

**Highways Department**

**Tuen Mun Western Bypass**

**Project Profile**

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# **1 BASIC INFORMATION**

## **1.1 Project Title**

Tuen Mun Western Bypass

## **1.2 Purpose and Nature of the Project**

Tuen Mun Western Bypass (TMWB) forms part of the strategic road network linking up Shenzhen Bay Bridge and Hung Shui Kiu New Development (HSK NDA) via the Kong Sham Western Highway (KSWH) in the north; the Hongkong – Zhuhai – Macao Bridge (HZMB), the Airport and North Lantau via the Tuen Mun – Chek Lap Kok Link (TM-CLKL) in the south. The strategic route formed by TM-CLKL and TMWB is one of the possible highway options identified under the Northwest New Territories (NWNT) Traffic and Infrastructure Review (the Review) conducted by the Transport Department to meet the long-term traffic demand of the NWNT and Lantau.

In July 2007, the Legislative Council Panel on Transport supported going ahead with the TMWB and TM-CLKL package after deliberation on its competitive edges in terms of traffic benefits, planning flexibility and strategic functions over the other possible highway options identified in the Review. TM-CLKL is now under construction while TMWB is at the planning and preliminary design stage. Upon completion of TMWB, it will reduce the journey time between the NWNT and North Lantau, support various developments in the vicinity (such as HSK NDA), and alleviate the anticipated traffic congestion on the major roads in Tuen Mun.

Two separate Environmental Impact Assessment (EIA) study briefs for TMWB, namely, Study Brief No. ESB-174/2007 and Study Brief No. ESB-219/2011, had been issued in December 2007 and February 2011 respectively by the Director of Environmental Protection in respect of two previous alignment options. However, these alignments were not adopted due to strong objections received. The latest alignment was then drawn up. Both Tuen Mun District Council and Yuen Long District Council had indicated no objection that a further investigation study could be carried out on this latest alignment.

The latest alignment of the TMWB consists of 9 km long tunnels connecting TM-CLKL in the south and KSWH near San Sang San Tusen in the north, plus slip tunnels of 3 km long connecting to Tsing Tin Road in Tuen Mun North.

## **1.3 Name of Project Proponent**

Highways Department, HKSAR Government

## **1.4 Location and Scale of the Project**

The location of the project is shown on the attached Drawing No. HZM6828TH-SK0016. The study area for the possible alignment covers a large part of Tuen Mun area and a small part of Hung Shui Kiu, all of which are within the HKSAR boundary. The southern and northern boundaries of the study area are at Pillar Point and Ha Tsuen area respectively while the eastern and western boundaries

run along east of the Tuen Mun River Channel/Tuen Mun Road and the ridge of the Castle Peak respectively.

The scope of the TMWB is to provide a dual two-lane highway and associated connections to the TM-CLKL in the south and the KSWH in the north, with intermediate connections to Tsing Tin Road in Tuen Mun North. It mainly comprises the following:

- (i) About 9 km long tunnels running through Castle Peak linking the TM-CLKL toll plaza and the KSWH;
- (ii) Site formation for toll plaza adjacent to the TM-CLKL toll plaza;
- (iii) Viaduct/at-grade road from the toll plaza to Lung Mun Road including modification to the roundabout at Lung Mun Road and Mong Tat Street;
- (iv) Elevated bridges at the northern connection point with the KSWH;
- (v) About 3 km long slip tunnels connecting Tsing Tin Road in Tuen Mun North;
- (vi) Modification works to the Tsing Tin Road/Tsun Wen Road Interchange to accommodate the tunnel portal;
- (vii) Modification works to the Tuen Mun Road/Tsing Tin Road Interchange;
- (viii) Ventilation buildings;
- (ix) An administration building and other ancillary buildings; and
- (x) Possible adits and the associated connection with existing roads.

Subject to review in the further investigation study, the 9 km tunnels may be changed to viaducts or at-grade roads at some sections. Moreover, as shown in Drawing No. HZM6828TH-SK0016, alternative connection points with the KSWH will also be investigated in the further investigation study.

There will also be refinement of the highway alignment within the study area, 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**

The proposed TMWB involves the construction and operation of highways and the associated link roads, which is classified as Designated Projects under the following categories under Schedule 2 of the Environmental Impact Assessment Ordinance:

- A.1. A road which is an expressway, trunk road, primary distributor road or district distributor road including new roads, and major extensions or improvements to existing roads;

- A.7. A road or railway tunnel more than 800 m in length between portals;
- A.8. A road or railway bridge more than 100 m in length between abutments; and
- Q.1. All projects including new access roads, railways, sewers, sewage treatment facilities, 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.

## **1.6 Contact Person**

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## **2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME**

### **2.1 Project Planning and Implementation**

The TMWB will be implemented under a PWP item. Consultants will be appointed to undertake the further investigation study of the project.

### **2.2 Project Programme**

The TMWB is required to be commissioned in the period of 2026 to 2031 to relieve the anticipated congestion at critical road sections in Tuen Mun. The packaging and programme of the project shall be ascertained by a further investigation study of TMWB, taking into account other relevant technical studies.

### **2.3 Interfacing with other Projects**

Potential projects that would interface with the TMWB have been identified and are listed below. This list should be re-visited during the EIA stage to ensure all the latest projects available from the respective stakeholders are incorporated.

<b>Phase</b>	<b>Other Projects in the Vicinity</b>
Construction	Tuen Mun Area 54 Development
	Proposed developments in Tuen Mun Area 40 and 46 and the adjoining areas
	Proposed and existing facilities and developments in Tuen Mun Area 38
	Existing fill bank and temporary construction waste sorting facilities in Tuen Mun Area 38
	Tuen Mun Sewerage – Investigation, Design and Construction
	Hung Shui Kiu New Development Area
	WENT Landfill Extensions
	Proposed Logistics Development at Tuen Mun Area 49
	Proposed Columbarium and Garden of Remembrance at Tsang Tsui, Tuen Mun
Operation	Kong Sham Western Highway
	Tuen Mun – Chek Lap Kok Link
	Proposed and existing facilities and developments in Tuen Mun Area 38
	Proposed developments in Tuen Mun Area 40 and 46 and the adjoining areas
	Castle Peak and Black Point Power Stations
	Hung Shui Kiu New Development Area
	WENT Landfill Extensions
	Proposed Logistics Development at Tuen Mun Area 49
	Proposed Columbarium and Garden of Remembrance at Tsang Tsui, Tuen Mun

### **3 POSSIBLE IMPACT ON THE ENVIRONMENT**

#### **3.1 Outline of Process Involved**

Based on the preliminary study, the TMWB would conceptually be made up of the following elements:

- Elevated bridges/viaducts
- Land tunnels
- At-grade roads
- Toll plaza(s)
- Ventilation buildings
- Administration building and other ancillary buildings

The elevated bridges/viaducts are likely to be of pre-stressed concrete construction with piled foundation. The tunnels of the TMWB would be constructed using drill and blast method or cut-and-cover method. The layouts and construction methods of the bridges, land tunnels, and the associated tunnel portals, ventilation system consisting of adits, shafts and buildings would be examined under the further investigation study of this project, and considerations would be taken in the refinement of the project alignment and the design to avoid and/or minimize the environmental impacts to the sensitive receivers.

The works areas, haul roads, locations for stockpiles associated with the construction works would also be examined and identified during the further investigation study of the project.

### **3.2 Existing Available Data**

In 2005, Highways Department engaged a consultant to undertake a Feasibility Study for the possible alignments of the TMWB. In 2008, Highways Department engaged another consultant to undertake an Investigation and Preliminary Design for the TMWB.

Two separate EIA study briefs, namely, Study No. ESB-174/2007 and Study No. ESB-219/2011, had been issued in December 2007 and February 2011 respectively by the Director of Environmental Protection in respect of two previous alignment options. However, these alignments were not adopted due to strong objections received.

Assessment on environmental impacts for the previous options had been carried out. A number of areas along the latest alignment shown in Drawing No. HZM6828TH-SK0016 were within the study areas of previous options and had been examined and assessed based on environment criteria such as air quality, noise, water quality, ecology, landscape and visual, cultural heritage and waste management. The information obtained from previous assessments had been reviewed and taken into account in preparation of this project profile.

A portion of the toll plaza lies within the Consultation Zone of the Pillar Point Valley Landfill. The toll plaza is a combined Toll Plaza for TM-CLKL and TMWB at Tuen Mun Area 46. A preliminary landfill gas hazards assessment had been conducted under the EIA Study of TM-CLKL.

### **3.3 Construction and Operation Environmental Impact**

It is anticipated that surrounding sensitive receivers could be affected by air quality, noise, water quality, ecological, landscape and visual, cultural heritage, waste management, hazard to life and landfill gas hazard impacts during the construction and operation stages.

#### **3.3.1 Air Quality**

During construction, the major construction works would be site formation, construction of the elevated bridges/viaducts, land tunnels, at-grade roads, administration/ventilation buildings and toll plaza. The potential air quality impact on air sensitive receivers would be generated from excavation and materials handlings, filling activities, haul roads and wind erosion of open sites and stockpiling areas. The construction dust generating activities would be those associated with site formation and construction works. Other major projects planned in the vicinity of the study area which might cause cumulative construction phase impacts to the environment will be identified.

During operation phase, potential air quality impacts will be associated with the background pollutant concentrations; vehicle emissions from open sections of existing and proposed road networks within the study area; portal and toll plaza emissions from the TMWB and the TM-CLKL; ventilation building emissions from the same projects; and industrial emission within the study area.

### **3.3.2 Noise**

During construction phase, potential noise impacts on noise sensitive receivers will be associated with construction activities and powered mechanical equipment including breakers, excavators, lorries, mobile cranes, concrete truck mixers, pokers, rollers, etc.. The key construction activities which would create noise impacts will be tunneling, piling for foundation, excavation and concreting etc. The noise impact and vibration arising from those construction activities will be minimized. The impact for any night time work would also need to be considered as well.

During operation phase, noise sources will be associated with the traffic using the highway, the tunnel portals and the ventilation buildings. The cumulative noise impact of neighbouring roads such as TM-CLKL, Lung Mun Road, Tsing Tin Road, Tsun Wen Road, Tuen Mun Road near Tsing Tin Road, KSWH and other fixed noise sources would need to be considered.

### **3.3.3 Water Quality**

During construction phase, potential water quality impacts would be from general construction activities; construction site run-off; accidental spillage; sewage effluent from construction workforce; and excavation activities. In addition, the construction of bridge foundation may affect the nearby Tuen Mun River Channel and local streams in Tuen Mun and Hung Shui Kiu.

During operation phase, local flow pattern may be affected in the vicinity of pier foundation. Other potential water pollution sources would include the road surface run-off from the bridges/viaducts; sewage effluent generated from staffs working at the administration buildings and operation of the ventilation buildings; and building run-off such as wash-off from the outside of the buildings during rainstorm. Consideration would also be given to the cumulative water quality impacts arising from other projects anticipated in operation concurrently.

### **3.3.4 Ecology**

During construction phase, major impacts on ecology for the TMWB would include terrestrial habitat loss at temporary works areas, administration/ventilation buildings, tunnel portals and bridges. The impact arising from the construction activities on the groundwater level within the study area will closely be monitored.

During operation phase, potential ecological impacts will include traffic noise and artificial lighting at areas such as bridges and portal areas, which may affect the behaviour of terrestrial fauna.

### **3.3.5 Landscape and Visual**

During construction phase, sources of impacts on landscape would include direct impacts such as construction works and associated slope works; and indirect impacts such as construction traffic, laying of utilities, temporary site access areas, site cabins and heavy machinery, increased road traffic congestion, after dark lighting and welding and dust during dry weather. For visual impacts during the construction



phase, the unmitigated visual impacts will be adverse in nature and will mainly include blockage of views to the visual resources, degrading of visual quality of existing views and visual incompatibility of the construction works with the surroundings.

During operation phase, the sources of impacts on landscape would be the operation of the TMWB. As the toll plaza would be connected with Lung Mun Road, there will be impacts due to vehicular emission on the vegetation at the adjacent land and on the road side planting. For visual impacts during the operation phase, the nature of unmitigated visual impacts could be adverse. Impact will be resulted from the blockage of views to the visual resources and permanent loss of open views. The magnitude of adverse visual impacts will be large for receivers located in close proximity to Green Belt Area where the proposed TMWB will result in blockage of views and permanent loss of panoramic village views that some receivers are currently enjoying.

### **3.3.6 Cultural Heritage**

The latest alignment will not encroach upon any Sites of Archaeological Interest. Special considerations would need to be given for the part of the TMWB near to potential Sites of Archaeological Interest. In order to avoid affecting unknown Sites of Archaeological Interest, if any, archaeological impact assessment will be conducted during the EIA stage to provide comprehensive archaeological information for evaluation. Built heritage impact assessment will also be conducted to identify the known and unknown built heritage items within the assessment area in the EIA submission stage.

### **3.3.7 Waste Management**

During construction phase, waste materials which will be generated can broadly be classified into distinct categories based on their nature and disposal options as inert construction and demolition (C&D) materials; non-inert portion of C&D materials (C&D waste); chemical waste; and general refuse. The impact arising from those generated waste on the Green Belt Areas and other areas will be considered.

### **3.3.8 Hazard to Life**

There is certain hazard risks related to blasting for tunnel construction. There may also be certain hazard risks on site during construction and operation as the project falls within the consultation zone of the Tuen Mun Water Treatment Works. The location of the concerned consultation zone is shown on the attached Drawing No. HZMB6828TH-SK0016.

The land tunnels will mainly be constructed by drill-and-blast method using explosives. This is commonly used for excavation of hard rock tunnels and is an economical method and less restricted by site conditions and equipment set-up, where tunneling by tunnel boring machine is not appropriate given the large diameter involved and the extreme wear and tear expected. A portion of the tunnel may be constructed by mechanical breaking and/or cut-and-cover methods, in which no explosives will be used. The exact nature of the construction method, as well as its extent, will be ascertained in the further investigation study.

The types of explosives used for the construction of the land tunnels by the drill-and-blast method would be cartridged emulsion explosives; bulk emulsion explosives and primers, boosters, detonating cords and detonators. The impact arising from the drill-and-blast method, such as the storage, transport of explosives and the general materials/waste during construction will be assessed.

The risk from the Tuen Mun Water Treatment Works will also be assessed.

### **3.3.9 Castle Peak Firing Range**

The TMWB will run through the Castle Peak and may be within the Castle Peak Firing Range. The impacts on the Castle Peak Firing Range during the construction and operation phases of the TMWB will be assessed.

### **3.3.10 Landfill Gas Hazard**

The proposed alignment falls within the consultation zone of the closed Pillar Point Valley Landfill. Landfill gas hazard assessment will be carried out as appropriate for construction or/and operation phases of the project to address its potential risk.

## **4 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT**

### **4.1 Existing and Planned Sensitive Receivers**

A number of existing potential sensitive receivers have already been identified in the preparation of this project profile. Other potential sensitive receivers including those existing and planned sensitive receivers identified during the EIA study will be considered. Detailed investigation and surveys will be carried out to assess how they are affected by the proposed project under this EIA study.

#### **4.1.1 Air Quality**

Potential air sensitive receivers are located at:

- EMSD Tuen Mun Vehicle Servicing Station, DSD Pillar Point Preliminary Treatment Works;
- Tuen Mun River Trade Terminal, Pillar Point Fire Station; Butterfly Beach Laundry;
- Shan King Estate; Siu Hong Court, Kin Sang Estate, Tai Hing Estate, Ching Chung Koon Road Government Quarter, Lakeshore Building, Brilliant Garden, Leung King Estate, San Wai Court, Tin King Estate, Siu Kwai Court, Chelsea Height, Affluence Garden, Grandeur Garden, Prime View Garden, San Sang San Tsuen;
- Butterfly Beach, Butterfly Beach Park, Playground at Tai Sang House, Tsing Tin Playground, Tsing Tin Garden, Tai Hing Indoor Recreation Centre, Tang Shiu Kin Sports Ground, Castle Peak Road (San Hui) Park, Tennis Court at

Tsing Chung Koon Road Government Quarter and Fung Tei Garden;

- Tuen Mun Catholic Secondary School, Hong Chi Monninghope School, Tuen Mun Government Secondary School;
- Jockey Club Tuen Mun Home for the Aged Blind, Tuen Mun Hospital and Castle Peak Hospital; and
- Ching Chung Koon, Ching Leung Nunnery, Ling Tao Monastery.

The locations of the above potential air sensitive receivers are shown in Drawing No. HZM6828TH-SK0018.

#### **4.1.2 Noise**

Potential noise sensitive receivers are located at:

- Siu Hin Court, Kin Sang Estate, Tai Hing Estate, Siu Kwai Court, Shan King Estate, Affluence Garden, Ching Chung Koon Road Government Quarters, Lakeshore Building, Rich Building, Victory Building, Brilliant Garden, Siu Hong Court, Leung King Estate, San Wai Court, Tin King Estate, Chelsea Height, Grandeur Garden, Prime View Garden, San Sang San Tsuen;
- Tuen Mun Catholic School, Hong Chi Morninghope School, Shi Hui Wen Secondary School, Christian Alliance College, C.C.C. Tam Lee Lai fun Memorial Secondary School;
- Jockey Club Tuen Mun Home for the Aged Blind, Ching Chung Home for the elderly, Tuen Mun Hospital, Castle Peak Hospital; and
- Ching Chung Koon, Ching Leung Nunnery, Ling Tao Monastery.

The locations of the above potential noise sensitive receivers are shown in Drawing No. HZM6828TH-SK0020.

#### **4.1.3 Water Quality**

Potential water sensitive receivers would be:

- Tuen Mun River;
- Cooling water intakes, Water Supplies Department flushing water intakes, gazette beaches and secondary contact zone along the shore of Pillar Point, all inland waters (such as natural streams and water courses) at or near the proposed project; and
- Gazetted and non-gazetted beaches in Tuen Mun.

The locations of the above potential water sensitive receivers are shown in Drawing No. HZM6828TH-SK0021.

#### **4.1.4 Ecology**

Potential ecological sensitive receivers would be:

- Castle Peak Site of Special Scientific Interest (SSSI) and Siu Lang Shui SSSI;
- Siu Lang Shui Butterfly Overwintering Site;
- Tuen Mun Area 54 Woodland;
- San Sang San Tsuen Egrettry;
- Woodland and Natural Streams in Conservation Area near San Sang San Tsuen;  
and
- Tuen Mun Egrettry.

The locations of the above potential ecological sensitive receivers are shown in Drawing No. HZM6828TH-SK0022.

#### **4.1.5 Landscape and Visual**

Potential landscape and visual sensitive receivers would be:

##### Landscape Sensitive Receivers

- Industrial urban landscape near Tuen Mun River Trade Terminal;
- Upland and hillside landscape at Castle Peak;
- Castle Peak SSSI;
- Woodland in Tuen Mun Area 54;
- Green Belt Areas in Tuen Mun and Yuen Long;
- Butterfly Beach and Butterfly Beach Park, as well as the nearby Open Space zone;
- Conservation Area Zone in Lam Tei and Yick Yuen; and
- Residential urban fringe landscape around Shan King Estate and Tin King Estate.

##### Visual Sensitive Receivers

- Shan King Bus Terminus, Shek Pai Tau Sitting-out Area, Car Park of The Hong Kong Society for Rehabilitation,

- Castes Tuen Mun Madden Foundation Secondary School, Yan Oi Tong Chan Wong Suk Fong Memorial Secondary School, Christian Alliance College, Tsung Tsin College, Buddhist Sum Heung Lam Memorial College and Shi Hui Wen Secondary School, Ma Kam Ming Charitable Foundation Ma Ko Pan Memorial College, The Church of Christ in China Tam Lee Lai Fun Memorial Secondary School, Sheng Kung Hui Mung Yan Primary School;
- The Jockey Club Yan Oi Tong Swimming Pool, Tai Hing Sports Centre, Tuen Mun Tang Shiu Kin Sports Ground;
- Tsing Chung Koon Road Government Quarters;
- Ching Chung Koon and Tuen Mun Hospital, Jockey Club Tuen Mun Home For the Aged Blind;
- King Fung Children's Playground, Tsing Tin Playground, San Wo Lane Playground, Castle Peak Road (San Hui) Park, Rooftop Gardens of Tuen Mun Riverside Park and Riverside Promenade, Fung Tei Garden;
- Ching Leung Nunnery, Gig Lok Monastery, Tuen Mun Treatment Works Government Quarters;
- Green Belt Area with Graves located Northeast of Tsun Wan Road and Shek Pai Tau Road, Green Belt Area East of Fung Tei Garden, Green Belt Area North of Kong Sham Western Highway with Mixed Vegetation (Grassland / Shrubland), Green Belt Area South of San Seng Tsuen Village along East and West of Kong Sham Western Highway;
- Tai Hing Substation;
- Residential of Tin King Estate, Kin Sang Estate, Tai Hing Estate, Greenland Garden, Chelsea Heights, Affluence Garden, along Tseng Choi Street, Prime View Garden, Kingston Terrace, Grandeur Garden, Elegance Garden, Noble Place, Brilliant Garden, Parkland Villas, Siu Hong Court, South Hillcrest, Fu Tai Estate, Lingarde Garden, Botania Villa; and
- Village of San Hui Tsuen, Kau Hui Tsuen, Wong Ka Wai and Leung Tin Tsuen.

The locations of most of the above potential landscape and visual sensitive receivers are shown in Drawing No. HZM6828TH-SK0023.

#### **4.1.6 Cultural Heritage**

Cultural heritage resources in the vicinity of the study area would be:

- Shek Kok Tsui Site of Archaeological Interest in Tuen Mun;
- Siu Hang Tsuen Site of Archaeological Interest in Tuen Mun;

- Kei Lun Wai Site of Archaeological Interest in Tuen Mun;
- Fu Tei Ha Site of Archaeological Interest in Fu Tei;
- Tsing Chuen Wai Site of Archaeological Interest in Tuen Mun;
- San Hing Tsuen Site of Archaeological Interest in Tuen Mun;
- Tuen Tsz Wai Site of Archaeological Interest in Tuen Mun;
- Tseung Kong Wai Site of Archaeological Interest in Ha Tsuen;
- Tsing Shan Monastery in Tuen Mun;
- Ching Chung Koon in Tuen Mun;
- Ching Leung Fat Yuen in Tuen Mun;
- Ho's and Man's ancestral grave at Por Lo Shan in Tuen Mun;
- To's ancestral graves at Lam Tei;
- Hau Kok Tin Hau Temple in Tuen Mun; and
- No. 3 San Shek Wan North Road in Tuen Mun.

The cover area of the above cultural heritage resources is shown in Drawing No. HZM6828TH-SK0024.

#### **4.2 Hazard to Life**

The hazard risks related to blasting for tunnel construction and the hazard risks during construction and operation for the project falling within the consultation zone of the closed Pillar Point Valley Landfill and also the consultation zone of Tuen Mun Water Treatment Works will be identified.

#### **4.3 Major Elements of Surrounding Environment and Land Uses**

The study area at southern connection point with the TM-CLKL covers the offices and workshops at the Tuen Mun Area 40. The study area along the land tunnels running north from TM-CLKL covers the Castle Peak, Por Lo Shan and Yuen Tau Shan, which are undeveloped areas characterized by steep natural terrain and a number of temples. The northern connection point with the KSWH is an undeveloped area characterized by a number of villages and the proposed HSK NDA. The exit point of the slip tunnels at Tsing Tin Road is characterized by high-rise residential buildings. There are also a number of schools and the Tuen Mun Hospital in this area. There are a number of sites of environmental/ecological/historical importance located within the study area, including Castle Peak SSSI.

## **5 ENVIRONMENTAL MITIGATION MEASURES**

Based upon the potential impacts as a result of the construction and operation of the project, it is anticipated that mitigation measures will be required. Measures to minimize environmental effects are detailed below.

### **5.1 Measures to Minimize Environmental Impacts**

#### **5.1.1 Air Quality**

Appropriate dust mitigation measures as stipulated in the Air Pollution Control (Construction Dust) Regulations will be implemented during the construction period to control fugitive dust emission.

The key measures are:

1. Regular watering on all exposed and unpaved surface, particularly during dry weather;
2. Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers;
3. Covering all excavated or stockpile of dusty material by impervious sheeting or spraying with water to maintain the entire surface wet;
4. Provision of wheel washing facilities at the exit points of the site;
5. Covering of any dusty materials on vehicles leaving the site; and
6. Avoid slope cutting and minimize extent of cut-and-cover tunnelling section.

Subject to investigation and further assessment to identify additional mitigation measures, at least the following measures will be considered during operation period to minimize the air quality impacts on nearby air sensitive receivers.

1. Provision of buffer area between the sources and the receivers; and
2. Location of ventilation buildings and tunnel portals far away from the air sensitive receivers.

#### **5.1.2 Noise**

Subject to investigation, the following measures will be considered during construction period to minimize construction noise impacts on nearby noise sensitive receivers.

1. Implementing good site practices such as orientating the noisy plant away from the nearby noise sensitive receivers, proper fitting of silencer on the construction equipment and use of quiet plant;

2. Temporary noise barriers are likely to be required along the construction site boundary such that construction equipment and noise are screened;
3. Silencers on construction equipment should be properly fitted and maintained during the construction works; and
4. Mobile plant should be sited as far as possible and practicable away from noise sensitive receivers.

Subject to investigation, the following measure will be considered during operation period to minimize the traffic noise impacts on nearby noise sensitive receivers.

1. Noise barriers and low noise surface material may be required along some sections of the new highway for reducing traffic noise during the operation phase.

### **5.1.3 Water Quality**

The following mitigation measures during the construction period will be adopted to control the water quality impact:

1. Good site practice in accordance with the ProPECC PN 1/94 “Construction Site Drainage” and “Recommended Pollution Control Clauses for Construction Contracts” issued by EPD, and the procedures in ETWB TCW No. 5/2005 “Protection of Natural Stream / Rivers from adverse impact arising from construction works”; and
2. All runoffs arising from the construction site should be properly collected and treated to ensure the effluent comply with Water Pollution Control Ordinance. Silt trap and oil interceptor will be provided to remove the oil, lubricants, grease, silt, grit and debris from the wastewater before being pumped to the public stormwater drainage system. The silt traps and oil interceptors will be cleaned and maintained regularly.

The following measures will be adopted during operation period to minimize the water quality impacts on nearby water sensitive receivers.

1. Stormwater from road surface should be collected into drainage system via silt traps and oil interceptor to remove silt / grit and oil before discharging; and
2. Develop contingency plan for accidental chemical spillage.

### **5.1.4 Ecology**

Avoidance of any identified sensitive sites will be the preferred mitigation measure. Subject to investigation, the following mitigation measures during construction phase will be considered to minimize the impact.

1. The water quality mitigation measures proposed in Section 5.1.3 will be adopted; and
2. Disruption to terrestrial sensitive areas will be avoided as far as possible.



The following mitigation measures during operation phase will be considered to minimize the impact.

1. The water quality mitigation measures proposed in Section 5.1.3 will be adopted; and
2. Should there be encroachment of woodland due to the TMWB, compensation planting will be considered.

### **5.1.5 Cultural Heritage**

A Cultural Heritage Impact Assessment, including the Built Heritage Impact Assessment and Archaeological Impact Assessment will be carried out under the EIA study to assess the potential direct and indirect impact on cultural heritage. Impacts on cultural heritage will be avoided as far as practicable. If unavoidable, mitigation measures to the direct and indirect impacts on cultural heritage will be proposed and implemented with prior agreement with the Antiquities and Monument Office.

### **5.1.6 Landscape and Visual**

Mitigation measures to minimize environmental impact during both the construction and operation phases should be comprehensively reviewed for both landscape and visual aspects. Possible mitigation measures are as follows:

#### During construction phase

- Temporary greening treatment on bare soil surface before construction works of structures take place;
- Hoarding to be erected at the interface between the construction site and the existing area;
- Early formation of the planting area and advance planting of vegetations on the concerned landscape sensitive receivers;
- Sensible locations of viaduct alignment, columns and portals to minimize impact to existing trees; and
- Trees already included or potentially registrable in the “Register of Old and Valuable Trees” under ETWB TCW No. 29/2004, and trees with high conservation or amenity value, to be identified for preservation in early stage.

#### During operation phase

- Aesthetic design of the portal structures;
- Aesthetic design of any noise barrier on bridges near residential areas;
- Tree planting and earth mounds near portals to reduce their apparent size/scale

and to visually screen and soften the structures;

- Early formation of the planting area and advance planting of vegetations on the concerned landscape sensitive receivers in operation phase;
- Concealing the portal structures on their roof and sides by earth mounds and vegetation planting on top of the mounds;
- Sensible locations of bridges alignment, columns and portals to minimize impact to existing trees. Felled trees have to be compensated;
- Earth mounds and tree planting near columns to reduce the apparent height and massiveness of supporting columns;
- Re-provision of any loss open spaces and recreational facilities on-site or off-site; and
- Trees already included or potentially registrable in the “Register of Old and Valuable Trees” under ETWB TCW No. 29/2004, and trees with high conservation or amenity value, to be identified for preservation in early stage.

#### **5.1.7 Waste Management**

The waste management hierarchy is to minimize the waste generation. If waste generation cannot be avoided, 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 minimization, including reuse, recycle, matching disposal with other projects, handling, storage, transportation and disposal of expected waste materials.

As the TMWB is a highway for use by road traffic, waste impact during the operation stage is considered as extremely small.

#### **5.1.8 Hazard to Life**

The further investigation study will look into the way of delivery of explosives, including the alternative of establishment of explosives magazine for overnight storage. Hazard assessment for explosives would be conducted taking into account the impact of delivery and use of explosives for tunnel construction on the population in the vicinity of the tunnel alignment, including the risks from transport of explosives, use of explosives and transport of explosives to the blast faces inside the tunnels. The impact of explosives to Castle Peak Firing Range in the vicinity of TMWB will be assessed.

#### **5.1.9 Landfill Gas Hazard**

Landfill gas hazards assessment on the closed Pillar Point Valley Landfill will be conducted. Appropriate mitigation measures would be recommended where necessary.

## **5.2 Severity, Distribution and Duration of Environmental Effects**

For the TMWB, air, noise, landscape and visual impact will be severe during construction.

The level of archaeological impact will need to be ascertained subject to detailed Cultural Heritage Impact Assessments.

Subject to investigation on noise impacts, permanent noise barrier/low noise surfacing may be required to keep the noise impact to acceptable level.

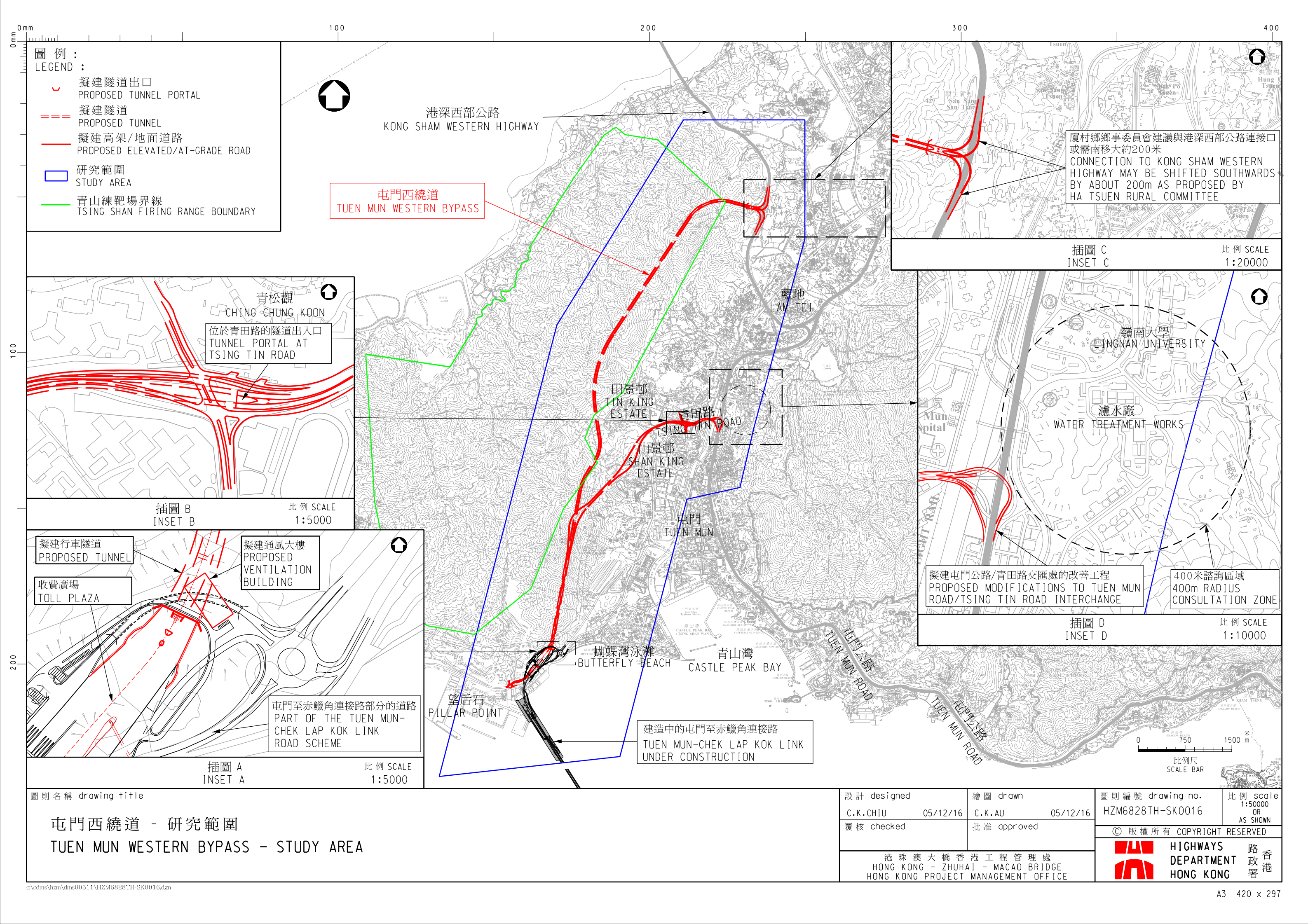
## **5.3 Further Implication**

Public consultation will be arranged once sufficient information is available.

## **6 USE OF PREVIOUSLY APPROVED EIA REPORTS**

No previous approved EIA report exists for the proposed project. However, reference may be made to the following previously approved EIA reports within the study area:

<b>Register No</b>	<b>Title</b>
EIA-015/BC	EIA of the Proposed 6000 MW Thermal Power Station at Black Point
EIA-015/1999	Planning and Development Study of Potential Housing Sites in Area 54, Tuen Mun
EIA-078/2002	Deep Bay Link
EIA-082/2002	Shenzhen Western Corridor
EIA-123/2006	Emission Control Project at Castle Peak Power Station "B" Units
EIA-142/2007	Widening of Tuen Mun Road at Tsing Tin Interchange
EIA-158/2008	Traffic Improvement to Tuen Mun Road Town Centre Section
EIA-166/2008	Decommissioning of the Co-combustion Pilot Plant at Tap Shek Kok
EIA-174/2009	Tuen Mun - Chek Lap Kok Link
EIA-237/2016	Additional Gas-fired Generation Units Project
EIA-248/2016	Hung Shui Kiu New Development Area



圖例：  
LEGEND :

- - - 擬建隧道出口  
PROPOSED TUNNEL PORTAL
- = = = 擬建隧道  
PROPOSED TUNNEL
- 擬建高架/地面道路  
PROPOSED ELEVATED/AT-GRADE ROAD
- 研究範圍  
STUDY AREA
- 青山練靶場界線  
TSING SHAN FIRING RANGE BOUNDARY

屯門西繞道  
TUEN MUN WESTERN BYPASS

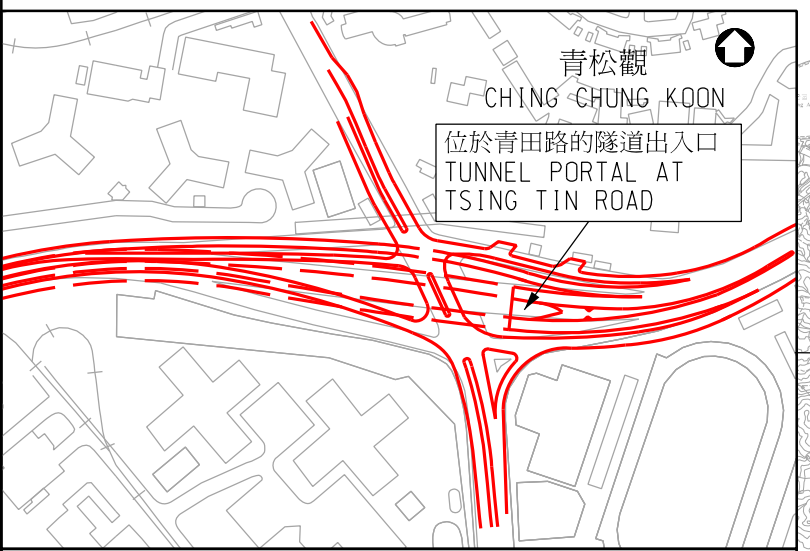


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INSET B  
比例 SCALE  
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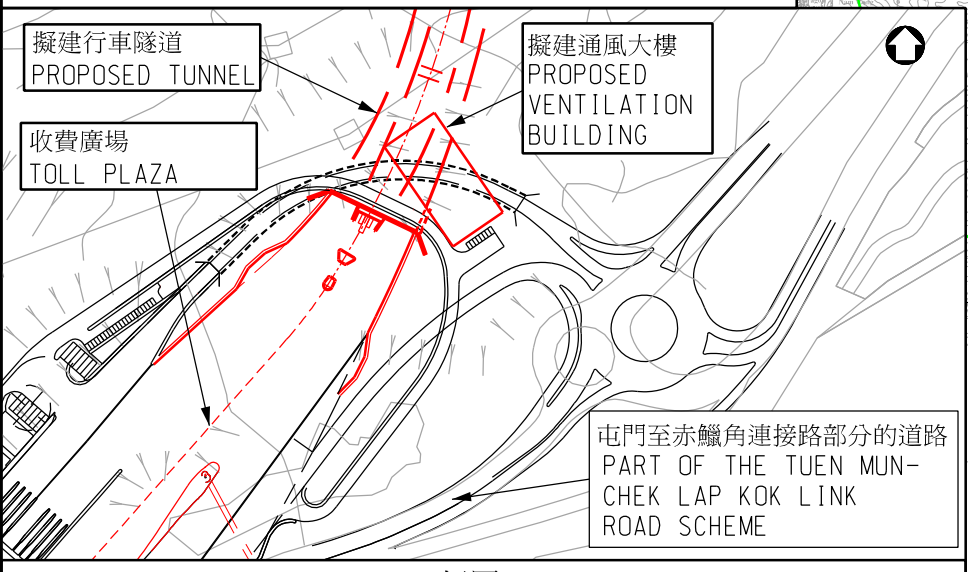


插圖 A  
INSET A  
比例 SCALE  
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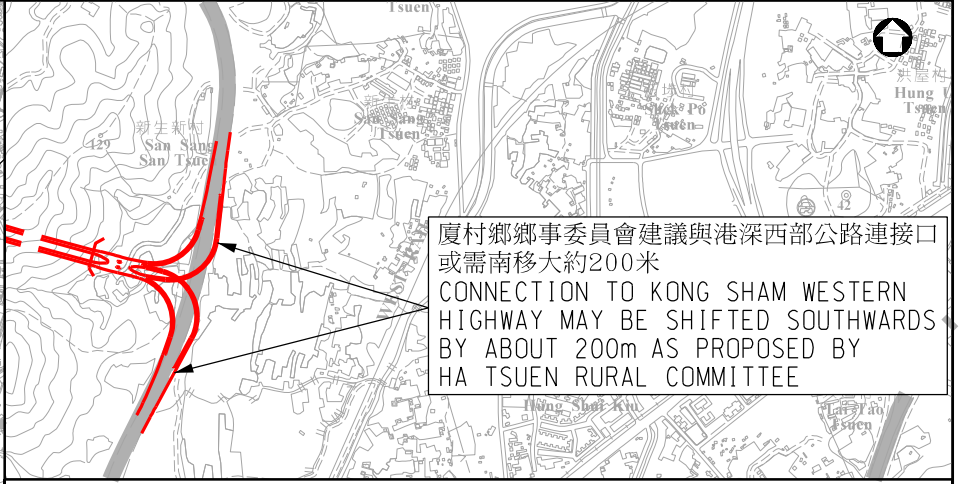


插圖 C  
INSET C  
比例 SCALE  
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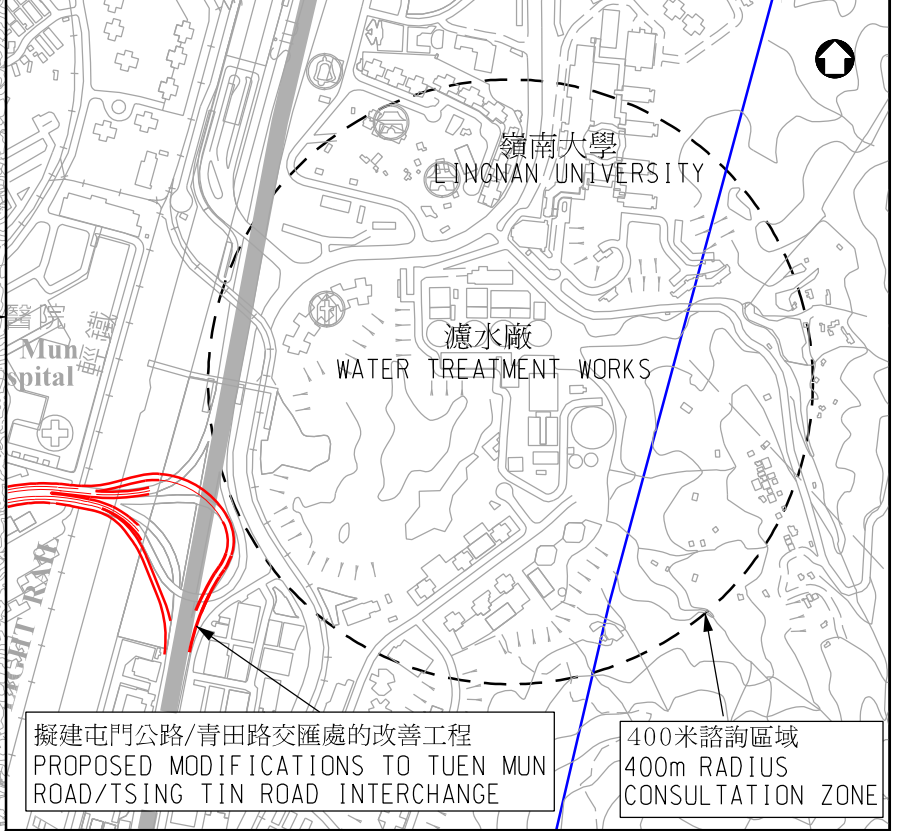







插圖 D  
INSET D  
比例 SCALE  
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圖則名稱 drawing title  
**屯門西繞道 - 研究範圍**  
**TUEN MUN WESTERN BYPASS - STUDY AREA**

設計 designed C.K.CHIU 05/12/16	繪圖 drawn C.K.AU 05/12/16	圖則編號 drawing no. HZM6828TH-SK0016	比例 scale 1:5000 OR AS SHOWN
覆核 checked	批准 approved	© 版權所有 COPYRIGHT RESERVED	
港珠澳大橋香港工程管理局 HONG KONG - ZHUHAI - MACAO BRIDGE HONG KONG PROJECT MANAGEMENT OFFICE		<b>HIGHWAYS DEPARTMENT HONG KONG</b> 路政署	

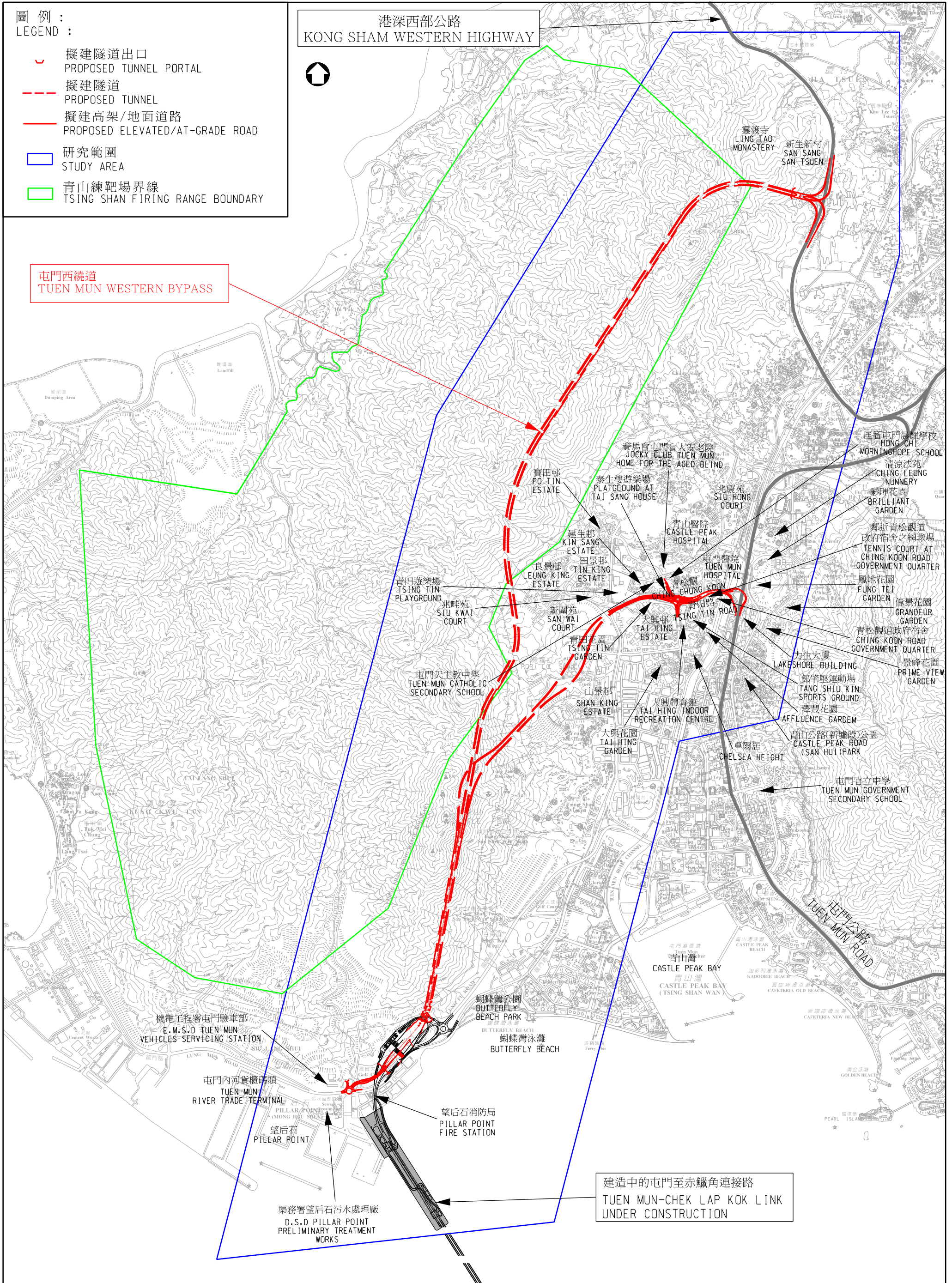
圖例：  
LEGEND：

-  擬建隧道出口  
PROPOSED TUNNEL PORTAL
-  擬建隧道  
PROPOSED TUNNEL
-  擬建高架/地面道路  
PROPOSED ELEVATED/AT-GRADE ROAD
-  研究範圍  
STUDY AREA
-  青山練靶場界線  
TSING SHAN FIRING RANGE BOUNDARY

港深西部公路  
KONG SHAM WESTERN HIGHWAY



屯門西繞道  
TUEN MUN WESTERN BYPASS



圖則名稱 drawing title

屯門西繞道 - 空氣的敏感受體  
TUEN MUN WESTERN BYPASS - AIR SENSITIVE RECEIVERS






圖則編號 drawing no.  
HZM6828TH-SK0018

比例 scale  
1:30000

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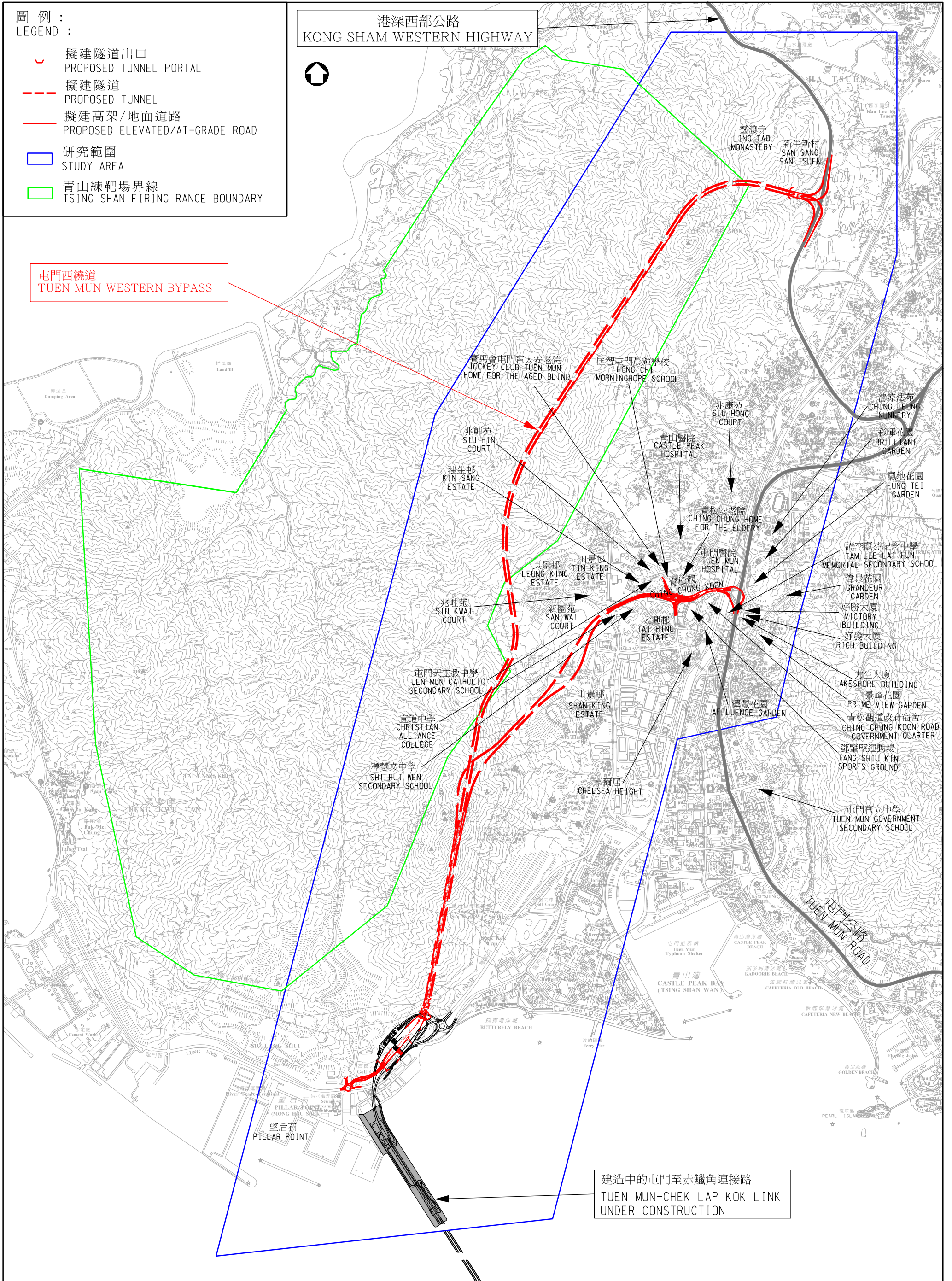
圖例：  
LEGEND：

-  擬建隧道出口  
PROPOSED TUNNEL PORTAL
-  擬建隧道  
PROPOSED TUNNEL
-  擬建高架/地面道路  
PROPOSED ELEVATED/AT-GRADE ROAD
-  研究範圍  
STUDY AREA
-  青山練靶場界線  
TSING SHAN FIRING RANGE BOUNDARY

港深西部公路  
KONG SHAM WESTERN HIGHWAY



屯門西繞道  
TUEN MUN WESTERN BYPASS



圖則名稱 drawing title

屯門西繞道 - 噪音的敏感受體  
TUEN MUN WESTERN BYPASS - NOISE SENSITIVE RECEIVERS

圖則編號 drawing no.  
HZM6828TH-SK0020






比例 scale  
1:30000

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HIGHWAYS  
DEPARTMENT  
HONG KONG 路政署

圖例：  
LEGEND：

-  擬建隧道出口  
PROPOSED TUNNEL PORTAL
-  擬建隧道  
PROPOSED TUNNEL
-  擬建高架/地面道路  
PROPOSED ELEVATED/AT-GRADE ROAD
-  研究範圍  
STUDY AREA
-  青山練靶場界線  
TSING SHAN FIRING RANGE BOUNDARY

港深西部公路  
KONG SHAM WESTERN HIGHWAY



屯門西繞道  
TUEN MUN WESTERN BYPASS

建造中的屯門至赤鱗角連接路  
TUEN MUN-CHEK LAP KOK LINK  
UNDER CONSTRUCTION

圖則名稱 drawing title

屯門西繞道 - 水質的敏感受體  
TUEN MUN WESTERN BYPASS - WATER SENSITIVE RECEIVERS

圖則編號 drawing no.  
HZM6828TH-SK0021






比例 scale  
1:30000

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HIGHWAYS DEPARTMENT  
HONG KONG 路政署

圖例：  
LEGEND：

-  擬建隧道出口  
PROPOSED TUNNEL PORTAL
-  擬建隧道  
PROPOSED TUNNEL
-  擬建高架/地面道路  
PROPOSED ELEVATED/AT-GRADE ROAD
-  研究範圍  
STUDY AREA
-  青山練靶場界線  
TSING SHAN FIRING RANGE BOUNDARY

港深西部公路  
KONG SHAM WESTERN HIGHWAY



新生新村附近林地及天然河流  
WOODLAND AND NATURAL STREAM OF  
SAN SANG SAN TSUEN

新生新村島林  
SAN SANG SAN  
TSUEN EGRETRY

屯門西繞道  
TUEN MUN WESTERN BYPASS

屯門第54區林地  
TUEN MUN AREA  
54 WOODLAND

屯門島林  
TUEN MUN EGRETRY

青山具特殊科學價值地點  
CASTLE PEAK SITE OF SSSI

小冷水具特殊科學價值地點  
SIU LANG SHUI SSSI

小冷水蝴蝶越冬場  
SIU LANG SHUI BUTTERFLY  
OVERWINTERING SITE

蝴蝶灣泳灘  
BUTTERFLY BEACH

青山灣  
CASTLE PEAK BAY  
(TSING SHAN WAN)

望后石  
PILLAR POINT

建造中的屯門至赤鱸角連接路  
TUEN MUN-CHEK LAP KOK LINK  
UNDER CONSTRUCTION

圖則名稱 drawing title

屯門西繞道 - 潛在生態的敏感受體

TUEN MUN WESTERN BYPASS - POTENTIAL ECOLOGICAL SENSITIVE RECEIVERS

圖則編號 drawing no.  
HZM6828TH-SK0022

比例 scale  
1:30000







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DEPARTMENT  
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路政署  
香港



圖例：  
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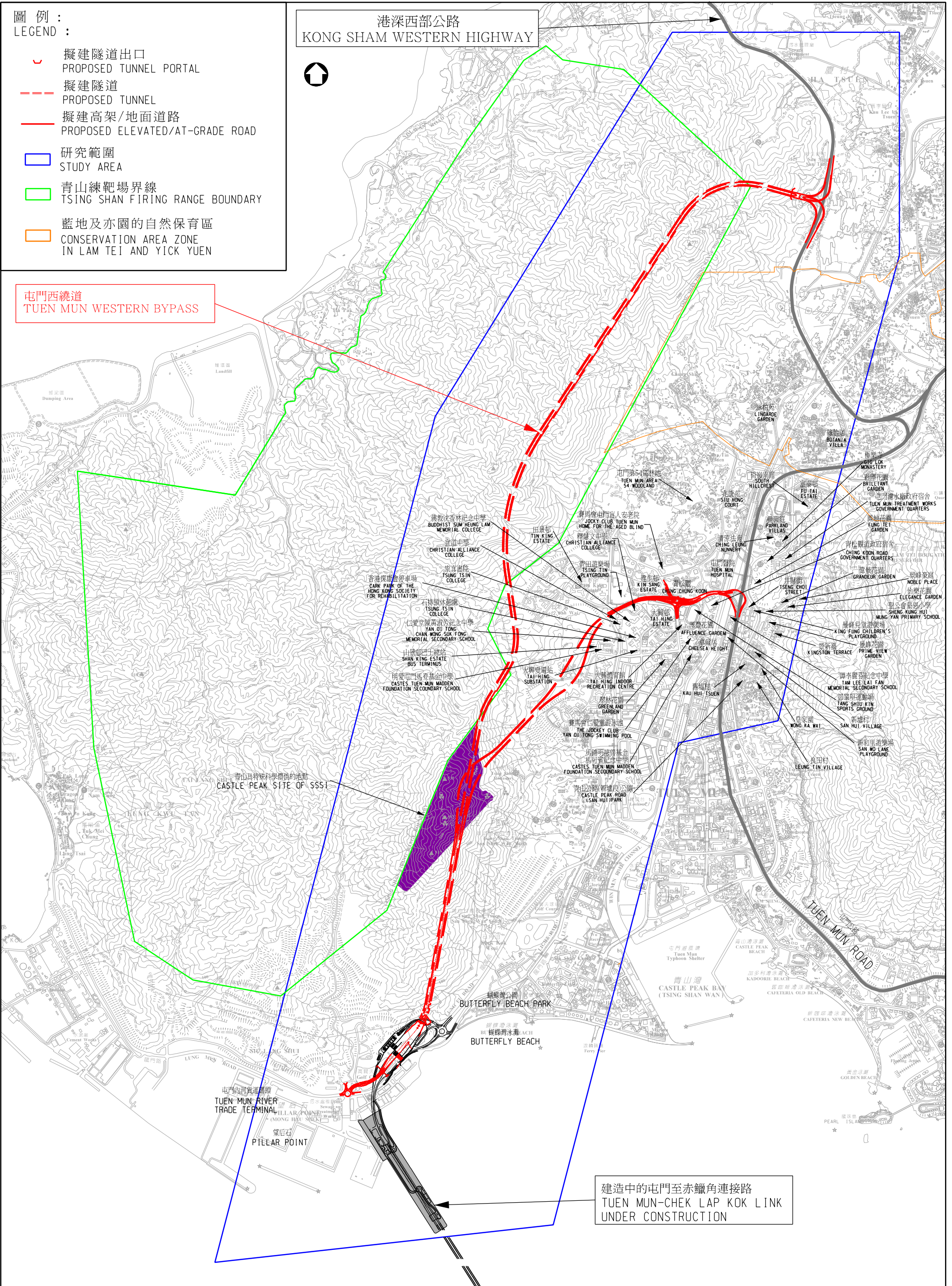
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-  擬建隧道  
PROPOSED TUNNEL
-  擬建高架/地面道路  
PROPOSED ELEVATED/AT-GRADE ROAD
-  研究範圍  
STUDY AREA
-  青山練靶場界線  
TSING SHAN FIRING RANGE BOUNDARY
-  藍地及亦園的自然保育區  
CONSERVATION AREA ZONE  
IN LAM TEI AND YICK YUEN

港深西部公路  
KONG SHAM WESTERN HIGHWAY



屯門西繞道  
TUEN MUN WESTERN BYPASS

建造中的屯門至赤鱗角連接路  
TUEN MUN-CHEK LAP KOK LINK  
UNDER CONSTRUCTION



圖則名稱 drawing title

屯門西繞道 - 景觀及視覺的敏感受體

TUEN MUN WESTERN BYPASS - LANDSCAPE AND VISUAL SENSITIVE RECEIVERS






圖則編號 drawing no.  
H2M6828TH-SK0023

比例 scale  
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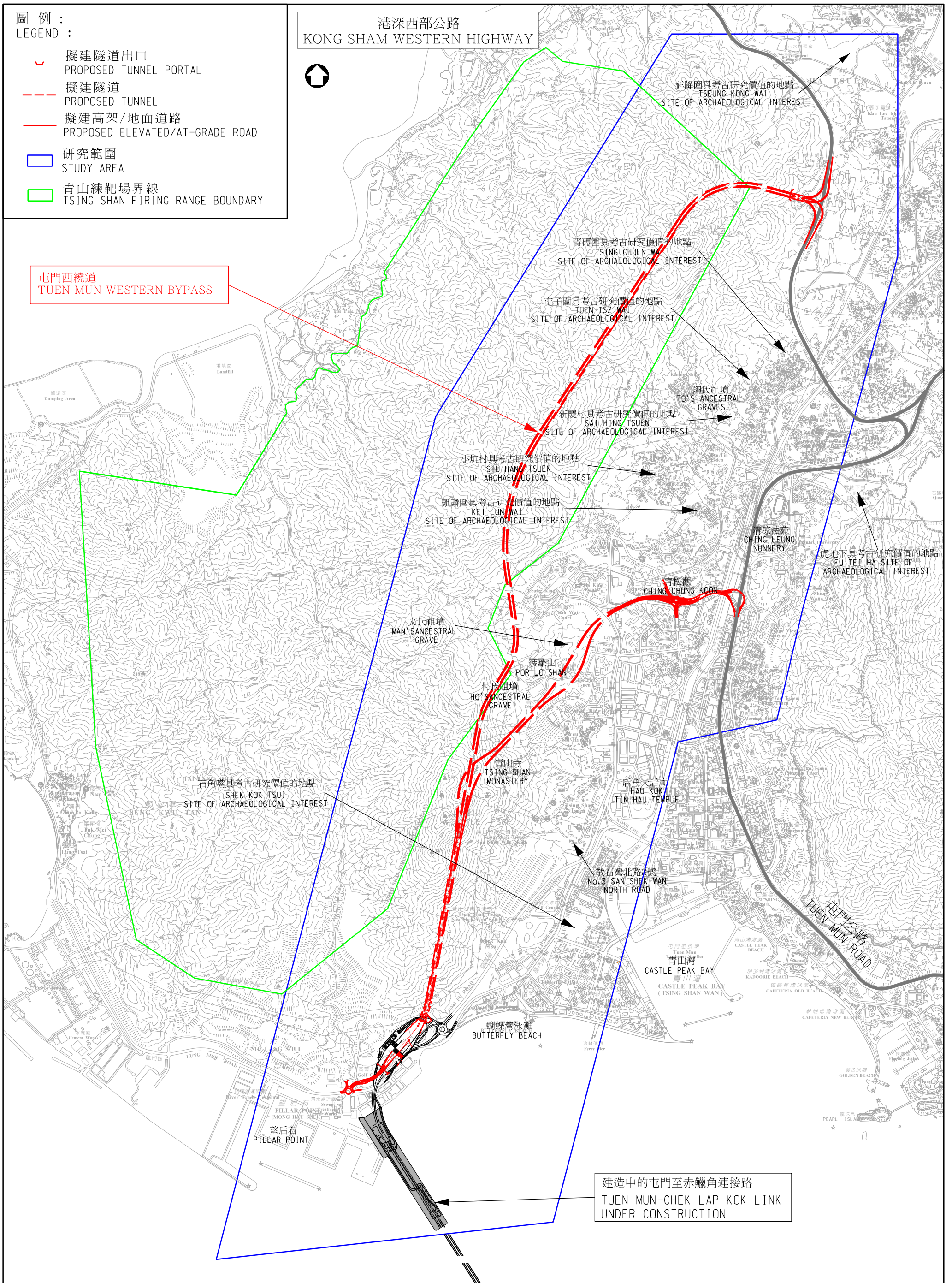
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圖例：  
LEGEND：

-  擬建隧道出口  
PROPOSED TUNNEL PORTAL
-  擬建隧道  
PROPOSED TUNNEL
-  擬建高架/地面道路  
PROPOSED ELEVATED/AT-GRADE ROAD
-  研究範圍  
STUDY AREA
-  青山練靶場界線  
TSING SHAN FIRING RANGE BOUNDARY

港深西部公路  
KONG SHAM WESTERN HIGHWAY



圖則名稱 drawing title

屯門西繞道 - 文化遺產覆蓋範圍  
TUEN MUN WESTERN BYPASS - COVER AREA OF CULTURAL HERITAGE

圖則編號 drawing no.  
HZM6828TH-SK0024

比例 scale  
1:30000

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