Highways Department

Northern Metropolis Highway – Kwu Tung Section

Project Profile

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1. BASIC INFORMATION

1.1 Project Title

1.1.1 The title of the Project is “Northern Metropolis Highway – Kwu Tung Section” (hereafter referred to as the Project).

1.2 Purpose and Nature of the Project

1.2.1 The Government promulgated the final report of the “Hong Kong 2030+: Towards a Planning Vision and Strategy Transcending 2030” in October 2021, in which the Northern Metropolis was set out. With the progressive population intakes of the development areas in the Northern Metropolis, it is foreseeable that the existing road network serving these development areas would become overloaded in the future and hence new major road projects are proposed under the “infrastructure-led” and “capacity-creating” approaches to ensure the planning of major transport infrastructure could cater for or even reserve transport and logistic capacity to drive long-term development.

1.2.2 Amongst the major transport infrastructure projects announced in the 2022 Policy Address, Northern Metropolis Highway (NMH) is a major road project to facilitate the “east-west” connectivity. NMH is to provide a new strategic route between Tin Shui Wai in the New Territories West and Heung Yuen Wai in the New Territories East, thereby enhancing the east-west connectivity of the Northern Metropolis and alleviating the potential traffic congestion at Yuen Long Highway, San Tin Highway and Fanling Highway.

1.2.3 According to the “Hong Kong Major Transport Infrastructure Development Blueprint” (the Blueprint) promulgated by the Government in 2023, the proposed NMH consists of 4 major road sections, including the Tin Shui Wai Section, San Tin Section, Kwu Tung Section as well as the New Territories North (NTN) New Town Section.

1.2.4 According to the current development plan, with the progressive development of San Tin Technopole and the Ngau Tam Mei area, traffic congestion on San Tin Highway is anticipated during peak hours by 2036. Therefore, the San Tin Section of NMH is scheduled for commissioning in or before 2036. The remaining sections of NMH are scheduled to complete in phases in about 3 to 4 years after the commissioning of the San Tin Section.

1.2.5 The objective of the Project is to enhance the connectivity between the interchange at Fanling Highway and the proposed interchange at Man Kam To Road to alleviate the future traffic demands generated by the future developments in the concerned locations.

1.3 Name of Project Proponent

1.3.1 Highways Department of the Government of Hong Kong Special Administrative Region (HKSAR).

1.4 Location and Scale of the Project and History of Site

1.4.1 The location of the Project is shown on the Figure 1.

1.4.2 The alignment of the Kwu Tung Section connects the proposed interchange near Fanling Highway (Pak Shek Au Section), which is under San Tin Section in the west, passing through Ma Tso Lung Area mainly in form of viaduct, and passing Crest Hill (Tai Shek

Mo) in form of tunnel. It then crosses the Ng Tung River and finally connects to the proposed Interchange at Man Kam To Area.

1.4.3 The scope of the Project mainly comprises the following:

(i) Construction of an approximately 5-kilometre (km) long dual three-lane carriageway, mainly in the form of at-grade road/tunnel/viaduct, from Fanling Highway (Pak Shek Au Section) towards Man Kam To Area;

(ii) Two interchanges at Ma Tso Lung Area and Man Kam To Area; and

(iii) Associated civil, geotechnical, landscape, road and drainage works, ancillary buildings, traffic control and surveillance system, ventilation buildings (if any), toll collection facilities, electrical and mechanical installations, reprovisioning of facilities affected by the proposed works and environmental mitigation measures, etc.

1.4.4 The alignment crosses the Ma Tso Lung Stream in the form of viaduct. The viaduct columns will not encroach the Ma Tso Lung Stream.

1.4.5 The proposed works components mentioned above are tentative and subject to review in next detailed design stage and during the course of the Environmental Impact Assessment (EIA) study. There may be refinement of the alignment of the Project, which will be subject to a variety of factors such as planning and engineering considerations, environmental impacts, traffic impacts, land resumption requirements, construction programme and cost, etc.

1.5 Number and Types of Designated Projects to be covered by the Project Profile

1.5.1 The Project comprises the construction and operation of highways and the associated slip roads, which is classified as Designated Project (DP) under the following categories under Part I, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO), subject to more detailed design and planning at later stage:

Item A.1 A carriageway for motor vehicles that is an expressway, trunk road, primary distributor road or district distributor road;

Item I.1 A drainage channel or river training and diversion works located less than 300m from the nearest boundary of existing or planned conservation area;

Item Q.1 All projects involving earthworks, dredging works and other building works partly or wholly in an existing or gazetted proposed country park or special area, a conservation area, an existing or gazetted proposed marine park or marine reserve, a site of cultural heritage, and a site of special scientific interest; and

Item K.10 A depot for the storage of, or a manufacturing plant for the manufacture of, explosives (as defined by section 2 of the Dangerous Goods Ordinance (Cap. 295))

1.6 Contact Person

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2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Planning and Implementation

2.1.1 The Project will be implemented under a Public Works Programme item. The Project Proponent has appointed consultants to undertake the Investigation study and preliminary design of the Project under Agreement CE4/2024 (HY). Subject to completion of detailed design, contractor(s) will be appointed to carry out the construction works.

2.2 Project Programme

2.2.1 The EIA study for the Project is in the pipeline following San Tin Section. The Project is expected to commission in about 3 to 4 years after the commissioning of the San Tin Section to alleviate the potential traffic congestion at Fanling Highway as well as to support New Development Areas. The packaging and programme of the Project will be ascertained by the investigation study, taking into account other relevant technical studies.

2.3 Interactions with other Projects

2.3.1 Major committed / planned projects that will potentially interface with the Project have been identified and are listed below. Any cumulative impact from the concurrent projects during both construction and operation phases of the Project will be addressed in the EIA stage as appropriate. The list below should be reviewed during the EIA stage to ensure the concurrent projects with best available information are incorporated.

- San Tin Technopole
- Kwu Tung North New Development Area
- Fanling North New Development Area
- Ma Tso Lung Development
- New Territories North New Town Development
- Development of Lok Ma Chau Loop: Eastern Connection Road
- Northern Link
- Northern Link Eastern Extension
- Improvement of Tai Tau Leng Roundabout and Fanling Highway
- San Tin Section and New Territories North (NTN) New Town Section of the NMH

3. POSSIBLE IMPACT ON THE ENVIRONMENT

3.1 General

3.1.1 Based on the preliminary study, the Project will involve land-based construction works and conceptually be made up of the following elements:

- Construction of tunnel by Drill & Blast / Drill & Break and/or Tunnel Boring Machine (TBM) methods (subject to further study);
- Construction of associated tunnel portals, ventilation buildings (if any), administration building and other ancillary facilities;
- Construction of viaducts / at-grade roads and road widening works; and
- Associated environmental protection and mitigation works, for example, noise enclosures / barriers (if necessary).

3.2 Construction and Operation Environmental Impact

3.2.1 The potential environmental impacts associated with the Project during both construction and operation phases are discussed in the following paragraphs. Detailed impact assessments will be carried out during the EIA study.

Air Quality

3.2.2 The air quality impact assessment will follow the criteria and guidelines for evaluating and assessing air quality impact as stated in Section 1 of Annex 4 and Annex 12 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) respectively.

3.2.3 During construction phase, the potential sources of air quality impact on the air sensitive receivers (ASRs) would be the dust emissions generated from construction activities including site formation, excavation works, mucking out blasted rock and soil from tunnelling works, materials handling, backfilling, wind erosion of open sites and stockpiling area as well as exhaust emissions from construction machinery and construction vehicles. Cumulative impacts from other potential interfacing projects planned in the vicinity of the Project would be identified and taken into account in the EIA study.

3.2.4 During operation phase, potential air pollution sources associated with the Project will include vehicular emissions from the proposed open roads sections, tunnel portals and ventilation buildings (if any) of the NMH. Cumulative air quality impacts from the vehicular emissions from neighbouring existing and planned road networks (e.g. Fanling Highway) and other emissions in the vicinity of the Project would be identified and taken into account in the EIA study.

Noise

3.2.5 The noise impact assessment will follow the criteria and guidelines for evaluating and assessing noise impact as stated in Annex 5 and Annex 13 of the EIAO-TM. respectively. The EIAO Guidance Note No. 9/2023 "Preparation of Construction Noise Impact Assessment Under the EIAO", EIAO Guidance Note No. 12/2023 "Road Traffic Noise Impact Assessment Under the EIAO", and EIAO Guidance Note No. 16/2023 "Preparation of Fixed Noise Sources Impact Assessment Under the EIAO" will also be taken into consideration.

3.2.6 During construction phase, potential major sources of noise impact on the noise sensitive receivers (NSRs) would be associated with the use of powered mechanical equipment (PME) (e.g. breakers, excavators, lorries, mobile cranes, concrete truck mixers, concrete pokers and rollers) for construction activities. The key construction activities of the NMH that would create noise impacts include piling for foundation, excavation and concreting, etc. Meanwhile, potential ground-borne noise impacts would be caused mainly by the use of PME for rock breaking / drilling. A construction programme should be formulated so that no works will be required in restricted hours, (i.e. between 7 p.m. and 7 a.m. or at any time on a general holiday (including Sunday)), as far as practicable in the EIA study.

3.2.7 During operation phase, potential major sources of noise impact on the NSRs would be associated with the traffic using the new roads and fixed plants (e.g. ventilation shaft (if any) of the NMH). The cumulative noise impacts from neighbouring existing and planned road networks and other fixed noise sources associated with the Project would be identified and considered in the EIA study.

Water Quality

3.2.8 The water quality impact assessment will follow the criteria and guidelines for evaluating and assessing water pollution as stated in Annexes 6 and 14 of the EIAO-TM respectively.

3.2.9 During construction phase, potential sources of water quality impacts may be associated with the construction site run-off, diversion of watercourse (if any) (Ng Tung River), fill of ponds and construction activities of the NMH, which may cause blockage of existing drainage channel and the increase in the amounts of pollutants, such as suspended solids, in the nearby water system. Meanwhile, sewage effluents from construction workforce and the accidental spillage of chemical may also cause water pollution. There may be potential infiltration / drawdown of groundwater from tunnel construction. In addition, when the proposed highway crossing Ng Tung River, there may possibly be construction of piles and foundation for the viaduct. As far as practicable, the piles and piers will avoid encroaching on the Ng Tung riverbed, and will be located at riverbank, or even away from riverbank. In view of the site constraints (e.g. the existing cycle bridge, the CLP pylon, the East Rail Line, the Dong Jiang Watermain, the underground utilities, etc.) which may govern the piles and piers' location and span arrangement, where it is inevitable to locate the piles and piers within Ng Tung River, non-dredging method would be adopted. The excavation and removal of materials from pile shaft will be carried out within pile casing to minimise water quality impact.

3.2.10 During operation phase, potential sources of water quality impacts would be associated with the surface runoff from the new roads and wash-off from the buildings proposed under the Project, as well as sewage effluents generated from the staffs working in the administration buildings.

Ecology

3.2.11 The evaluation and assessment of terrestrial and aquatic ecological impacts will follow the criteria and guidelines as stated in Annexes 8 and 16 of the EIAO-TM respectively. The EIAO Guidance Note No. 10/2023 "Methodologies for Terrestrial and Freshwater Ecological Baseline Surveys", EIAO Guidance Note No. 7/2023 "Ecological Baseline Survey for Ecological Assessment", EIAO Guidance Note No. 6/2010 "Some

Observations on Ecological Assessment from the Environmental Impact Assessment Ordinance Perspective" will also be taken into consideration.

3.2.12 During the construction phase, there may be potential impacts on habitats due to aboveground works. Additionally, ecological resources along the proposed alignment may experience potential indirect ecological impacts, such as potential construction-related disturbances, or potential flight path obstruction (e.g. the flight corridor along Ng Tung River). Underground works such as tunnelling works (subject to further study) for the proposed alignment may also result in potential hydrogeological impacts (e.g. ground water drawdown). Relevant impacts would be addressed comprehensively during EIA study stage.

3.2.13 During operation phase, while habitat loss is no longer anticipated, the presence of viaducts or road structures may still have some potential impacts, such as potential flight path obstruction. Potential hydrogeological impacts may arise from the underground section of the proposed alignment.

Fisheries

3.2.14 The fisheries assessment will follow the criteria and guidelines for evaluating and assessing fisheries impact as stated in Annexes 9 and 17 of the EIAO-TM respectively. The EIAO Guidance Note No. 15/2023 "Methodologies for Fisheries Baseline Surveys" in relation to fishponds will also be taken into consideration.

3.2.15 Key fisheries resources include both active and inactive fishponds along the proposed NMH alignment (e.g. those near Ng Tung River and Ho Sheung Heung). Some abandoned fishponds are also observed nearby. The active and inactive fishponds support aquaculture activities and production, which may be subject to impact due to loss of fishponds. Other indirect impacts may arise from potential deterioration of water quality due to site runoff, risk of groundwater drawdown, and potential impact on bund stability and pond accessibility during the construction and operation phases.

Landscape and Visual

3.2.16 The evaluation and assessment of landscape and visual impacts will follow the criteria and guidelines as stated in Section 1 of Annex 10 and Annex 18 of the EIAO-TM respectively. The EIAO Guidance Note No. 8/2023 "Preparation of Landscape and Visual Impact Assessment under the EIAO" will also be taken into consideration.

3.2.17 The major landscape and visual impacts of the NMH would be associated with the proposed at-grade / elevated roads, associated tunnel portals, and administration and ventilating buildings (if any). Landscape with distinctive character/resources such as "Wetland Buffer Area" and "Conservation Area" zone, are found within the assessment area of the Project.

3.2.18 During the construction phase, landscape impacts would be anticipated from aboveground construction sites, associated slope works and retaining walls of the NMH, and temporary working areas, etc. Potential impacts on landscape resources such as impact on hillside vegetation, impact on vegetation in existing villages, impact on roadside amenity, and disturbance on watercourses and ponds, would also be anticipated. The extent of landscape impacts will be further assessed during the Environmental Impact Assessment (EIA) study.

3.2.19 During the operation phase, there would be landscape impacts due to the affected existing vegetation and the aboveground structures of the NMH (e.g. open roads, interchange, viaducts, associated slope works and retaining walls, tunnel portals, and ventilation buildings (if any), etc.) may also lead to potential changes in the visual quality experience for the public viewers by the nearby road users, hikers and other recreational users. The extent of these changes will be further assessed during the Environmental Impact Assessment (EIA) study.

Cultural Heritage

3.2.20 The evaluation and assessment of cultural heritage impacts will follow the criteria and guidelines as stated in Section 2 of Annex 10 and Section 2 of Annex 19 of the EIAO-TM respectively.

3.2.21 No declared monument, proposed monument, graded historic building or Government historic site identified by the Antiquities and Monuments Office is located within 100 m of the Project.

3.2.22 No Site of Archaeological Interest (SAI) is located within 100 m of the Project. During the construction phase, no direct impacts on SAI from at-grade construction activities are anticipated.

3.2.23 Four medium archaeological potential areas identified in the approved EIA report of North East New Territories New Development Areas (Register No.: EIA-213/2013) fall within the Project Boundary and may be affected during the construction phase. This EIA study should include impact assessment to the cultural heritage resources and recommend appropriate measures to mitigate any potential impact(s). Additionally, three other medium archaeological potential areas are located outside the Project Boundary but within 100m of the Project. Given there is no construction activity outside the Project Boundary, no construction impacts are anticipated for these areas.

3.2.24 On the other hand, direct impact on built heritage would not be anticipated during the construction phase. However, indirect impact due to ground-borne vibration would be anticipated on built heritage located in close vicinity of the Project. This EIA study should include impact assessment to the cultural heritage resources and recommend appropriate measures to mitigate any potential impact(s).

3.2.25 During the operation phase, no potential impact on built heritage and archaeological heritage is anticipated, subject to further review and findings under the EIA study.

Waste Management

3.2.26 The evaluation and assessment of waste management implications will follow the criteria and guidelines as stated in Annexes 7 and 15 of the EIAO-TM respectively.

3.2.27 During the construction phase, the main activities that would generate waste include excavation, tunnelling, and demolition and construction of structures. Typical waste generated from the above activities includes inert and non-inert construction and demolition (C&D) materials, excavated sediment, chemical waste from the maintenance of the plants, and equipment and general refuse from the construction workforce.

3.2.28 During the operation phase, the amount of waste generated would be limited, comprising mainly the general refuse from the workforce and chemical wastes from the operation and maintenance.

Land Contamination

3.2.29 The evaluation and assessment of potential land contamination issues will follow the guidelines as stated in Sections 3.1 and 3.2 of Annex 19 of the EIAO-TM.

3.2.30 Potential land contamination sources in the vicinity of the Project would include construction material storage, container storage, warehouse, and vehicle maintenance workshop at Ma Tso Lung and along Man Kam To Road. A detailed assessment is required to examine if there is any potential land contamination issue within the Project area and any associated works area.

3.2.31 Potential contaminated land impacts would be related to the health risks for site workers, disposal of contaminated soils where encountered, and potential health risks to future users.

Hazard to Life

3.2.32 The hazard to life assessment will follow the criteria stated in Section 2 of Annex 4 of the EIAO-TM.

3.2.33 The NMH tunnel passing through Crest Hill would be constructed by the Drill & Blast / Drill & Break method or TBM methods (subject to further study). If the Drill & Blast method is adopted, controlled blasting operations using explosives would take place temporarily. A quantitative risk assessment would be conducted to assess the hazards due to the overnight (subject to further study) storage, transport and use of explosives and to ensure appropriate safety measures if required, to be strictly implemented to safeguard the wellbeing of nearby populations.

3.2.34 The alignment falls within the consultation zone of Sheung Shui Water Treatment Works (SSWTW), which is a Potentially Hazardous Installation (PHI) with its storage of liquid chlorine exceeding the threshold quantity. According to Drinking Water Safety Advisory Committee (DWSAC) Paper No. 2/2023, construction of On-Site Chlorine Generation (OSCG) plants in SSWTW completed in 2023. However, sodium hypochlorite solution has been adopted for temporary use due to the need of time to train up the staffs to use the OSCG plants, and it is targeted that the OSCG plants in SSWTW be in full operation by end of 2025. Further consultation with relevant departments will be conducted during the EIA Study stage.

Landfill Gas Hazard

3.2.35 The landfill gas hazard assessment will follow Section 1.1(f) in Annex 7, Section 3.3 in Annex 19 of the EIAO-TM. The Landfill Gas Hazard Assessment Guidance Note (1997) (EPD/TR8/97).) will also be taken into consideration.

3.2.36 The Ma Tso Lung Landfill (MTLL) is located to the west of the proposed Kwu Tung Section of NMH, near Tit Hang. Part of the proposed Kwu Tung Section falls within the 250 m Consultation Zone of MTLL. Potential risk of landfill gas hazard during both the construction and operation phases would be addressed in the EIA study.

4. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

4.1 Existing and Planned Sensitive Receivers

4.1.1 The major existing and planned sensitive receivers that may be affected by the Project have been identified and listed out in the following paragraphs. The listed receivers are not exhaustive and are subject to further review in the EIA study.

Air Quality

4.1.2 Key potential air sensitive receivers that may be affected by the Project include:

- Village type houses near Pak Shek Au;
- Village type houses near Tit Hang;
- Village type houses near Ma Tso Lung;
- Village type houses at Fu Tei Au Tsuen;
- Village type houses at Hung Kiu San Tsuen;
- Possible Ma Tso Lung Development Area;
- Planned Kwu Tung North Development Area;
- Planned Fanling North New Development Area;
- Possible Remaining Phase Development of the New Territories North; and
- Lo Wu Correctional Institution.

Noise

4.1.3 Key potential noise sensitive receivers that may be affected by the Project include:

- Village type houses near Pak Shek Au;
- Village type houses near Tit Hang;
- Village type houses near Ma Tso Lung;
- Village type houses at Fu Tei Au Tsuen;
- Village type houses at Hung Kiu San Tsuen;
- Possible Ma Tso Lung Development Area;
- Planned Kwu Tung North Development Area;
- Planned Fanling North New Development Area;
- Possible Remaining Phase Development of the New Territories North; and
- Lo Wu Correctional Institution.

Water Quality

4.1.4 Key potential water sensitive receivers (WSRs) that may be affected by the Project include:

- Ponds adjacent to Ma Tso Lung Road, Ho Sheung Heung Road, Fai King Road and Fu Tei Au Road;
- Ponds near Sheung Shui Water Treatment Works;
- Watercourses near Ma Tso Lung;
- Ma Tso Lung Stream and its tributes;

- Ng Tung River;
- Shek Sheung River;
- Sheung Yue River;
- Conservation Area (e.g. fishponds) within water quality impact assessment area;
- Marsh and watercourses distributed along the proximity of proposed highway;
- Wetland Conservation Area; and
- Wetland Buffer Area.

Ecology

4.1.5 Key potential ecological sensitive receivers nearby that may be affected by the Project include:

Sites of Conservation Importance:

- Wetland Conservation Area;
- Wetland Buffer Area;
- Long Valley and Ho Sheung Heung Priority Site for Enhanced Conservation;
- Long Valley Nature Park (LVNP);
- "Conservation Area" gazetted under Approved Ma Tso Lung and Hoo Hok Wai Outline Zoning Plan (OZP) No. S/NE-MTL/3, and Approved Fanling North OZP No. S/FLN/4; and
- Proposed Hoo Hok Wai Wetland Conservation Park.

Other Ecologically Sensitive Resources:

- Inner Deep Bay and Shenzhen River Catchment Important Bird Area;
- Wooded habitats (e.g. woodland, mixed woodland, and shrubland);
- Agricultural land;
- Wetland habitats (e.g. pond, marsh, seasonally wet grassland, and watercourses including Ng Tung River and Ma Tso Lung Stream);
- Species of conservation importance (including mammals, avifauna, herpetofauna and terrestrial insects such as butterflies, odonates, and fireflies, and freshwater fauna);
- Egretries (e.g. Ho Sheung Heung Egretry, and Man Kam To Road Egretry and its satellites);
- Avifauna roosting sites (e.g. Ho Sheung Heung Ardeid Night Roost, Man Kam To Road Ardeid Night Roost, LVNP Ardeid Night Roost, Man Kam To Road Overwintering Bird Roost, and Lower Ng Tung River Overwintering Bird Roost);
- Flight corridor along Ng Tung River;
- Firefly hotspot (Fu Tei Au Road); and
- Existing mitigation planting area and compensation wetland (along Ng Tung River, Ecological Area (EA) and Offsite Wetland Compensation Areas (OWCA) of Lok Ma Chau Loop.

Fisheries

4.1.6 Potential fisheries sensitive receivers that may be affected by the Project include:

- Active and inactive fishponds within the Study Area which support fisheries

resources (aquaculture activities and aquaculture production).

Landscape and Visual

4.1.7 Key potential landscape resources, visual resources and key public viewing points that may be affected by the Project include:

Key Landscape with Distinctive Character/Resources:

- Hillside vegetation in She Leng, Crest Hill and Cham Shan;
- Vegetation in Conservation Areas near Ng Tung River; and
- Wetland Buffer Area near Ma Tso Lung etc.

Key Visual Resources:

- Mountain backdrop from She Leng, Crest Hill, Fung Kong Shan and Cham Shan;
- Wetlands at Hoo Hok Wai and Long Valley Nature Park; and
- River channels at Ng Tung River.

Key Public Viewing Points:

- Hikers' view at She Leng;
- Hikers' view at Crest Hill;
- Hikers' view at Fung Kong Shan;
- Hikers' view at Cham Shan;
- View at Hoo Hok Wai;
- View at Ma Tso Lung;
- View at Long Valley Nature Park; and
- View along Ng Tung River etc.

Cultural Heritage

4.1.8 Four medium archaeological potential area identified in the approved EIA report of North East New Territories New Development Areas (Register No.: EIA-213/2013) are partially located within the Project Boundary. Additionally, three other medium archaeological potential areas are located outside the Project Boundary but within 100m of the Project. Other cultural heritage resources within and in the vicinity of the proposed alignment will be identified and assessed in the EIA study.

Hazard to Life

4.1.9 There are various types of sensitive receivers along the alignment of the Project including populated areas, man-made slopes, retaining walls, natural boulders, and potentially unstable terrain etc. Charge weights per delay will be controlled during blasting operations to minimise the hazards.

Landfill Gas Hazard

4.1.10 The Ma Tso Lung Landfill (MTLL, operation ceased since 1979) is located to the west of the proposed Kwu Tung Section of NMH, part of the proposed alignment of Kwu Tung Section falls within the 250 m Consultation Zone of the MTLL.

5. ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND FURTHER ENVIRONMENTAL IMPLICATIONS

5.1 General

5.1.1 The EIA study will investigate those environmental impacts (both cumulative impacts and those arising from the Project) and propose the appropriate mitigation measures with the intention that the Project would be environmentally acceptable and cost-effective. The residual impacts, if any, would be confined to within the allowable limits. Subject to the findings of the EIA study, environmental monitoring and audit of potential impacts that may arise from implementation of the works will be provided during the construction and operation phases. The following mitigation measures would also be incorporated in the design and construction of the Project.

5.2 Measures to Minimise Environmental Impacts

Air Quality

5.2.1 During the construction phase, dust emissions from the related construction activities, such as excavation, mucking out of blasted rock and soil, materials handling, and emissions from construction machinery and construction vehicles etc., would be anticipated. Appropriate air quality control measures as stipulated in the Air Pollution Control (Construction Dust) Regulations along with good site practices will be implemented to minimise the air pollutant emissions. Subject to findings of EIA study, possible key mitigation measures, including but not limited to the following, will be considered if appropriate:

- Regular watering on all exposed and unpaved surface, excavation, and fill materials handling, particularly during dry weather;
- Covering all excavated or stockpile of dusty materials by impervious sheeting or spraying with water to maintain the entire surface wet;
- Provision of wheel washing facilities at construction site access;
- Covering any dusty materials on vehicles before leaving the site;
- Implementing speed control of vehicles on unpaved haul roads;
- Erection of screen hoarding along the construction site boundary;
- Follow the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation and Air Pollution Control (Fuel Restriction) Regulations (i.e., using liquid fuel with a sulphur content of less than 0.001% by weight) to control the exhaust emissions from construction equipment;
- Connect construction machinery to mains electricity supply and avoid the use of diesel generators and diesel-powered machinery as far as practicable to minimise air quality impact arising from the construction machinery;
- Provision of blasting door at the portal of tunnel with air treatment system;

- The areas within 30 m of the blasting area should be wetted with water prior to blasting;

- Blasting shall not be carried out when the strong wind signal or tropical cyclone warning signal No. 3 or higher is hoisted;

- Avoid the use of exempted Non-road Mobile Machinery (NRMMs);

- Deploy electrified NRMMs as far as practicable; and

- Plan the travelling route of construction vehicles on public roads as far as practicable in a way to minimise the air quality impact on ASRs.

5.2.2 During the operation phase, the major source of air pollutants will be the exhaust gas emissions from the vehicular use of the NMH and associated slip roads. Additionally, the vehicular emissions from the tunnel portals and ventilation buildings (if any) will also give impacts on the air quality. Subject to findings of EIA study, possible key mitigation measures, including but not limited to the following, will be considered if appropriate:

- Provision of buffer areas between the sources of air pollutant and the ASRs;

- Location and orientation of the ventilation buildings (if any) and tunnel portals to be away from the nearby ASRs;

- Alternative road alignment / portal exit of the NMH for provision of sufficient buffer areas between the sources of air pollutant and the ASRs; and

- Other mitigation measures may be necessary subject to air quality assessment during the EIA stage.

Noise

5.2.3 Subject to findings of EIA study, possible key measures to minimise construction noise impacts on nearby NSRs during the construction phase would include:

- Use of quieter PME fitted with silencers/mufflers or alternative quieter construction methods;

- Provision of temporary/movable noise barriers and enclosures where practicable;

- Installation of temporary noise screening structures or barriers along the construction site boundary;

- Adopt good site practices such as locating the noisy equipment and activities as far away from nearby NSRs as practicable, providing proper maintenance of construction plants and limiting the use and number of equipment operating close to the NSRs;

- Proper planning of travelling route of the construction vehicles;

- Incorporate the noise control requirements stipulated in the "Recommended Pollution Control Clauses for Construction Contracts" of the EPD into the construction works contract(s) for the Contractor to follow and implement relevant measures to minimise the construction noise impact; and

- Make reference to the ProPECC Note PN1/24 to plan and implement the project, and the particular specifications shall be imposed in the construction contract(s) to avoid causing adverse construction noise impact on the nearby NSRs.

5.2.4 Subject to findings of EIA study, the following measures will be considered during the operation phase to minimise noise impacts on nearby NSRs:

- Noise barriers / enclosures and low noise road surface materials will be provided for open road sections of the NMH where necessary;

- Sound-absorbing materials may be required for tunnel portals where the NSRs are in their vicinity; and

- Suitable mitigation measures (e.g. proper orientation, silencers, acoustic louvres and acoustic enclosures, etc.) for the fixed plants of proposed facilities, including ventilation shafts (if any), administration building and other ancillary buildings should also be reviewed and considered in the EIA study.

Water Quality

5.2.5 Subject to findings of EIA study, the following mitigation measures during the construction phase will be adopted to prevent adverse impacts on nearby WSRs:

- Good site practice in accordance with the ProPECC PN 2/24 “Construction Site Drainage” and “Recommended Pollution Control Clauses for Construction Contracts” issued by Environmental Protection Department (EPD);

- Implementation of recommended pollution control clauses for construction contracts, and guidelines under Environment, Transport and Works Bureau Technical Circular (Works) (ETWB TC(W)) No. 5/2005 “Protection of Natural Stream / Rivers from Adverse Impact arising from Construction Works”;

- Construction surface runoffs should be properly collected by silt trap and oil interceptor to remove the oil, lubricants, grease, silt, grit and debris before being discharged to the public stormwater drainage system to ensure compliance with the Water Pollution Control Ordinance;

- Appropriate monitoring and mitigation measures should be developed for groundwater control (e.g. probing ahead and pre-grouting during tunnel construction, and installation of waterproof lining after the formation of the tunnel) to minimise the potential groundwater drawdown / infiltration due to tunnel construction;

- Proper construction techniques should be employed to prevent sediment release during construction. Stringent site sediment control and mitigation

measures should be implemented to prevent elevation of concentration of suspended solids;

- Flow diversion shall be conducted prior to the construction works to prevent water from overflowing in the surrounding area;

- Flow diversion should be conducted in dry season as far as practicable when the flow is low;

- Construction works at the existing ponds should be conducted only after dewatering of these ponds is fully completed;

- Water in existing ponds shall be sampled and pre-treated if required before discharge;

- Proper management of the drained water and sediment shall be implemented to prevent their release into existing watercourses; and

5.2.6 Subject to findings of EIA study, The following measures will be incorporated for the NMH to minimise the water quality impacts on nearby WSRs during operation phase:

- Appropriate mitigation measures in accordance with the ProPECC PN1/23 "Drainage Plans subject to Comment by the Environmental Protection Department -Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations" issued by EPD;

- Adopting storm drainage system to collect the surface runoffs from the road by silt trap and oil interceptor to remove silt / grit and oil before discharging; and

- Adopting sewerage system to collect the wastewater generated from the NMH and connecting the system to the existing sewerage network in the region.

Ecology

5.2.7 Subject to findings of EIA study, the following mitigation measures during the construction phase will be considered to avoid, minimise and compensate the ecological impacts:

- Avoid / minimise direct encroachment on sites of conservation importance and ecologically sensitive habitats;

- Avoid / minimise habitat fragmentation and unnecessary disturbance to the natural habitats;

- Establish buffer area and implement seasonal control on construction activities, where necessary;

- Adopt alternative design or construction methods where necessary;

- Carefully plan the placement of equipment and stockpile area in the designated area within existing disturbed lands;

- Compensation for unavoidable loss of important natural habitats;
- Translocation / transplantation of unavoidably affected species of conservation importance with low mobility;
- Maintaining flight corridor by fine-tuning alignment;
- Maintaining animal movement corridor by inclusion of wildlife corridor / underpass; and
- Good site practices and mitigation measures aiming to reduce impacts from air, noise and water pollution, to minimise the potential groundwater drawdown / infiltration due to tunnel construction (as stated in **Sections 5.2.1**, **5.2.3** and **5.2.5**), and to minimise potential impact on the ecological resources.

5.2.8 During the operation phase, subject to findings of EIA study, appropriate measures, including but not limited to traffic noise and water quality control measures as stated in **Sections 5.2.4** and **5.2.6**, and control of direction / intensity of light not spilling into the sensitive areas, should be incorporated into the design of the NMH to avoid / minimize the potential ecological impacts. In addition, potential ground water drawdown / infiltration would not be expected during operation phase.

Fisheries

5.2.9 The proposed NMH alignment and the associated aboveground works for the tunnelling works (including ground investigation and treatment work) that may encroach onto fisheries resources should be avoided or minimised as far as practicable.

5.2.10 Good site practices for the control of construction site runoff should be fully implemented to minimise impacts on the ponds in vicinity of the Project. Careful planning of works and adoption of good site practice would be recommended to minimise potential fisheries impacts, where appropriate.

Landscape and Visual

5.2.11 Mitigation measures to minimise landscape impact during both the construction and operation phases and visual impact during the operation phase should be comprehensively reviewed.

5.2.12 The following mitigation measures will be considered during the construction phase subject to the investigation and the findings of EIA study:

- Tree preservation in accordance with DEVB TC(W) No. 4/2020 and TC(W) No. 5/2020;
- Implementation of good site practices for preservation and protection of the existing natural streams in accordance with ETWB TC(W) No. 5/2005;
- Minimise disturbance to Wetland Buffer Area and Conservation Areas nearby;

- Minimise disturbance to Ng Tung River and watercourses nearby;
- Erection of decorative screen hoarding or hoarding compatible with the surrounding areas;
- Management of construction activities and facilities; and
- Reinstatement of temporarily disturbed landscape areas.

5.2.13 The following mitigation measures will be considered during the operation phase subject to the investigation and the findings of EIA study:

- Trees and shrubs will be planted to provide adequate greening, screening, and mitigation, and to minimise visual impact of the Project, where appropriate;
- Sensible locations of viaducts alignment, columns and portals to minimise impact on existing trees and adjoining existing, planned and potential developments;
- Tree transplanting and compensatory planting for compensation of the loss of existing vegetation (including trees and shrubs). In case loss of vegetation in woodland are unavoidable, compensation in native woodland mix will be provided to mitigate the impact and enhance the biodiversity;
- Aesthetically pleasing design and responsive design will be adopted for aboveground structures (e.g. tunnel portals and ventilation buildings (if any)). Buffer planting will be provided near portals to reduce their apparent size/scale and to visually screen and soften the structures;
- Aesthetic design will be adopted for the road structures such as slip roads, viaducts and tunnel portals, and slope associated structures. Road structures will be designed with considerations and suitable measures to minimise the visual impact of the road corridor. Submission to Advisory Committee on the Appearance of Bridges and Associated Structures (ACABAS) in respect of the aesthetic design of the structures associated with the public highway system in accordance with ETWB TC(W) No. 36/2004 will be made during preliminary design; and
- The visual impact of noise mitigation measures, including noise barriers(if any), will be mitigated by appropriate design, which includes the use of transparent panels, appropriate colour selection of panels and supporting structures, and design of supporting structures to incorporate a high level of quality and aesthetics.

Cultural Heritage

5.2.14 A Cultural Heritage Impact Assessment, including the Built Heritage Impact Assessment and Archaeological Impact Assessment, will be conducted during the EIA stage to assess the potential impacts on cultural heritage during the construction and operation phases. Impacts on cultural heritage resources should be avoided as far as practicable. If unavoidable, mitigation measures to minimise the impacts on

cultural heritage will be proposed and implemented with prior agreement with the Antiquities and Monuments Office.

Waste Management

5.2.15 The waste management hierarchy aims to minimise waste generation. If waste generation cannot be avoided, subject to findings of EIA study, a material/waste management plan will be established prior to commencement of excavation and construction work to outline the methods that can be incorporated into the Project for waste minimisation, including reuse, recycle, matching disposal with other projects, handling, storage, transportation and disposal of expected waste materials.

5.2.16 During the operation phase, waste collectors shall be employed to remove general refuse and chemical waste, if any, generated from administration / ventilation buildings (if any) on a regular basis. Reuse and removal of recyclables shall be encouraged. Collection bins for used aluminium cans, wastepaper, plastics, and glass bottles are recommended to be provided at the administration buildings. The recyclables shall be collected by a recycler on a regular basis.

Land Contamination

5.2.17 Site appraisal should be carried out during the EIA study to identify if there are any potential soil / groundwater contaminations within the Project area and any associated works area. Site investigation and land contamination assessment should be conducted prior to the construction works at the concerned area. Based on the findings of site investigation and assessment, appropriate remediation strategies / options should be detailed in a Remediation Action Plan if contamination is identified. Upon completion of the remediation works, if any, a Remediation Report demonstrating that the clean-up works has been adequately carried out should be submitted to EPD for endorsement prior to commencement of any construction / development works.

Hazard to Life

5.2.18 Potential hazards associated with the overnight (subject to further study) storage, transport and use of explosives will be assessed. Close liaison with the Mines Division of Civil Engineering and Development Department will be maintained. Necessary safety precautions and control measures will be proposed during the EIA study.

Landfill Gas Hazard

5.2.19 During the construction phase, a section of the proposed NMH alignment falls within the MTLL Consultation Zone. The landfill gas hazard assessment undertaken for the EIA report of the North East New Territories New Development Areas (Register No.: AEIAR- AEIAR-175/2013) categorises MTLL to be a medium source. To reduce landfill gas risk to an acceptable level, precautionary measures will be required to mitigate hazard associated with accumulation of landfill gas.

5.2.20 Furthermore, for enclosed spaces created during construction or required by design within areas of the project that fall within the consultation zone, appropriate protection measures should be implemented based on the risk levels assessed in the EIA with reference to EPD's "Landfill Gas Hazard Assessment Guidance Note" (Report No. EPD/TR8/97). A mechanical ventilation system, methane gas detection system and routine gas monitoring would be considered and implemented where appropriate. A

Qualitative Landfill Gas Hazard Assessment (QLFGHA) should be conducted during the detailed design stage of the future development.

5.3 Severity, Distribution and Duration of Environmental Effects

5.3.1 Subject to the findings of assessments, effective control and mitigation measures would be identified to ensure that the impacts are kept at acceptable levels. The potential severity, distribution and duration of environmental effects such as beneficial and adverse effects, short-term and long-term effects, secondary and induced effects, cumulative effects and transboundary effects, will be considered and addressed in the EIA study, where applicable.

5.4 Further Implication

5.4.1 Close co-ordination with relevant authorities, particularly EPD and other interfacing projects will be necessary. Public consultation will be arranged once sufficient information is available.

6. USE OF PREVIOUSLY APPROVED EIA REPORTS

6.1.1 There is no previously approved EIA report under EIAO for the Project. Nonetheless, reference may be made to the following previously approved EIA reports and will be referred to in the subsequent EIA study:

Register No.	Title
AEIAR-052/2002	Sheung Shui to Lok Ma Chau Spur Line
AEIAR-142/2009	Provision of a Poultry Slaughtering Centre in Sheung Shui
AEIAR-133/2009	Construction of Cycle Tracks and the associated Supporting Facilities from Sha Po Tsuen to Shek Sheung River
AEIAR-175/2013	North East New Territories New Development Areas
AEIAR-176/2013	Development of Lok Ma Chau Loop
AEIAR-259/2024	Northern Link
AEIAR-261/2024	San Tin / Lok Ma Chau Development Node

Figure

Indicative Layout Plan For Northern Metropolis Highway – Kwu Tung Section

ISO A1 841mm x 594mm

Approved:

Checked:

Designer:

Project Management Initials:

LEGEND:

INDICATIVE ALIGNMENT/SLIP ROAD OF NORTHERN METROPOLIS HIGHWAY - KWU TUNG SECTION
北都公路-古洞段初步走線/支線

INDICATIVE TUNNEL
暫定隧道

CONSERVATION AREA
自然保育區

CLOSED MA TSO LUNG LANDFILL (MTLL)
已關閉馬草壟堆填區

250m CONSULTATION ZONE OF CLOSED MA TSO LUNG LANDFILL
已關閉馬草壟堆填區的250米諮詢區

WORKS BOUNDARY MAY POTENTIALLY SLIGHTLY OVERLAP WITH CONSERVATION AREA (SUBJECT TO FURTHER REVIEW)
工程邊界可能與自然保育區範圍有輕微重疊（有待進一步研究）

INDICATIVE LOCATION OF INTERCHANGES
交匯處暫定位置

I/C 07

827000 E

830000 E

833000 E

842000 N

839000 N

N

深圳灣
SHENZHEN BAY

深圳河
SHENZHEN RIVER

打鼓嶺
TA KWU LING

缸瓦甫
KONG NGA PO

恐龍坑
HUNG LUNG HANG

文錦渡路
MAN KAM TO ROAD

羅湖
LO WU

梅林坳河
MUI LING AU RIVER

大石磨
CREST HILL

I/C 07

I/C 08

往北都公路-新界北新市鎮段
TO NM HIGHWAY NEW TERRITORIES NORTH NEW TOWN SECTION

馬草壟
MA TSO LUNG

北都公路-古洞段
NM HIGHWAY KWU TUNG SECTION

往北都公路-新田段
TO NM HIGHWAY SAN TIN SECTION

上水
SHEUNG SHUI

塱原
LONG VALLEY

新田
SAN TIN

粉嶺公路
FANLING HIGHWAY

粉嶺
FANLING

石湖圍
SHEK WU WAI

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Plot File by: YangKG 7/10/2025
PATH: P:\PROJECTS\60750817\DRAWING\REPORT\R30.3\R30.3_101.dgn

AECOM
AtkinsRéalis

PROJECT 項目

NORTHERN METROPOLIS HIGHWAY - INVESTIGATION STAGE
北都公路-勘察研究

CLIENT 業主

路政署
HIGHWAYS DEPARTMENT

CONSULTANT 工程顧問公司

AECOM - ATKINSREALIS JOINT VENTURE

SUB-CONSULTANTS 分判工程顧問公司

ISSUE/REVISION 修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS 階段

SCALE 比例
A3 1 : 30000

DIMENSION UNIT 尺寸單位
METRES 米

KEY PLAN 索引圖

PROJECT NO. 項目編號

AGREEMENT NO. 協議編號
CE 4/2024(HY)

SHEET TITLE 圖紙名稱
INDICATIVE LAYOUT PLAN FOR NORTHERN METROPOLIS HIGHWAY - KWU TUNG SECTION
北都公路-古洞段初步走線平面圖

SHEET NUMBER 圖紙編號
60750817/R30.3/FIGURE 1
60750817/R30.3/圖 1