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**ACE-EIA Paper 7/2009**

*For advice*

**Environmental Impact Assessment Ordinance (Cap. 499)  
Environmental Impact Assessment Report  
Hong Kong Section of  
Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL)**

**PURPOSE**

This paper summarizes the key findings and recommendations of the Environmental Impact Assessment (EIA) report on the Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link (hereafter known as “the Project”), submitted under section 6(2) of the Environmental Impact Assessment Ordinance (EIAO). The EIA report will be presented by the applicant, MTR Corporation Limited, and their consultants at the meeting if necessary.

**ADVICE SOUGHT**

2. Members’ views are sought on the findings and recommendations of the EIA report.

**NEED FOR THE PROJECT**

3. The Project will form part of the national high-speed railway network, connecting Hong Kong with Guangzhou, with intermediate stations at Futian, Longhua and Humen, outside of Hong Kong. It will provide a fast and convenient railway service linking the cities, with the journey time between Hong Kong and Guangzhou reduced from about 100 minutes as at present to about 50 minutes. With the Project’s Mainland section connected to the Beijing-Guangzhou Passenger Line and the Hangzhou-Fuzhou-Shenzhen Passenger Line, Hong Kong can be connected directly with major Mainland cities, such as Beijing and Shanghai, as well as other major cities in the Pearl River Delta via the Intercity Rapid Rail.

4. The EIA report states that the Project will help promote Hong Kong as the gateway to the Pearl River Delta area, further strengthen the economic ties and cooperation between Hong Kong and the Mainland, promote mutual economic prosperity and development, and raise the competitiveness of the region as a whole.

## **DESCRIPTION OF THE PROJECT**

5. The Project is a 26 km long underground railway running from West Kowloon to boundary at Huanggang, as shown in **Figures 1 to 3**. The Terminus of the Project will be at West Kowloon in Hong Kong and will be provided with Boundary Crossing facilities. The Project comprises of a West Kowloon Terminus (WKT), eight ventilation buildings, one emergency access point, Stabling Sidings (SSS) and maintenance facilities at Shek Kong, and an Emergency Rescue Station (ERS) located next to the SSS. The Project constitutes a designated project (DP) by virtue of the following items in Schedule 2, Part I of the EIAO:

- (i) A railway and its associated stations (Item A.2 of Part I of Schedule 2 of the EIAO);
- (ii) a railway siding and maintenance workshop (Item A.4 of Part I of Schedule 2 of the EIAO);
- (iii) a railway tunnel more than 800 m in length between portals (Item A.7 of Part 1 of Schedule 2 of the EIAO); and
- (iv) project includes works partly or wholly in a country park or special area, a conservation area, and a site of special scientific interest (Item Q.1 of Part 1 of Schedule 2 of the EIAO).

## **VIEWS OF THE DIRECTOR AND RELEVANT AUTHORITIES**

6. The Director of Environmental Protection (DEP), in conjunction with the relevant authorities, considers that the EIA report meets the requirements of the EIA Study Brief and the Technical Memorandum on Environmental Impact Assessment Process (TM). DEP will take into account comments from the public and the Advisory Council on the Environment before deciding whether or not to approve the EIA report.

## ALTERNATIVES/OPTIONS

7. In the EIA report, alternatives/options with respect to railway alignment, locations of the major facilities and construction methods are provided. The preferred options have taken into account environmental factors as well as other considerations such as geographical and geological consideration, land resumption, site constraints, constructability, operation flexibility, maintenance and disruption to the community.

## SPECIFIC ENVIRONMENTAL ASPECTS TO HIGHLIGHT

### Ecology

8. During construction phase, the Project will have both underground works for tunnel construction and above-ground works such as for construction of ventilation buildings, the SSS and ERS in Shek Kong. There will also be marine dredging works at Lung Kwu Sheung Tan (LKST) to form a berthing area.

9. Regarding above-ground works area, the EIA report states that above-ground works are minimized through underground tunneling construction methods. Only several areas in the northern section of the Project have more natural habitats. Please refer to **Figure 4** for the map of “Protected Areas in the Northern Section of the XRL Project” extracted from the EIA report. In these works areas, the identified habitats are generally of low ecological value, and flora and fauna recorded are predominantly common species in Hong Kong. There would be approximately 53 ha of low value habitats lost, 60% of which are developed area/wasteground. The EIA report concludes that the direct ecological impact from the Project is low.

10. The construction of the SSS and ERS will affect watercourse habitat with size of approximately 2.32 ha. According to the EIA report, potential impacts on the watercourse habitats have been minimized, through the use of a flood bypass and incorporation of ecologically friendly channel features, such as natural stream bed substrate and vegetated stream banks, into the SSS open drainage channel sections to provide aquatic habitats for wildlife use. Under the current design, the total area of open channel to be provided will be approximately 2.42 ha.

11. Regarding underground works with the use of such as Tunnel Boring Machine (TBM) or blasting, the EIA report states that potential impacts on hydrology would be avoided through the implementation of suitable measures such as pre-excavation probing and grouting, closed face tunnel boring machine for tunnel boring, recharge wells, and groundwater monitoring.

12. Regarding marine works at LKST, the EIA report states that dredging works would last for approximately three months involving an area of about 0.65 ha. No species of conservation interest were found in the sub-tidal and intertidal marine ecological field surveys. The barging point area is not a habitat of high importance for Chinese White Dolphins and the potential impact to the dolphins and their habitats is considered to be low. There is no recent record of horseshoe crabs, and no significant impact on their potential habitats due to the proposed works is anticipated. According to the EIA report, given the low ecological significance of the impacted area and with the implementation of precautionary control measures, limited marine ecological impact is expected.

### Air-borne Noise

13. The Project requires construction works within a densely built-up urban setting and in rural areas. Assessments in the EIA report show that construction noise level of up to 91 dB(A)<sup>1</sup> is expected under the unmitigated scenario. Mitigation measures such as quieter plant, movable noise barriers, noise insulating fabric and acoustic enclosure are recommended. With these noise mitigation measures in place, there would only be exceedance of less than 3 dB(A) above the relevant standards at representative dwellings in West Kowloon and Shek Kong. Noise monitoring would be carried during construction to ensure the nuisance to residents would be kept to a minimal.

14. At the Hong Kong Institute of Vocational Education Haking Wong Waterfront Annex at Nam Cheong, the EIA report also states that construction noise level of up to 85 dB(A) is expected under the unmitigated scenario. With mitigation measures in place, the construction noise levels would be reduced to 77 dB(A), which still exceeds the relevant standards by 7 dB(A) during normal school hours. To avoid adverse impacts to the school, no noisy construction works would be allowed during the school examination period.

15. The unmitigated operational train noise from trains passing through the ERS at high speed and trains going to and from the SSS at Shek Kong is predicted to be 1-15 dB(A) above the appropriate standard. With noise control measures including a 8 m high noise barrier next to the ERS and absorptive panels inside the ERS, the mitigated operational train noise is expected to comply with the relevant standards.

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<sup>1</sup> According to the TM, the daytime standards for domestic premises and hotels is 75 dB(A). For educational institutions and all other where unaided voice communication is required, the standard is 70 dB(A) (65 dB(A) during examination).

## Ground-borne Noise

16. Regarding the ground-borne construction noise arising from the use of TBM, there would be exceedance of up to 15 dB(A) above the relevant criteria at a few sensitive receivers in West Kowloon and Shek Kong for about 2-3 days. The exceedance would be transient and to further alleviate the impact, monitoring at the time of TBM operation would be carried out in consultation with the affected parties with a view to looking for possible ways to further alleviate the impacts such as rescheduling of works.

17. Given that the Project is an underground railway, ground-borne noise during operation is also an issue considered. The EIA report predicts that the ground-borne noise levels at the sensitive receivers will comply with the established criteria. Nevertheless, to further minimize the noise levels, the applicant undertakes to provide about 6 km of low noise trackform at some sections at West Kowloon and Shek Kong.

## Landscape and Visual Quality

18. The EIA report finds that, with mitigation measures such as tree protection and erection of decorative screen hoarding, there would be moderate to substantial residual landscape and visual impacts on village residential Visual Sensitive Receivers (VSRs) near the SSS and VSRs in high-rise residential developments around WKT during construction phase, which is temporary in nature.

19. During the operation phase, the EIA report finds that there would be some localized moderate to slight residual impact due to Ventilation Buildings and associated railway structures particularly on adjacent village residential VSRs. The SSS would alter the visual context of the area. With the implementation of mitigation measures, e.g. buffer woodland planting at the boundary, green roof on facilities buildings, the residual impact on adjacent VSRs would be reduced to slight. The WKT would also alter the visual context of West Kowloon, particularly due to loss of open view and reduction of the depth of current view from the adjacent residential development. The EIA report concludes that given that the Project would introduce green landscape podium on WKT and open space on the proposed passenger transport interchange (PTI) as new visual amenity resources of the area, the residual impact of WKT on adjacent VSRs is considered as moderate to slight with mitigation measures in Year 10.

20. The visual impact of the ventilation shafts within West Kowloon Cultural District could not be determined at this stage and would be further reviewed in the detailed design stage to further refine the scale, location, disposition, design and integration strategies of the ventilation shafts to minimise their visual impacts.

21. The surface works during construction phase would affect existing landscape resources such as trees. The EIA report finds that all the affected trees are common species with an average of medium to low amenity value. A total of approximately 5,200 trees would be retained on-site, approximately 1,100 trees would be transplanted, and around 5,500 trees would be felled. None of the affected trees is Champion Trees or Registered Old and Valuable Trees maintained by the Leisure and Cultural Services Department. Detailed tree felling application and compensatory planting proposals would be submitted to seek approval from relevant authorities in accordance with the ETWBTC No. 3/2006 prior to construction of the Project.

### Cultural Heritage

22. The Project runs through urban West Kowloon and Tsuen Wan District, and the rural Kam Tin, Ngau Tam Mei and Mai Po area, where a number of Declared Monuments and Graded Historical Buildings are located. In particular, there will be drill and blast tunnel works at about -25mPD in rock below the ex-Lai Chi Kok Hospital (ex-LCKH) (a Grade III historic building) and vibration impact is a concern due to blasting. Geotechnical and structural survey was conducted in the EIA and found that with mitigation measures such as limiting quantity of explosives and vibration monitoring, there would be no adverse impact.

23. Some archaeological artefacts such as fragments of kitchen utensils near Ming Dynasty were discovered at the southern portion of the SSS. Such archaeological findings were of similar sorts usually discovered in the nearby areas in previous studies. Moreover a rescue excavation is recommended in the EIA report to be conducted prior to commencement of construction works at this area to preserve any archaeological remains by detailed records. There are also inaccessible sites in the works areas that may also have archaeological potential, but currently being occupied by different land uses, such as pig and chicken farms, open storage and garages. To investigate whether there are any archaeological remains in these inaccessible areas and identify mitigation measures as necessary, a further archaeological investigation is recommended in the EIA report to be conducted upon the completion of land resumption and prior to the construction works at these areas, in liaison with the Antiquities and Monuments Office.

### Waste Management

24. The EIA report finds that, with on-site reuse of about 0.7 Mm<sup>3</sup> of the construction materials generated from the construction phase, the Project would generate about 9.1 Mm<sup>3</sup> of surplus C&D materials. The materials would be used in other possible outlets such as the Hong Kong-Zhuhai-Macao Bridge project and as aggregates for concrete batching plant. If the possible outlets in Hong Kong are not available at the time of construction, the materials will be transported by Civil

Engineering and Development Department barges to Mainland as the last resort.

25. The total volume of dredged/excavated sediment generated from the Project is estimated to be about 308,200 m<sup>3</sup>. Approximately 120,800 m<sup>3</sup> sediment would be suitable for Type 1 – Open Sea Disposal, 184,800 m<sup>3</sup> sediment requires Type 2 – Confined Marine Disposal, and 2,600 m<sup>3</sup> sediment for Type 3 – Special Treatment/Disposal, in accordance with Practice Note for Authorized Persons and Registered Structural Engineers PNAP 252.

### Water Quality

26. The EIA report states that during construction phase the water quality impacts from land-based construction activities would be related to potential release of sediment-laden run-off from surface works areas, open cut excavation and tunnelling works. Impact on water quality would be insignificant, with the implementation of control measures and good site practice, such as sediment trap, provision of cover for stockpiles to minimize site runoff, and proper site drainage.

27. The water quality impact during the proposed dredging works for the LKST Barging Point has been quantitatively assessed in the EIA. The impact generated from the dredging works would be localized and minor, thus would unlikely contribute any significant cumulative water quality impact. To minimise the water quality impact, mitigation measures such as silt curtain and closed grab dredger will be adopted.

### Air Quality

28. Potential air quality impacts from the construction works for the Project would be mainly related to construction dust from excavation, materials handling, spoil removal and wind erosion, as well as operation of concrete batching plant, temporary stockpiles and barging facilities. Mitigation measures in the Air Pollution Control (Construction Dust) Regulation and specific dust control measures for the concrete batching plant and barging facilities have been recommended, e.g. regular watering, covering dusty material storage area, provision of dust collectors.

29. The air quality assessment results for the construction phase indicates that the predicted maximum 1-hour and 24-hour average Total Suspended Particulates (TSP) concentrations at all the representative ASRs would meet the relevant TM's criterion<sup>2</sup> and relevant Air Quality Objectives (AQOs)<sup>3</sup>. However, the Project's contribution to the annual TSP concentrations at West Kowloon, Nam Cheong and

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<sup>2</sup> The TM's criterion for hourly TSP concentration is 500 µg/m<sup>3</sup> for construction dust impact assessment.

<sup>3</sup> The relevant AQO for 24-hour and 1-year TSP concentration are 260 and 80 µg/m<sup>3</sup> respectively.

Shek Kong would be up to  $2.34 \mu\text{g}/\text{m}^3$ , i.e., about 2.9% of the annual TSP AQO. Environmental monitoring and audit for dust emission shall be conducted during the construction phase of the Project so as to check compliance with legislative requirements.

30. Regarding operation phase, the EIA report states that no adverse air quality impact is expected from the operation of the Project and the proposed diesel locomotive at SSS. The mechanical air ventilation system for the proposed PTI will be designed in accordance with Environmental Protection Department Practice Note for Professional Persons – Control of Air Pollution in Semi-Confined Public Transport Interchange (ProPECC PN1/98), and air quality impact during its operation is therefore not anticipated.

### Hazard to Life

31. The hazard to life arising from the storage and transport of explosives in the Project has been assessed in a quantitative risk assessment. The results show that the societal risk lies within the “As Low As Reasonably Practicable” (ALARP) region when compared to the TM criteria. An ALARP assessment was carried out by identifying all practicable mitigation measures and assessing the cost effectiveness of each measure in terms of the risk reduction achieved and the cost of implementing the measures. The results show compliance with the ALARP principles with the recommendations implemented.

### Landfill Gas Hazard

32. A section of the XRL alignment will be located underneath the Ngau Tam Mei Landfill (NTML), and the Barging Point in Kwai Chung and the Nursery Site in Siu Lang Shui will be located within the Consultation Zones of the Gin Drinkers Bay Landfill (GDBL) and Siu Lang Shui Landfill (SLSL) respectively. Source-pathway-target analysis conducted in the EIA shows that landfill gas risk posed by NTML to the XRL tunnels during both construction and operation phases is medium while the landfill gas risk posed by the GDBL and SLSL to the Barging Point and the Nursery Site during the construction phase, respectively, will be very low. Landfill Gas protection measures and monitoring requirements have been recommended in the EIA report. The EIA expects that with the proposed protection measures in place, the potential risk of landfill gas migration to the Project will be minimal.

## **ENVIRONMENTAL MONITORING AND AUDIT**

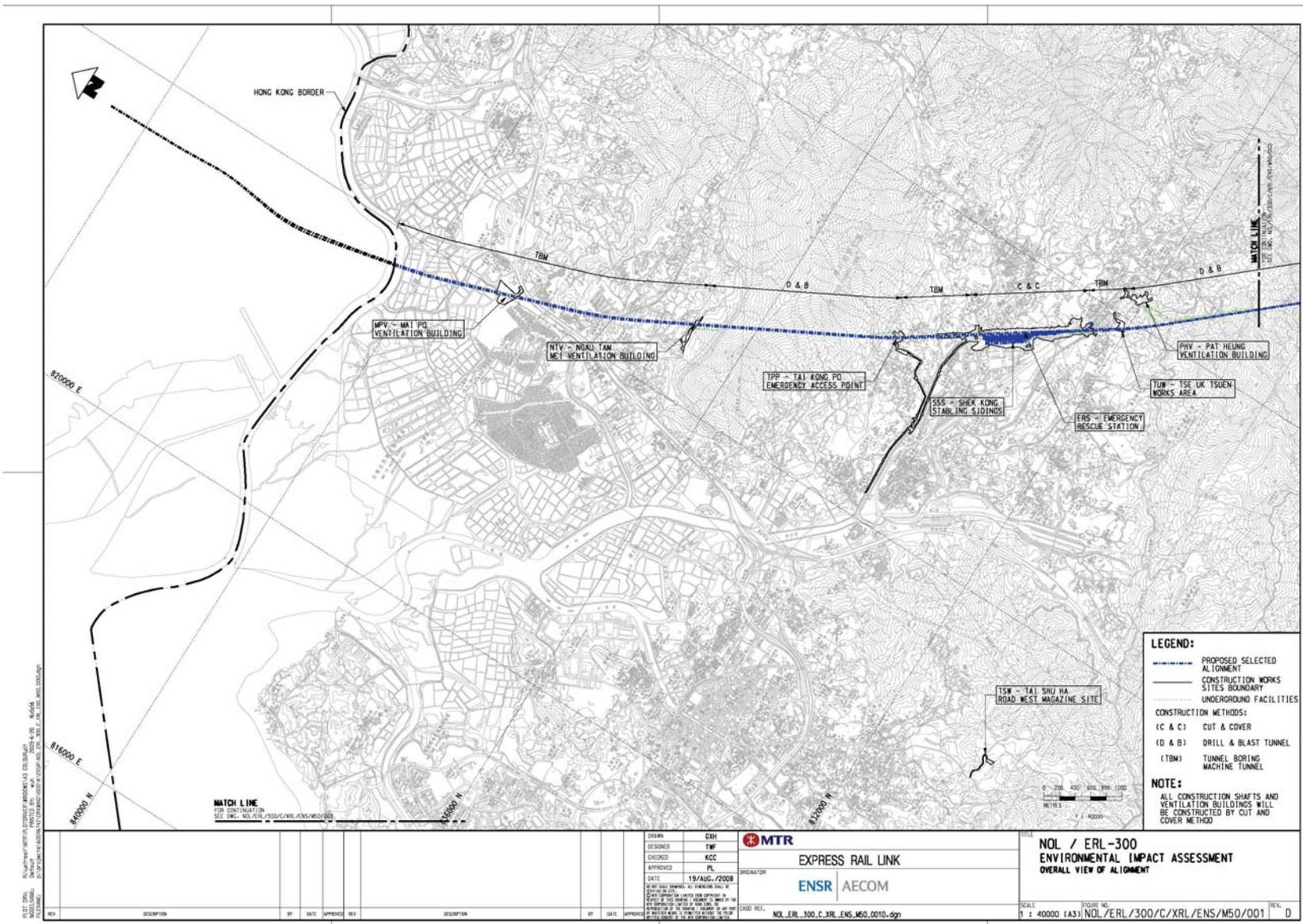
33. The EIA report includes an Environmental Monitoring and Audit (EM&A)

Manual which recommends an EM&A programme during both the construction and operation phases of the Project, in particular EM&A for (i) construction phase air-borne noise, ground-borne noise, dust, landscape and visual impacts, cultural heritage impacts, changes in water table level, landfill gas hazard; and (ii) landfill gas monitoring and commissioning test for airborne and ground-borne noise during operation phase. It is also the applicant's intention to set up relevant resident liaison channels during the construction stage to ensure good and effective public participation with a view to minimising the potential environmental impacts.

## **PUBLIC CONSULTATION**

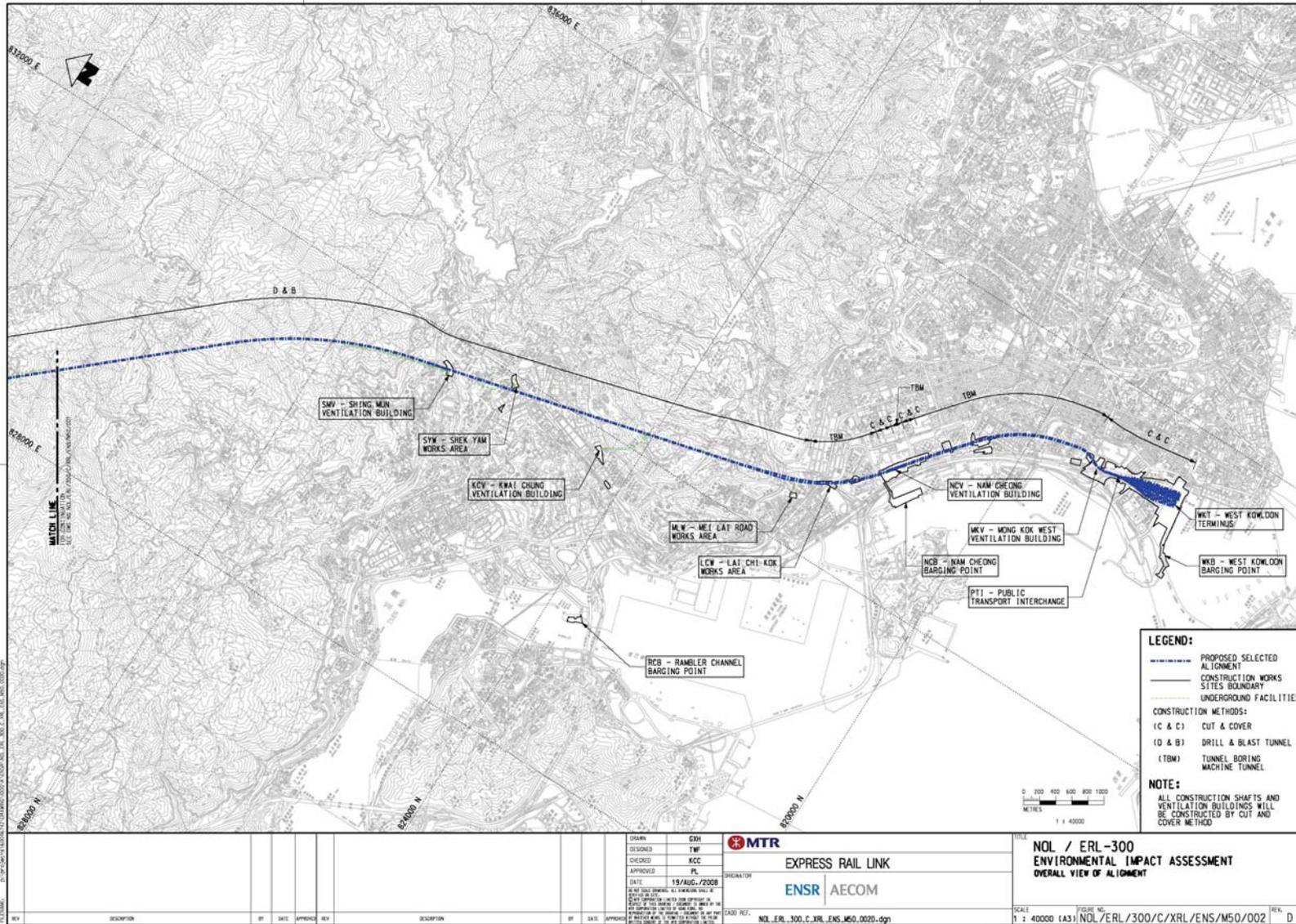
34. The EIA report, EM&A Manual and Executive Summary are available for public inspection under the EIAO from 21 July 2009 to 19 August 2009. At the meeting, members will be briefed on any public comments received.

**July 2009**  
**Environmental Assessment Division**  
**Environmental Protection Department**



**Figure 1:** Overall View of Alignment & Works Sites  
 Project Title: Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link

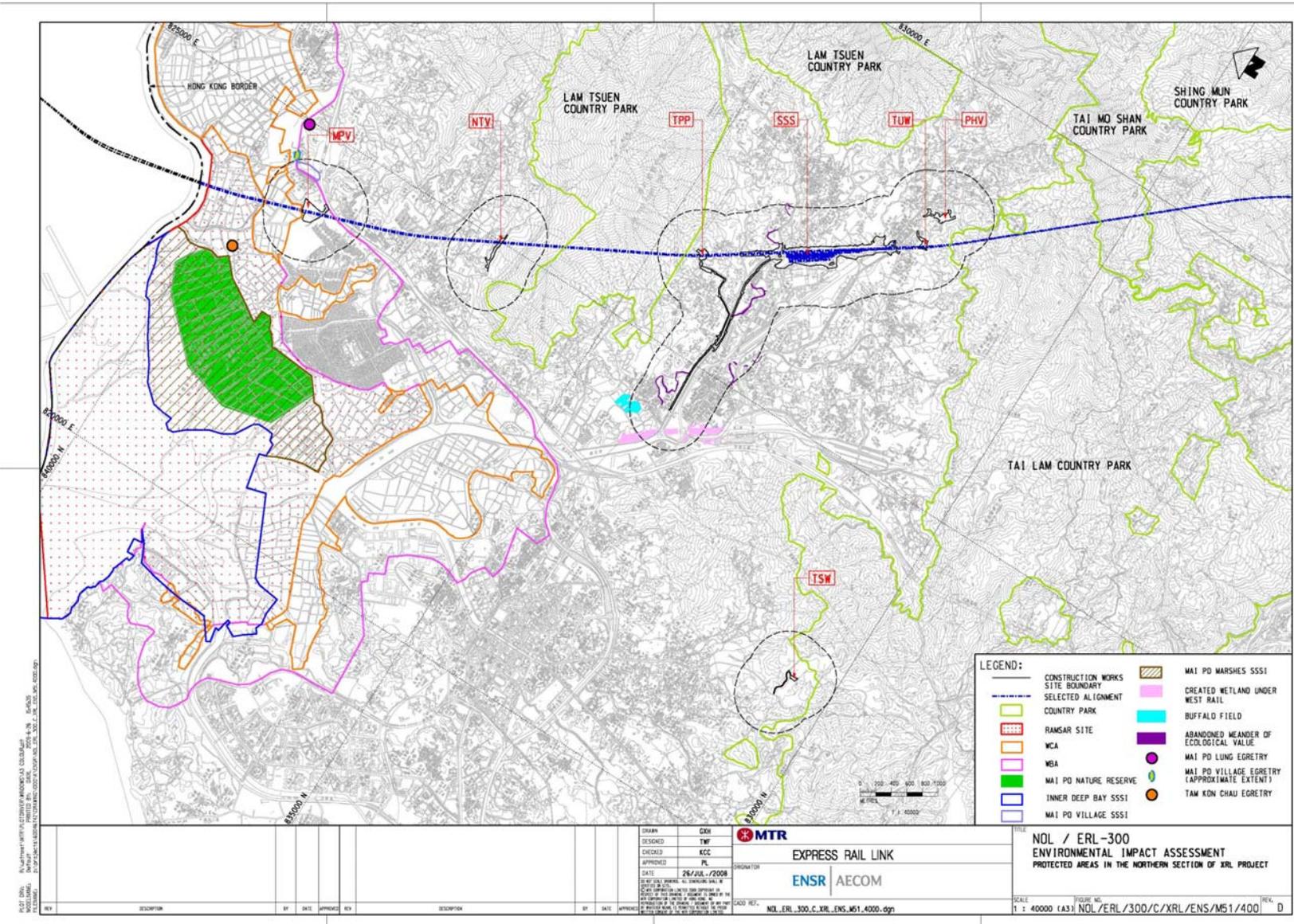
ACE-EIA Paper: 7/2009  
 Note: This figure is extracted from the EIA Report



**Figure 2: Overall View of Alignment & Works Sites**  
 Project Title: Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link

ACE-EIA Paper: 7/2009  
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**Figure 4:** Protected Areas in the Northern Section of XRL Project  
 Project Title: Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link

ACE-EIA Paper: 7/2009

Note: This figure is extracted from the EIA Report

