the vicinity of the CHT south tunnel portal, Hung Hing Road and RHKYC is available for the underground duct and the vertical air duct shaft. In order to bring the air ventilation duct to the ground level and extend it to the western breakwater while keeping it away from the CHT tunnel structure, the cross harbour gas main, the clubhouse building of the RHKYC, which is a potential heritage building, and a substantial portion of the RHKYC site will be affected;
  - the alignment of the CHT is right underneath the western end of the northern breakwater, any extension of the air ventilation duct to and construction of the exhaust vent at this location will entail reconstruction of the breakwater and impose great risk of damaging the immersed tunnel tube of CHT. Furthermore, the alignment of the proposed Shatin to Central Link (SCL) will run at about 150m to the east of the CHT in order to achieve a safe clearance from CHT during construction and operation of SCL in future. The required working space for constructing the SCL will further impose restriction on

locating the exhaust vent within the western and middle portions of the northern breakwater. Therefore, the exhaust vent cannot be practicably located at or near the western end and the middle portion of the northern breakwater in view of the constraints imposed by the CHT and the proposed SCL.

There is no better practically feasible alternative location than the proposed location of the vent shaft at the eastern breakwater of CBTS in terms of a balance of engineering practicality, environmental benefits and visual compatibility to the surrounding environment.

- 2.5.60 The height of the vent shaft is required to facilitate air dispersion and discharge. To achieve dispersion of the vitiated air from the tunnel to the open air, the recommended minimum height measured from the bottom of the louvres is 12.5m to provide the required stack height to prevent the tunnel exhaust from affecting future users of the breakwater. Besides, to allow an acceptable air discharge velocity and to achieve the required air flow rate, a minimum louvre area of 94m<sup>2</sup> should be provided and thus the height of the louvre is around 7.5m depending on the width of the louvre. Given the ground level of the eastern breakwater is around 5mPD, the height of the vent shaft is around +25mPD for a building height of around 20m.
- 2.5.61 The location of the Administration Building is selected at the least prominent location along the available waterfront area. It is proposed at a location underneath the elevated IEC, where other beneficial use is limited, and adjacent to the tunnel portal area, where the tunnel operation and maintenance vehicles can access the tunnel efficiently. The location of the Administration Building is shown in both the Concept Plan (**Figure 2.5**) and the RODP (**Figure 2.5a**). Alternative locations along the waterfront would compromise the opportunity for harbourfront enhancement and, hence, are not recommended.

#### *Alternative Reclamation Options and Shoreline Configurations*

- 2.5.62 The size of reclamation, and the corresponding shoreline configuration, is determined based on the minimum extent of reclamation that is needed to meet the essential engineering requirements for the construction of the Trunk Road. It is the minimum reclamation required to meet the overriding need for the Trunk Road. A step by step approach is taken to ensure the reclamation is the minimum extent required. The first step is to confirm that there is an overriding and present need for the Trunk Road. The next step is to identify any “no-reclamation options”. If there is no reasonable alternative to reclamation, the third step is to ensure that the reclamation is restricted to only the minimum amount necessary to meet the overriding public need.
- 2.5.63 The compelling and present need for the Trunk Road has been confirmed and reference can be made to the CCM Report. The need for the Trunk Road is explained in Section 2 of the CCM Report and also mentioned in paragraphs 2.4.10 to 2.4.17 above. The Trunk Road is the “missing link” in the strategic road network of Hong Kong and will provide the essential east-west linkage between Rumsey Street Flyover in Central and the IEC in Causeway Bay. The implementation of the Trunk Road will relieve the existing congested east-west corridor of Hong Kong Island North. The need for the Trunk Road has been clearly established through traffic and transport studies. The Expert Panel has confirmed the need for the Trunk Road and intermediate slip roads. The Expert Panel considers that the Trunk Road is essential for improving the reliability of the road network. The findings of the traffic and transport studies, and of the Expert Panel, demonstrate conclusively the compelling and present need for the Trunk Road.

- 2.5.64 The “no-reclamation” options are given in Section 3 of CCM Report. All possible alignments for the Trunk Road, including suggestions from the public, have been examined, taking into account land use and infrastructural constraints, with a view to determining if there are any that do not require any reclamation for the Trunk Road construction. It is found that the feasible Trunk Road routeing is along the foreshore of Wan Chai and Causeway Bay. However, foreshore alignments do require reclamation for Trunk Road tunnel construction at the western end of WDII where the Trunk Road tunnel crosses over the MTR Tsuen Wan Line, and at the eastern end of WDII where the Trunk Road tunnel must rise to ground level for the connection with the elevated IEC, at least. There is no feasible “no-reclamation” alignment for the Trunk Road, and at least some reclamation will be required for the Trunk Road construction.
- 2.5.65 The “Report on Trunk Road Alignments and Harbour-front Enhancement, April 2006” sets out the findings of the investigations on the alternative schemes of the Trunk Road and the conclusions regarding the need for reclamation and the minimum extent of reclamation. Reference is made to Annex G of the CCM Report which can be viewed at the website: [http://www.harbourfront.org.hk/eng/content\\_page/reportTRA.html?s=1](http://www.harbourfront.org.hk/eng/content_page/reportTRA.html?s=1). As given in the above paragraphs 2.5.1 to 2.5.41, the preferred Trunk Road option, Trunk Road Tunnel Variation 1, has been derived with a detailed examination of Trunk Road needs and constraints, including an exhaustive investigation into the need for reclamation for the Trunk Road construction and of alternative schemes that might do away with reclamation or, at least, minimise reclamation. Trunk Road Tunnel Variation 1 affects the minimum area of the Harbour and serves best to protect and preserve the Harbour, among all the options that have been assessed. This option has clearly expressed support as the preferred Trunk Road scheme, following extensive consultations with various public, advisory and relevant statutory bodies.
- 2.5.66 Details of the extent of reclamation, in respect of the engineering requirements for the construction of the Trunk Road tunnel, reclamation and seawalls, are presented in a “Minimum Reclamation Report”, a copy of which is appended at Annex O of the CCM Report which can be viewed at the web site: [http://www.devb-plb.gov.hk/reclamation/eng/ccm/annexO\\_e.pdf](http://www.devb-plb.gov.hk/reclamation/eng/ccm/annexO_e.pdf). Detailed examination of the engineering requirements in respect of highway geometric design and construction of the Trunk Road tunnel, reclamation and seawalls, and reprovisioning requirements, has been carried out to accurately determine the minimum extent of reclamation. In total, an area of 12.7ha of reclamation (in addition to an area of 0.4ha of affected water area by flyover structures) is needed to meet essential engineering requirements for construction of the Trunk Road. This is the minimum reclamation required to meet the overriding public need for the Trunk Road.
- 2.5.67 With the size of reclamation being minimised to the minimum extent to meet the overriding need for the Trunk Road, the affected area of the harbour, the foreshore and seabed is minimised, and the corresponding environmental impacts, such as marine ecological and cultural heritage impacts, on the foreshore and seabed are also minimised. Details of the marine ecology and cultural heritage impact assessment for the proposed scheme shall refer to the respective sections in this WDII&CWB EIA Report.
- 2.5.68 As presented in the “Minimum Reclamation Report”, as appended at Annex O of the CCM Report, the shoreline (ie the seawall copeline) is set at the minimum separation from the Trunk Road tunnel and it follows the curvature of the Trunk Road tunnel edge. Smooth curves have been adopted at indented areas rather than sharp corners along the shoreline, and a curved splay in the seawall is incorporated at the corner with Expo Drive East, where there is a drainage culvert. This smoothing of the shoreline will enhance flows and prevent accumulation of pollutants or floating refuse.



## 2.6 Construction Methods and Engineering Requirements

- 2.6.1 Alternative construction methods have been considered in the CCM Report. Deep bored tunnel construction is given in Section 3.4; immersed tube tunnel construction method is discussed in Section 4.2; temporary reclamation for tunnel construction below seabed is discussed in Annex O of the CCM Report.

### *Deep Bored Tunnel Construction*

- 2.6.2 A deep bored tunnel option for the Trunk Road has been examined with a view to avoiding reclamation. The idea being that a tunnel constructed by tunnel boring machine (TBM) at sufficient depth below the surface would not require reclamation and can be constructed without disturbing existing facilities and infrastructure.
- 2.6.3 However, at the western end of WDII, at the connection with the Trunk Road tunnel constructed under CRIII and for the crossing over the MTR Tsuen Wan line, the deep tunnel option must start off as shallow cut-and-cover tunnel, in reclamation, similar to all other Trunk Road options. At the eastern end, as the tunnel rises towards the seabed and ground cover becomes insufficient for the TBM construction, the form of construction needs to change to cut-and-cover tunnel, with associated reclamation to facilitate this construction along the North Point shoreline. Therefore reclamation is still essential and the bored tunnel is not a “no reclamation” option.
- 2.6.4 The major issue associated with a deep tunnel option is that the longer length of the Trunk Road tunnel along the North Point shoreline, all the way to the connection with the IEC near the North Point ferry piers, results in extensive reclamation along this part of the shoreline.
- 2.6.5 The issue of reclamation, and whether it is unnecessarily extensive, is the key concern in this instance. Because the bored tunnel must rise from a deeper level under the Causeway Bay Typhoon Shelter than the alternative cut-and-cover tunnel option, the tunnel portal will need to be located further to the east along the North Point shoreline, where there is no existing formed land that can be put to good use to accommodate the ground level tunnel portal, as is the case for the connection immediately to the east of the CBTS. As a consequence, the deep bored tunnel option will require a greater area of reclamation along the North Point shoreline than the alternative cut-and-cover tunnel option. As the deep tunnel option will result in a greater area of reclamation than an alternative available tunnel option, and as in any event the deep tunnel option does not perform as well as the alternative cut-and-cover tunnel option, there is no justification or overriding need to pursue this deep tunnel option. Furthermore, the affected area of the harbour, the foreshore and seabed, will be greater, and the corresponding environmental impacts, such as marine ecological impacts, would be greater than the adopted Trunk Road Tunnel Variation 1.

### *Immersed Tube vs Cut-and-Cover Tunnel Construction*

- 2.6.6 Immersed tube tunnel form of construction may be used where the tunnel lies just below seabed; reclamation would not be required for this form of tunnel construction. However, this form of construction is not suitable where the tunnel level rises above seabed level, as the exposed tunnel section would then be at risk of damage from ship impact, anchors, etc, the tunnel structure would be more susceptible to degradation in the aggressive marine environment, and the protrusion of the tunnel structure above the seabed would restrict marine access to the shoreline. Also, even where the tunnel lies below seabed level, the soft seabed materials would need to be excavated so that the immersed tube units lie in a trench on a firm foundation. Along the Wan Chai shoreline, this would involve excavating a deep trench immediately adjacent to the existing seawalls, which would undermine these seawalls. Use of immersed tube is therefore considered

not feasible in this instance, and the most practical and reasonable form of construction for the Trunk Road tunnel along the Wan Chai shoreline is cut-and-cover, constructed through reclaimed land.

- 2.6.7 Through the ex-PCWA basin and the CBTS, where the Trunk Road tunnel lies below seabed level, immersed tube or cut-and-cover tunnel construction may be considered. For both forms of construction, permanent reclamation is not required. In the case of cut-and-cover tunnel, temporary reclamation may be formed to facilitate the tunnel construction, but this can be removed on completion of construction so that the finished product, ie retention of the existing seabed condition, is the same for both methods. Factors to be considered in selecting an appropriate construction method include: whether the tunnel alignment runs wholly through seabed or partly in existing seabed and partly under existing seawalls and land formation, the latter making cut-and-cover construction more practically feasible (more efficient and cost effective construction with less disruption to existing shoreline facilities and infrastructure) than use of precast immersed tunnel sections that need to be placed in open trenches; the depth of the tunnel (where the tunnel lies at a significant depth below the seabed, for example near the Cross Harbour Tunnel crossing, at -30mPD, major deep and wide trenches will need to be excavated, making immersed tube construction more disruptive with greater impacts); or the tunnel length available for immersed tube construction (short lengths will not be cost effective for the precast fabrication of tunnel units). The form of tunnel construction is an important consideration in respect of avoiding conflict with the SCL, as Trunk Road cut-and-cover tunnel can be constructed across the future SCL alignment with much closer separation allowance. Because the Trunk Road tunnel is on diaphragm wall (piled) supports, it will not be structurally adversely affected by the construction of the SCL tunnels.
- 2.6.8 Where the Trunk Road tunnel rises up above the seabed to ground level, for the connection with the IEC at the eastern end of the CBTS, cut-and-cover tunnel in reclamation will again be the feasible form of construction.
- 2.6.9 In summary, cut-and-cover tunnel in reclamation is considered to be the practical and feasible form of construction for implementation of the Trunk Road at the west of the HKCEC, through the HKCEC water channel, along the Wan Chai shoreline and through the CBTS.
- 2.6.10 Cut-and-cover tunnel construction involves first installing the tunnel walls by using diaphragm walls (these are reinforced concrete wall panels constructed in existing ground from ground level down to the required depth, usually to the underlying rock layer) on both sides of the tunnel, then excavating the soil from between the diaphragm walls, constructing reinforced concrete top and bottom slabs between the diaphragm walls to form the tunnel box and, finally, backfilling over the tunnel. This form of construction is carried out in existing or formed land to provide the necessary construction access from the surface – should the tunnel alignment cross over seabed, reclamation will be required to first form the land through which the diaphragm walls need to be constructed.

2.6.11 Whereas cut-and-cover tunnel construction is the practical and feasible form of construction for the overall Trunk Road, there is localised section underneath the CHT portal approach ramp where the Trunk Road tunnel will be generally in rock. As mentioned in paragraphs 2.5.3 and 2.5.16 above, the Trunk Road tunnel will pass underneath the existing rock anchors of the CHT portal structure. The rock anchors, based on available as-built information, are installed to a depth of around -17mPD, therefore, allowing for minimum clearance beneath the anchors, the Trunk Road must pass beneath the CHT rock anchors and through the rock strata at a road level of around -30mPD. Drilling and breaking construction method will be carried out for this section of tunnel underneath the CHT. Small diameter drills will be used to drill through the rock to form a honeycomb type structure in the rock, which would then be easily broken out without the use of explosives or chemical expanding grouts. This construction method for hard rock tunnelling is considered to minimise the impacts on the existing CHT portal structure.

2.6.12 Alternative construction method like the drill-and-blast method which is normally used for tunnels through rocky hills and mountains, not for tunnels below seabed with mixed soil conditions, is considered not applicable in this case.

#### ***Piled-Deck Spanning across the MTR Tsuen Wan Line***

2.6.13 The Trunk Road must not impose any loads on, or cause any movement of, the existing MTR Tsuen Wan Line immersed tube tunnel. Tunnelling under the MTR tunnel at sufficient depth to avoid disturbance to the existing ground and movement of the MTR tunnel would result in exceedance of permissible tunnel gradients from the connection to the existing road network at the Central Interchange. A piled Trunk Road tunnel structure spanning across the MTR tunnel will be constructed to meet statutory limitations on allowable surcharge, lateral pressure and movement.

#### ***Temporary reclamation for tunnel below seabed***

2.6.14 The Trunk Road tunnel beneath the ex-PCWA basin and the CBTS will be constructed by cut-and-cover method, for which reclamation is required (as explained above). Through these areas, though, the Trunk Road tunnel structure lies at sufficient depth below the seabed that consideration can be given to removing the reclamation after the tunnel has been constructed. The criteria for deciding where the reclamation can be removed are: that the top tunnel should be deep enough to allow for adequate structural protection in the absence of the protective reclamation, and where the tunnel passes through anchorage areas, an additional seabed layer for ships's anchor embedment; and that the removal of reclamation should not have the effect of creating new embayments, in order to avoid water quality impacts.

2.6.15 Note that these temporary reclamation areas are not considered as areas affecting the harbour, insofar as they are short term (for the duration of the construction period) and solely for the purpose of achieving the end product (ie in order to ultimately achieve minimum reclamation). The temporary works will not cause permanent damage to the harbour.

#### ***Construction Methods for Other Infrastructure***

2.6.16 A number of existing waterfront facilities (ferry piers, drainage culverts, cooling water intakes, sewage outfall, etc.) will be affected by the WDII reclamation. Although these facilities will be reprovisioned under the Project, they should be kept functional and operational during reclamation until the reprovisioned facilities are constructed and available for use. There is therefore a requirement for reclamation to be carried out in stages, with careful planning of construction sequence for both the reclamation and reprovisioning works.

- 2.6.17 The resultant reclamation staging creates a number of relatively small and confined areas of land formation. Containment of fill within each of these areas by seawalls is proposed, with the seawalls constructed first and filling being carried out behind the seawalls. This method will allow the land area formed in each stage to be maximised and also has significant benefits in terms of water quality; by containing all filling behind seawalls, the release of suspended sediments during the filling operations will not impact the open water areas of the harbour.
- 2.6.18 Seawall construction will, in general, comprise wave energy absorbing caisson seawall units, where exposed to harbour waves, constructed on dredged foundations for stability reasons. These caisson seawall units will be in the form of precast caisson units. In lieu of casting the precast units at the works site, off-site (Mainland) precast yard will be used for casting of these precast units and transportation to the seawall construction site by sea will be the common alternative adopted for precast works.
- 2.6.19 Dredging of marine mud is required for the foundations of the seawalls, culverts, at-grade roads, and associated with the construction of the CWB tunnel. The minimum extent of dredging required for foundations of the seawalls, roads and drainage culverts, and for practical engineering and construction reasons due mainly to the narrow configuration of the reclamation, effectively results in a fully dredged approach over the length of the site. **Figure 2.6** indicates the proposed extent of dredging for the WDII project.
- 2.6.20 The use of marine sand fill is proposed, with fill placed behind the enclosing seawalls of each reclamation stage. The use of marine sand fill will enable the formed land to comply with required engineering and settlement performance criteria, with the fill placed within a very tight programme in order to meet critical project completion dates. Transportation of marine sand fill will mainly by barges to achieve the filling rate to meet the construction programme.
- 2.6.21 While marine sand is proposed to be used generally for filling, detailed investigations have been conducted to explore the possibility of using public fill and surplus rock fill from appropriate sources that may be identified during the detailed implementation stages of the project, where engineering, programme and implementation constraints permit. The investigations indicate that it is possible to use public fill from Penny's Bay Reclamation Stage 2 (PBR2) in the upper formation layers, above +2.5 mPD. For the temporary reclamation where settlement is not a major concern, public fill from PBR2 for the full depth of reclamation is proposed, to maximise the use of public fill materials. Transportation of public fill from PBR2 to the works site will mainly by barges as both the supply and demand locations are at their respective shorelines. Delivery of reused construction and demolition materials within the site and/or surplus materials to the public fill reception facilities will be by barges for large quantities and by truck for local and small quantities.
- 2.6.22 The reprovisioned Wan Chai East ferry pier will be a piled structure, similar to the existing pier structure. Some concrete members or panels of the ferry pier structure may be in the form of precast units. Similar to the precast caisson units, besides casting the precast units at the works site, off-site precast yard in Mainland for casting of these precast units and transportation to the seawall construction site by sea will be the common alternative adopted for precast works.
- 2.6.23 The work site for the project will be located within the construction works area and the duration of works are given in the construction programme (**Appendix 2.5**). Alternatively, precast or prefabrication work may be carried out at off-site area in Mainland China for casting of concrete precast units or prefabrication of structural members.

## 2.7 Operation of the Project

- 2.7.1 Operational activities, on completion of the Project, would comprise essentially traffic movements on the new roads and public use of the waterfront. The RHKYC will continue to operate as at present. Other than the new waterfront leisure uses, there are no major changes of land uses which will result in new operations not already taking place along this shoreline.

## 2.8 Works Programme

- 2.8.1 The construction works are anticipated to commence on site in early 2009, with completion of the project by 2016. A construction programme is presented in **Appendix 2.5** for reference.
- 2.8.2 As noted in Section 2.6 above, construction needs to be carried out in stages in order to meet the services and utilities reprovisioning requirements and construction sequencing constraints. A staged construction programme, with works in each area being carried out sequentially has been developed to meet the objectives of the Project. The staging of the reclamation works, with respect to the above issues and constraints, is shown indicatively in **Figures 2.7 to 2.19**. A brief description of the proposed works, with reference to the staging requirements, is given in the following paragraphs.

### *Implementation Staging*

- 2.8.3 The construction works can be considered in terms of three main works areas being, from east to west, the North Point and Causeway Bay Reclamation, the Wan Chai Reclamation and the HKCEC Reclamation.

### *North Point & Causeway Bay Reclamation*

- 2.8.4 The reclamation at North Point will be in a two stages. The central area of reclamation will commence first to provide land for temporary reprovisioning of the FEHD Depot while the new Depot is under construction. The reclamation on either side will follow subsequently but the construction of the Trunk Road tunnel structure, which is partly on existing land, will commence after the temporary relocation of the existing FEHD Depot. The land formation at the eastern end of this reclamation area will be handed over for the construction of the tunnel approach ramp and connecting to the existing IEC.
- 2.8.5 The temporary reclamation in the typhoon shelter is divided into four stages to avoid creating an embayed water area with a pond of stagnant water between the temporary reclamation and the existing seawall during construction, and to allow the reuse of filling and surcharge materials between reclamation stages.
- 2.8.6 Works for the North Point and Causeway Bay Reclamation will commence in early 2009. The permanent land formation at North Point will be completed by late 2010 for handing over of works area for construction of tunnel approach ramps. The Trunk Road tunnel structure will be completed by early 2015 for tunnel installations and fitting out. Operational completion of the Trunk Road will be in 2016.

### *Wan Chai Reclamation*

- 2.8.7 Four stages have been proposed for Wan Chai Reclamation, in addition to the temporary reclamation of the ex-PCWA basin. The first stage is constructed between the existing Wan Chai East sewage outfall and the existing seawater intakes for WSD and Sun Hung Kai. This land needs to be formed in advance to allow the diversions of the sewage outfall and seawater intake pipelines.
- 2.8.8 The following stages, on either side of this advance reclamation area, are constructed subsequent to the diversion of the sewage outfall and the seawater intakes. The construction sequencing of these stages also makes provision for the drainage outfalls from Marsh Road and Canal Road and caters for the temporary relocation of the Wan Chai to Hung Hom ferry services to temporary berthing facilities.
- 2.8.9 Works in this area also commence in early 2009, with land formation being completed by mid 2013 and the Trunk Road tunnel structure completed by mid 2014 for tunnel installations and fitting out. Operational completion of the Trunk Road will be in 2016.

### *HKCEC Reclamation*

- 2.8.10 Reclamation in this area takes place after diversion of the existing cooling water intakes to the intake chambers already provided on the north side of the HKCEC. Reclamation on either side of the MTR Tsuen Wan line will follow the bored pile wall construction on either side for the Trunk Road crossing over the MTR line. Reclamation of the HKCEC water channel takes place before adjacent reclamation to either the east or west of the HKCEC Extension so as to avoid embayment of this confined water area.
- 2.8.11 Reclamation in this area would commence in early 2009 and would be completed by mid 2012. The Trunk Road tunnel works would be completed by early 2014 for tunnel installations and fitting out. Operational completion of the Trunk Road will be in 2016.

## **2.9 Related Projects**

- 2.9.1 The following projects are related to the WDII and CWB project:
- (i) Civil Engineering and Development Department's CRIII project, comprising reclamation along the Central waterfront for transport infrastructure needs (including CWB and NIL) and basic land use requirements. A section of CWB tunnel will also be constructed under CRIII project. Construction will take place from February 2003 to September 2012.
  - (ii) Trade Development Council's Atrium Link Extension project, comprising a link bridge spanning across the water channel between the Hong Kong Convention and Exhibition Centre (HKCEC) Phase I and HKCEC Extension. Construction will take place from May 2006 to March 2009. No cumulative dust impact from the Atrium Link Extension Project is expected.