

**IMPROVEMENT TO CASTLE PEAK ROAD BETWEEN  
KA LOON TSUEN AND SIU LAM**

**PROJECT PROFILE**

**JULY 1998**

**Highways Department,  
Major Works Project Management Office,  
3/F & 6/F, Homantin Government Offices,  
88 Chung Hau Street,  
Ho Man Tin, Kowloon.**

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## 1. Basic Information

### 1.1 *Project Title*

Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam

### 1.2 *Project Proponent*

Highways Department, Major Works Project Management Office

### 1.3 *Contact Person*

### 1.4 *Nature and Description of the Project*

Various sections of Castle Peak Road have been widened over the last few years to cope with the increase in traffic and there are proposals in the PWP pipeline for widening the section from Siu Lam and So Kwun Tan by 1999 and that from Tsuen Wan West to Ka Loon Tsuen by 2003. When these proposals are completed, the whole section of Castle Peak Road between Tsuen Wan West and Gold Coast in Tuen Mun will be of a dual 2-lane standard with the exception of the section between Ka Loon Tsuen and Siu Lam.

A traffic assessment shows that a single two-lane Castle Peak Road would have inadequate capacity by 2006 to cope with the traffic flows.

In view of the above, it is recommended that the section between Ka Loon Tsuen and Siu Lam be widened to dual 2-lane standard in order to provide a continuous level of service from So Kwun Tan to Tsuen Wan. The widened road would provide for an escape or relief route in case of incidents occurring on Tuen Mun Road.

The proposed scope of the project comprises:-

- (a) widening of Castle Peak Road to dual 2-lane standard;
- (b) provisioning of a 3.5 m wide footpath on both sides and 24 m long lay-bys at suitable locations;
- (c) provisioning of associated slope and drainage works, street lighting modifications, environmental mitigation measures and landscaping works;
- (d) re-provisioning of existing legal run-ins and appropriate modifications to junctions affected by this road improvement scheme;

- (e) provisioning of two new traffic lanes along and on the south side of Tuen Mun Road between Brothers Point and Siu Lam for use by the westbound traffic; and
- (f) modifying the existing underpass at the crossing with Tuen Mun Road at Brothers Point, if necessary.

### *1.5 Location of the Project*

The location of the project is shown in the drawing no. PMHP971/1PL/001 appended in Annex A.

### *1.6 Number and Types of Designated Project*

"Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam" is the only project covered by this project profile. The project is classified as Category A.1 under Schedule 2 of the EIA Ordinance.

## **2. Outline of the Planning and Implementation Programme**

### *2.1 Project Planning and Implementation*

It is proposed to implement the project by employing consultants to undertake the investigation study, detailed design and the construction supervision of the project.

### *2.2 Project Timetable*

According to the present programme, a consultant will be appointed in early 1999 to undertake the investigation study and associated EIA for the project. Taking into account of the time required for detailed design and necessary statutory procedures, it is anticipated that the construction works will commence in mid 2003 for completion in early 2007.

## **3. Possible Impact on the Environment**

### *3.1 Major Elements of the Surrounding Environment*

The existing sensitive receivers along the Castle Peak Road are outlined in Annex C.

### *3.2 Construction Impacts*

A general overview of potential construction impacts arising from the proposed project, together with various practical methods to mitigate the effects of those impacts are described in Section 6 of Annex C.

### 3.3 *Operational Impacts*

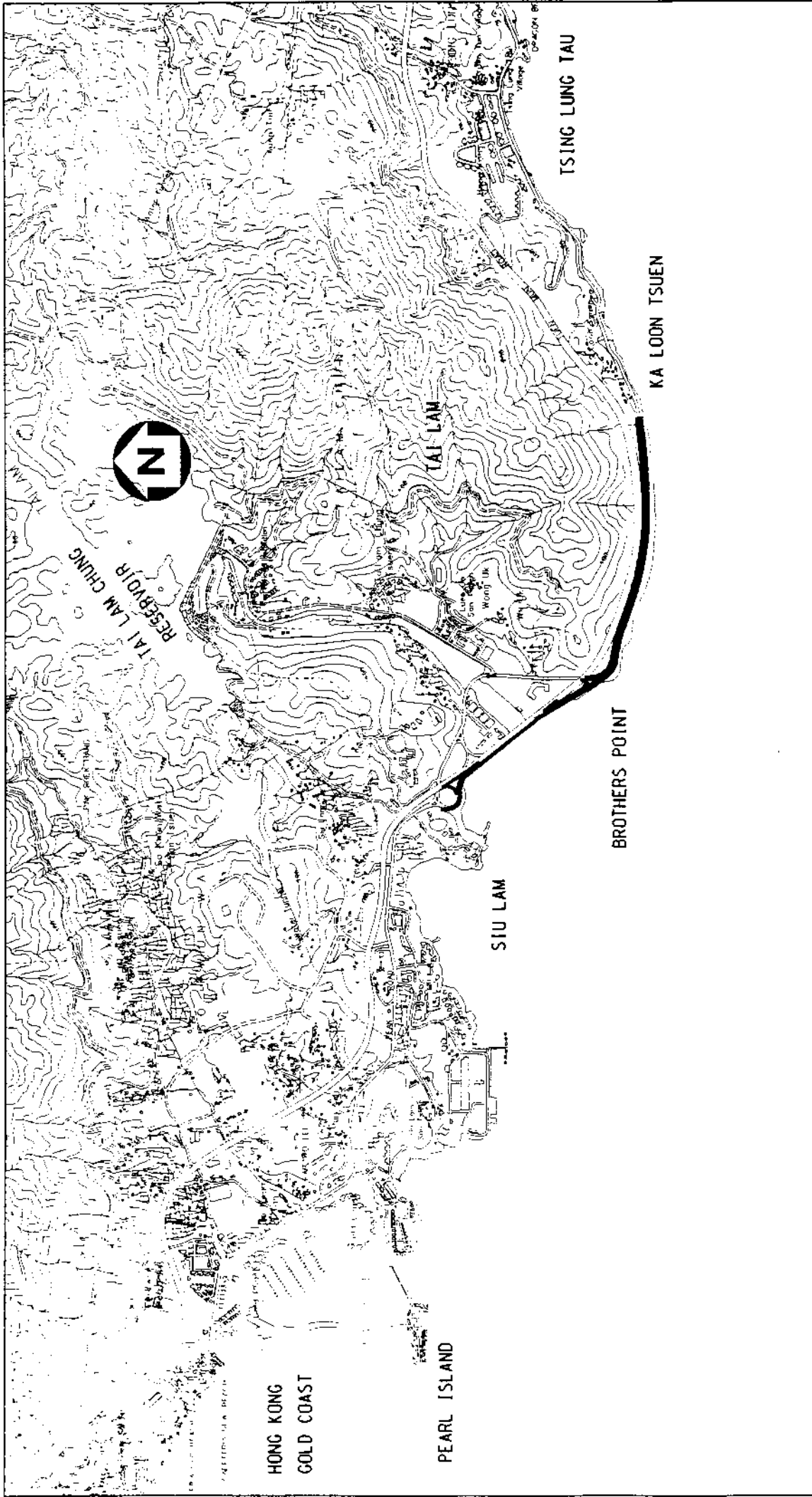
A general overview of potential operation impacts that may arise during the operation of the project, together with various practical mitigation measures are described in Section 6 of Annex C.


## 4. **Conclusion**

Study requirements for a further EIA for the captioned project are described in Section 7 of Annex C.

**ANNEX A**

**LOCATION PLAN**



title <b>IMPROVEMENT TO CASTLE PEAK ROAD BETWEEN KA LOON TSUEN AND SIU LAM          - LOCATION PLAN</b>		drawn by <b>M K LEUNG</b>	date <b>JUN 98</b>	drawing no. <b>PMHP971/IPL/001</b>	scale <b>1 : 25000</b>
		approved <b>S S WONG</b>	date <b>JUN 98</b>	 <b>HIGHWAYS          DEPARTMENT          HONG KONG</b>	
<b>MAJOR WORKS          PROJECT MANAGEMENT OFFICE</b>					

## **ANNEX B**

### **A CHECKLIST FOR PREPARING A PROJECT PROFILE REPORT**



## Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam

### Application for an EIA Study Brief - Checklist for Preparing a Project Profile Report

#### POSSIBLE IMPACT ON THE ENVIRONMENT

- |   |   |
|---|---|
| - gaseous emissions   | Nil   |
| - dust  | Please refer to para. 6.1.6 of the PER. Dust will likely be generated during construction phase of the project but appropriate mitigation measures, subject to the findings and recommendation of the EIA study, will be incorporated in the construction contract to minimize the problem. |
| - odour   | Nil.  |
| - noisy operations  | Please refer to para. 6.2.6 of the PER. Noisy operation is expected during construction phase of the project.   |
| - night-time operations   | Nil.  |
| - traffic generation  | Nil. The road improvement project was initiated by TD to cater for the traffic demand.  |
| - liquid effluents, discharges, or contaminated runoff  | Please refer to para. 6.3.3 of the PER. During the operational phase, surface run-off will likely be collected through oil interceptors and discharged into the drainage system.  |
| - generation of waste or by-products  | Nil.  |
| - manufacture, storage, use, handling, transport, or disposal of dangerous goods, hazardous materials or wastes | Small amount of petroleum, diesel, thinner, etc. are required for use during construction.  |
| - risk of accidents which would result in pollution or hazard   | Nil.  |
| - disposal of spoil material, including potentially contaminated material                                       | Nil.  |
| - disruption of water movement or bottom sediment   | Likely. The foundation works of the proposed bridge widening in Tai Lam Chung Nullah may affect the flow capacity and disturb the bottom sediment of the nullah.  |
| - unsightly visual appearance   | Noise mitigation measures in the form of barrier/partial enclosure will likely be required as a result of the road improvement works, which may induce visual impact on the environment. However, the noise barriers will be carefully designed to blend in with the environment.           |
| - ecological impacts  | Please refer to section 6.4 of the PER.   |

#### MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

- |                               |  |
|-------------------------------|--|
| a. - residential developments | CSD Married Quarters are located adjacent to |
|-------------------------------|--|

Siu Lam interchange.

- temporary housing areas Nil.
- educational institutions, including schools, kindergartens and nurseries There is a VTC Seamen's Training Centre and a Customs and Excise Training School located in the close vicinity of the works area.
- health care facilities, including hospitals, clinics, and homes for the aged Siu Lam Psychiatric Centre and Siu Lam Psychiatric Centre both situate at high level in about 150m to the east of the proposed works site.
- places of worship, including temples, churches, amphitheatre Nil.
- agricultural areas Nil.
- water courses, nullahs and confined bodies of water Tai Lam Chung Nullah is located within the proposed works limit of the project.
- beaches, gazetted or otherwise Nil.
- water catchment area and gathering grounds Nil.
- ground-water resources Nil.
- marine water resources including those for industrial uses, recreational uses or fisheries activities such as fishing grounds, shellfish harvesting/culture areas, fish spawning and nursery areas or fish culture zones Nil.
- industries which are sensitive to pollution Nil.
- airsheds with limited capacity to disperse pollution Nil.
- areas of conservation value, including Country Parks, Special Areas, Marine Reserves, Marine Parks, Ramsar Site, Sites of Special Scientific Interest and ecologically significant areas such as woodland, wetland and other wildlife habitats Nil.
- places of high visual value Nil.
- sites of cultural heritage Nil.
- b. - existing pollution blackspots Nil.
- nearby existing and/or discontinued industrial operations Nil.
- nearby trunk roads, and primary or secondary distributors Tuen Mun Road is running in parallel to Castle Peak Road.
- nearby noisy commercial, community or recreational activities Nil.
- aircraft noise, helicopter noise, rail noise Nil.
- existing or planned waste handling, treatment and disposal facilities Nil.
- potentially hazardous installations Nil.
- noisy or dusty open storage uses Nil.
- existing and past land uses of the project site and Some of the sites required for this project

environs

have been previously used as works areas for civil works projects.

**ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS**

- |    |  |  |
|----|--|--|
| a. | - pollution control technology   | Yes.   |
|    | - source control   | Yes.   |
|    | - waste management systems and practices   | Not Applicable.  |
|    | - potential for waste and wastewater minimization  | Yes.   |
|    | - risk mitigation measures and accident emergency response plans   | Yes.   |
|    | - acoustic barriers and insulation   | Yes.   |
|    | - buffer zones and landscaping   | Yes.   |
|    | - different siting of activities   | Yes.   |
|    | - site layout and building design  | Yes.   |
|    | - retention of natural environmental features  | Yes.   |
|    | - control of construction work practices   | Yes.   |
|    | - application of the Deep Bay Guidelines for dredging, reclamation & drainage works  | Not Applicable.  |
|    | - application of Chapters 9 and 10 of the Hong Kong Planning Standards & Guidelines (version available at the time the Ordinance comes into force) | Yes.   |
| b. | - beneficial and adverse effects   | As a result of the additional traffic using the improved road, the air and noise qualities are expected to be generally worsened than the existing but will still comply with the requirements, subject to the EIA study, stipulated in the HKPSG. |
|    | - short and long term effects  | The public may be temporarily affected by the implementation of the project especially during construction.  |
|    | - secondary and induced effects  | Nil.   |
|    | - cumulative effects   | Nil.   |
|    | - transboundary effects  | Nil.   |
| c. | - history of similar projects  | Improvement to Castle Peak Road from Siu Lam to So Kwun Tan;<br>Castle Peak Road Improvement between Area 2 and Sham Tseng, Tsuen Wan; and<br>Castle Peak Road Improvement between Sham Tseng and Ka Loon Tsuen, Tsuen Wan.                        |
|    | - public consultation to date  | Nil.   |
|    | - public interest and political sensitivity  | Nil.   |

**ANNEX C**

**PRELIMINARY ENVIRONMENTAL REVIEW**

**THE GOVERNMENT OF THE HONG KONG  
SPECIAL ADMINISTRATIVE REGION**

**PUBLIC WORKS PROGRAMME**

**PRELIMINARY PROJECT FEASIBILITY STUDY (PPFS) FOR**

**IMPROVEMENT TO CASTLE PEAK ROAD BETWEEN  
KA LOON TSUEN AND SIU LAM**

**PRELIMINARY ENVIRONMENTAL REVIEW (FINAL)**

**MAY 1998**

**Highways Department  
Major Works Project Management Office  
3/F, Homantin Government Offices  
88 Chung Hau Street,  
Ho Man Tin, Kowloon.**

**PRELIMINARY PROJECT FEASIBILITY STUDY (PPFS) -  
IMPROVEMENT TO CASTLE PEAK ROAD BETWEEN  
KA LOON TSUEN AND SIU LAM**

**PRELIMINARY ENVIRONMENTAL REVIEW**

**1. Objective of the Preliminary Environmental Review (PER)**

The objective of this PER is to conduct a preliminary environmental review based on the preliminary project layout of the proposed improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam. The PER will identify the potential environmental concerns, the likely mitigation measures required and the need for a detailed Environmental Impact Assessment (EIA) Study at the subsequent stage of this project.

**2. Background to the Study**

- 2.1 A traffic assessment shows that the existing single 2-lane Castle Peak Road could not cope with the traffic flows by 2006. Various sections of Castle Peak Road have been proposed to be widened under the PWP pipeline over the last few years to meet the increasing traffic demand. Improvement to the section between Siu Lam and So Kwun Tan is currently underway and is scheduled to be completed by 2001. The section from Tsuen Wan Area 2 to Ka Loon Tsuen will also be improved by 2003. Upon completion, the whole section of Castle Peak Road between Tsuen Wan West and Gold Coast in Tuen Mun will be upgraded to a dual 2-lane carriageway except the section between Ka Loon Tsuen and Siu Lam.
- 2.2 This project is proposed to upgrade the remaining about 2.3 km of Castle Peak Road between Ka Loon Tsuen and Siu Lam from a 10.3 m wide single carriageway to a dual 2-lane carriageway, including necessary upgrading of Siu Lam Interchange. The new carriageway will follow approximately the existing alignment of Castle Peak Road except the westbound carriageway of the section between Brothers Point and Siu Lam.
- 2.3 The proposed scope of the project comprises:-
- (a) widening of Castle Peak Road to dual 2-lane standard;
  - (b) provisioning of a 3.5 m wide footpath on both sides and 24 m long lay-bys at suitable locations;

- (c) provisioning of associated slope and drainage works, street lighting modifications, environmental mitigation measures and landscaping works;
  - (d) re-provisioning of existing legal run-ins and appropriate modifications to junctions affected by this road improvement scheme;
  - (e) provisioning of two new traffic lanes along and on the south side of Tuen Mun Road between Brothers Point and Siu Lam for use by the westbound traffic; and
  - (f) modifying the existing underpass at the crossing with Tuen Mun Road at Brothers Point, if necessary.
- 2.4 The proposed road improvement works and the approximate extent of works area are shown in the drawing no. PMHP971/1SK/010.
- 2.5 The Transport Department found that the concerned section of Castle Peak Road will have inadequate capacity by 2006. The construction works are currently planned to commence in 2003 for completion in early 2007.
- 2.6 The Transport Department is now carrying out the Third Comprehensive Transport Study (CTS-3) which will only be completed in mid-1999. The forecast traffic used in this PER were based on two previous studies conducted by Highways Department: (a) Feasibility Study for Castle Peak Road Improvements between Area 2 and Ka Loon Tsuen, Tsuen Wan under Agreement No. CE 39/94; and (b) Noise Impact Assessment for the Improvement to Castle Peak Road from Siu Lam to So Kwun Tan under Agreement No. CE 23/93.
- 2.7 The traffic forecasts under these two studies are up to 2011. Preliminary impact assessment in this report is based on the forecast 2011 morning peak hour traffic flows of 906 vehicles (36.7% heavy vehicles) eastbound and 1,113 vehicles (31.8% heavy vehicles) westbound along the section of Castle Peak Road between Ka Loon Tsuen and Siu Lam. The assumed traffic speed is 50 kmph.
- 2.8 It is therefore necessary to carry out an investigation assignment to update the traffic forecast up to 2016 and beyond and assess the corresponding environmental impacts on the surrounding environment.
- 3. Sensitive Receivers**
- 3.1 The proposed works run along the coastal area from Ka Loon Tsuen and Siu Lam. Residential or other kinds of development will not be affected by

the widened Castle Peak Road for the section between Ka Loon Tsuen and Brothers Point but the existing coastline will likely be covered by the future road embankment.

- 3.2 The traffic flow pattern between Brothers Point and Siu Lam will be affected by a new 2-lane westbound carriageway along the coast and adjoining Tuen Mun Road. The existing Castle Peak Road within this section will be used for the eastbound traffic. Since the traffic capacity of this section of the road will be increased, the air quality and noise level of the surrounding areas may be deteriorated. Existing sensitive receivers with respect to air and noise are hence identified as shown in the drawing no. PMHP971/1SK/010 and listed as follows:

- (a) Seamen's Training Centre,
- (b) Customs & Excise Training School,
- (c) Wu Uk Tsuen,
- (d) Siu Lam Psychiatric Centre Quarters, and
- (e) Correctional Services Department Married Staff Quarters Block J.

- 3.3 Luen On San Tsuen and Wong Uk Tsuen are far away from the existing Castle Peak Road and the detrimental environmental effects to the residential units in these villages as a result of the proposed improvement works are minimal.

- 3.4 More sensitive receivers will be identified in the future detailed assessment on the environmental impacts.

#### **4. Existing Environment**

##### *Air Quality*

- 4.1 There is no polluting industry in the vicinity of the area and the air pollutant mainly comes from the vehicles running along Castle Peak Road and Tuen Mun Road. As there is no high-rise building and the area is generally exposed, it appears that air quality is not an environmental problem in the area.

##### *Noise*

- 4.2 Much of the area is already affected by the traffic noise from existing Castle Peak Road and Tuen Mun Road. Those facades facing Tuen Mun Road are suffering from severe noise impact whereas those facades located upstream of the Tai Lam Chung Valley are generally environmentally acceptable.



### *Water Quality*

- 4.3 The works area falls into the coastal waters between Tsuen Wan and Tuen Mun and these waters are protected under the ordinance. All discharges into these waters are strictly controlled by Environmental Protection Department (EPD). No gazetted bathing beach is found along the works area. The nearest gazetted beaches are Gold Coast Beach and Anglers' Beach which are about 2.5 km to the west and 2 km to the east of the works area respectively.
- 4.4 There is some landing facilities at Brothers Point which cause some local turbidity but the extent is limited. These facilities will probably be removed under the proposed road improvement project. Since there is no industrial nor densely populated residential development in the area, the water quality pollutant mainly comes from the normal run-off of existing roads and the domestic discharge into Tai Lam Chung Nullah from the isolated huts up the valley. Because of the diluting effect, the water quality is generally acceptable.

### *Ecology*

- 4.5 Based on a desk survey and a site visit, there is no ecological sensitive woodlands and breeding grounds for rare or protected animals. However, the coastline along the works area can be classified as sensitive receivers of ecological impacts as recommended by the Hong Kong Planning Standards and Guidelines (HKPSG). A small portion of the coastline is natural while the rest is artificial. The artificial coastline has existed for many years since the completion of Tuen Mun Road in late 1970s. Small marine organisms have inhabited along this old reclaimed sea edge.

### *Landscape and Visual Quality*

- 4.6 The coastal section of study area is dominated by Tuen Mun Road and its associated slopes, the landscape character of which takes the form of cut flat rock slopes mixed with stripes of grassed slopes of varying width dotted with trees. The two roads are segregated by a slope of varying width, with two groups of remnant vegetation at each end. Where Castle Peak Road loops round the inner part of the estuary, the character changes into a mixture of rural village settlement, Government institute and container storage.

### *Visual Quality*

- 4.7 Along the coastline, the open view towards Lantau Island, Ma Wan and the Lantau Link dominates. Where the road turns inland, the varied land use of Tai Lam Valley, the vegetated slopes and the dam of Tai Lam Reservoir form the major views.

## 5. Environmental Constraint

5.1 The main environmental concerns are:

- operational air quality,
- operational noise,
- noise, dust and water quality impacts during construction, and
- construction impacts on coastal water ecology.

5.2 These potential impacts are discussed below. With the incorporation of mitigation measures in the road design, they are not expected to be insurmountable constraints. Residual impacts are expected to be within limits acceptable to EPD.

## 6. Potential Impacts

### 6.1 Air Quality

#### *Legislation and Guidelines*

6.1.1 The Air Pollution Control Ordinance (Cap. 311, 1983) provides powers for controlling air pollutants from a variety of stationary and mobile sources. It encompasses a number of Air Quality Objectives (AQOs). Current AQOs stipulate concentrations for a range of pollutants, of which carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>) and respirable suspended particulates (RSP) are relevant to this study. The AQOs are listed as follows:

Parameter	Maximum Average Concentration (µgm <sup>-3</sup> ) <sup>1</sup>			
	1-Hour <sup>2</sup>	8-Hour <sup>3</sup>	24-Hour <sup>3</sup>	Annual <sup>4</sup>
CO	30,000	10,000	—	—
NO <sub>2</sub>	300	—	150	80
RSP	—	—	180	55

*Notes:*

- 1 Measured at 298K and 101.325kPa.
- 2 Not to be exceeded more than three times per year.
- 3 Not to be exceeded more than once per year.
- 4 Arithmetic mean.

#### *Operational Air Quality*

6.1.2 Air quality is considered to be a key issue since compliance with the Air Quality Objectives (AQOs) is a statutory requirement. A preliminary air quality assessment has been undertaken to determine whether compliance with AQOs is likely to be achieved.

- 6.1.3 Maximum one-hour average NO<sub>2</sub> concentrations for the sensitive receptors are estimated and tabulated as follows:

Air Sensitive Receivers (ASRs)	Maximum one-hour NO <sub>2</sub> (µg/m <sup>3</sup> )
Seamen's Training Centre	128
Customs & Excise Training School	103
Wu Uk Tsuen	92
Siu Lam Psychiatric Centre Quarters	107
CSD Married Staff Quarters Block J	136

Exceedances of the AQOs are not predicted at any of the selected sensitive receivers. The highest maximum one-hour average NO<sub>2</sub> concentration is predicted to be 45% of the AQO limit of 300 µg/m<sup>3</sup>.

- 6.1.4 On the basis of the proposed alignment shown in the drawing no. PMHP971/1SK/010, an operational air quality impact assessment is considered necessary in subsequent stages of this project. In particular this should consider the future receivers as defined on the updated So Kwun Wat Outline Zoning Plan gazetted under the Town Planning Ordinance. If noise mitigation measures such as barriers are required, air quality may be affected. If direct technical remedies are employed, an air quality assessment of the mitigated scenario should then be performed to confirm continued compliance with the AQOs. In addition, traffic flow and emissions for intermediate years up to 2016 should be assessed to determine the worst case year for traffic air quality.

#### *Construction Air Quality*

- 6.1.5 As Castle Peak Road is in the closely proximity to sensitive school and residential facades, dust impacts during construction may be significant.
- 6.1.6 Construction dust impacts may be mitigated by inclusion of appropriate contract clauses for dust minimisation in the works contract. A control program can be instigated to monitor the construction process in order to enforce dust controls and modify methods of work to reduce dust emissions. In addition to appropriate dust suppression measures, a construction monitoring and audit plan should be formulated.

#### *Conclusions and Recommendations*

- 6.1.7 A preliminary air quality assessment has indicated that, given the present alignment, exceedances of AQOs at existing air sensitive receivers (ASRs) are not expected. Nonetheless, as the proposed road alignment is subject to further examination at the Feasibility Study Stage of this project, it would be prudent to include an air quality assessment in the forthcoming EIA study to address

potential impact to nearby school and residents; as well as to identify any constraints on locating both ASRs and planned sensitive receivers along the proposed alignment due to potential vehicular impacts and constructional dust impacts.

## 6.2 Noise

### *Legislation and Guidelines*

- 6.2.1 There are currently no statutory controls to limit the impacts from road traffic noise. However, the HKPSG provides criteria to control traffic noise at sensitive facades. The HKPSG recommends a maximum noise level in terms of  $L_{10}$  (peak hour) for facades that rely on open windows for ventilation as follows:

Use	Road Traffic Noise dB(A)
Domestic premises	70
Offices	70
Educational institutions including kindergartens and nurseries	65
Hospitals, clinics, convalescences and homes for the aged	55

### *Operational Noise*

- 6.2.2 Based on the forecast 2011 morning peak hour traffic flows of 906 vehicles (36.7% heavy vehicles) eastbound and 1,113 vehicles (31.8% heavy vehicles) westbound and an assumed traffic speed of 50 kmph, the maximum noise level in terms of  $L_{10}$  (peak hour) for the following noise sensitive facades are estimated and tabulated as below:

Noise Sensitive Receivers (NSRs)	Maximum noise level ( $L_{10}$ dB(A))
Seamen's Training Centre (facing CPR)	77.2
Seamen's Training Centre (facing TMR)	83.4
Customs & Excise Training School	70.7
Wu Uk Tsuen	61.5
Siu Lam Psychiatric Centre Quarters	69.0
CSD Married Staff Quarters Block J	75.3

Traffic noise predictions show that exceedances of the HKPSG criteria at the school and residential facades fronting the improved Castle Peak Road and Tuen Mun Road.

- 6.2.4 In order to meet the HKPSG criteria, it will be necessary to provide noise mitigation measures, possibly in the form of road side barriers along the improved alignment. Further assessment is needed at the Feasibility Study and detailed Design Stage to determine the form and extent of mitigation measures which is required to achieve compliance with the HKPSG's requirements. As a last resort, mitigation at the receivers may be considered.

#### *Construction Noise*

- 6.2.5 Owing to the close proximity of Castle Peak Road to sensitive school and residential facades, noise impacts during construction may be significant.
- 6.2.6 Construction phase impacts could be mitigated by standard contract document clauses. Restrictions on works during the evening, night-time, and on general holidays will be imposed under the conditions of mandatory Construction Noise Permits. Such restrictions may have programming and cost implications.

#### *Conclusions and Recommendations*

- 6.2.7 In conclusion, the need for a detailed assessment of noise impacts during both the construction and operation phases is identified. Operational noise impacts are expected to be significant, requiring costly noise mitigation measures. Construction noise impacts may have programming and cost implications.
- 6.2.8 A detailed noise assessment should cover both the construction noise and traffic noise resulting from increased traffic on the improved road.

### **6.3 Water Quality**

#### *Legislation and Guidelines*

- 6.3.1 The principal legislation against water pollution is the Water Pollution Control Ordinance (Cap. 358, 1990), which allows for the gazetting of Water Control Zones (WCZs) within which the discharge of liquid effluent and the deposit of matter directly into water bodies or into drains is controlled. The existing Castle Peak Road is adjacent to the coast between Tuen Mun and Tsuen Wan. The project area from Ka Loon Tsuen to Siu Lam lies within the North West Water Control Zone and the Western Buffer Water Control Zone. The criteria for each of these Water Control Zones and the standards for effluent discharged into these Zones are published by EPD.
- 6.3.2 Even though there is no gazetted bathing beach within the works area, it is worth to note the permissible standards for effluent to meet the Bathing Beach Water Quality Objectives which set standards for the indicator bacterium, *Escherichia coli*. The HKPSG states that no discharge outlet should be located within 100 m of the boundaries of any bathing beach. In addition, Section 9.1

of the Technical Memorandum entitled *Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (EPD, January 1991)* states that no new effluent will be permitted within 100 m of the boundaries of a gazetted beach in any direction, including rivers, streams and storm water drains.

#### *Operational Water Quality*

- 6.3.3 From a water quality perspective, road run-off will contain contaminants generated from vehicles, which may be worse than usual if the road usage is high and dominated by goods vehicles. Run-off will contain heavy metals from tyre and brake lining wear, hydrocarbons from unburned diesel fuel as well as combustion products such as PAHs. In addition, there is a risk to water quality from potential accidental spillage of polluting matter. This risk will depend on the types of materials transported, the volume and frequency of trips and other road safety factors (including incidence of poor driving conditions and road characteristics). The discharge of this runoff is unlikely to produce any quantifiable adverse effects.
- 6.3.4 As long as roadside drainage is directed through regularly maintained oil and sediment traps, problems should be minimal. The use of sumps and soak-aways will also mitigate potential impacts from road run-off and accidental spillage during the operational phase. In addition, silt traps will be provided to reduce the concentration of silt/sediments in stormwater run-off. These silt traps will also be cleaned and maintained regularly to ensure that they function properly.

#### *Construction Water Quality*

- 6.3.5 Works in the sub-tidal areas such as an earth embankment along the existing coastline or foundation works for bridges would have potential adverse impact on the coastal water quality.
- 6.3.6 Other possible impacts would arise from site runoff, which could contain suspended solids as well as dust and construction waste. Sewage effluent arising from the on-site construction workforce also have the potential to cause water pollution. The guidance in Practice Note No. 1/94 (Construction Site Drainage) issued by EPD should be strictly followed. Careful attention should be paid to work on cuttings, newly formed embankments and other steep areas where vegetation is removed to minimise top-soil and sediment wash-off. Overall, there will likely be an impact on the marine ecology but the impact on the local water quality should not be significant if the sites are properly controlled.
- 6.3.7 Water quality deterioration can be avoided by carrying out construction during the dry season. Construction impacts can be mitigated by a temporary on-site drainage system, such as silt traps and oil interceptors where necessary, bunding of fuel stores and careful site management. Sewage effluent arising from the

construction workforce would also require appropriate treatment and disposal to the satisfaction of EPD.

### *Conclusions and Recommendations*

- 6.3.8 In conclusion, the proposed road widening work is expected to have considerable impact on the marine ecology and water quality. The need for a detailed assessment of water quality impacts during both the construction and operation phases is also identified. Construction water quality impacts are expected to be significant, requiring precautionary mitigation measures which may have programming and cost implications. A detailed study is recommended to address the water quality impacts on the coastal waters due to different operations in the construction phase.

## **6.4 Ecology**

### **Legislation and Guideline**

- 6.4.1 The restoration of existing ecology and the criteria for evaluating the value of each habitat include the following:
- Chapter 10 (Conservation), *Hong Kong Planning Standards and Guidelines (HKPSG)*, which addresses the importance of woodlands (natural, plantation, and fung shui) as well as natural coastal shorelines as a priority for conservation;
  - *The Animals and Plants (Protection of Endangered Species) Ordinance (Cap. 187)* which lists rare and endangered plants and animals;
  - *Forestry Regulations (Cap. 96)* for protected plant species;
  - *The Wild Animal Protection Ordinance (Cap. 170)* (excluding fish and marine invertebrates) which protects wild animals by prohibiting the disturbance, taking or removal of animals and/or their nests or eggs; and
  - Maturity, diversity and species composition of woodland.

### *Impact during Construction*

- 6.4.2 Construction works would involve reclamation to the artificial coastline north of Tai Lam Nullah and the clearance of vegetation to make room for the carriageway. Planting of roadside trees along the newly widened road will be of value to both the inhabitants and road users.

### *Mitigation Measures*

- 6.4.3 Type of shoreline to be re-provided should be chosen such that it would facilitate marine organism inhabitation. Afforestation work should also be carried out to compensate for the loss of vegetation during construction.

- 6.4.4 If the tree survey for the project locates trees of conservation interest, measures should be taken to transplant them or to replace them on or near the site with new planting of the same species.
- 6.4.5 The proposed widening works at the Siu Lam Interchange will result in loss of a small area of existing woodland, non-native roadside trees, and some mature *Ficus* spp. These should be compensated for in the reinstatement works. It is necessary to employ precaution and mitigation measures during construction phase to minimise impact on the coastal water quality. It is also important to design the sea front in a more natural way so as to facilitate the re-colonization of natural organisms.

## **6.5 Landscape and Visual Impact**

### *Legislation and Guidelines*

- 6.5.1 The principal legislation that governs the requirements to address the Landscape and Visual Impact of the project is the EIA Bill assented by the Governor in February 1997.

### *Operational Impact*

- 6.5.2 Nearly the whole section of Castle Peak Road between Brothers Point and Siu Lam will remain intact. There will not be any significant landscape or visual impact on the environment except at locations where noise barriers are found necessary.
- 6.5.3 The section of Castle Peak Road between Ka Loon Tsuen and Siu Lam will be widened on the seaward side and the appearance of the coastline will resemble the existing one. The proposed carriageway crossing the Tai Lam Chung Nullah and adjoining Tuen Mun Road will not pose an additional visual intrusion to the surrounding.

### *Mitigation Measures*

- 6.5.4 A comprehensive landscape planting scheme should be implemented to mitigate the adverse impact associated with the road. Noise barriers, where proposed, should be designed to blend in with the landscape and be screened by vegetation.

## **7. Conclusions and Recommendations**

### **7.1 Broad Description of Review Undertaken**

A PER has been undertaken for the proposed Castle Peak Road improvement between Ka Loon Tsuen and Siu Lam to identify the potential environmental



concerns and the likely mitigation measures required. The PER has examined air quality impacts, noise impacts, water quality impacts, ecology impacts, and construction issues. The need and requirements for further assessments to be undertaken in subsequent stages have been defined.

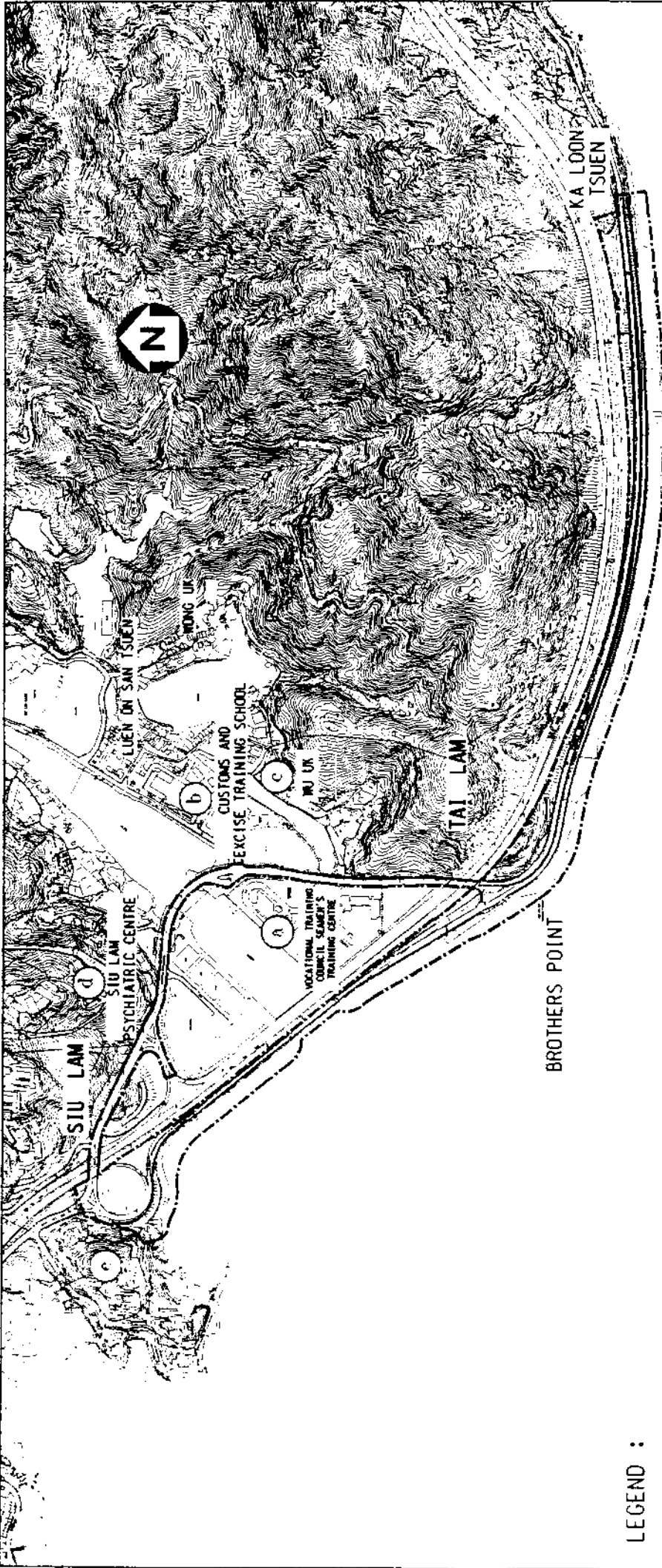
## **7.2 Key Findings and Recommendations of the Review**

7.2.1 The PER has identified operational noise impact from increased traffic and water quality impact during construction as significant environmental impacts. With the incorporation of noise mitigation measures in the road design and special precautionary measures for the coastal works, these two environmental constraints are not expected to be insurmountable.

7.2.2 The key findings and recommendations of this PER are as follows:

- Traffic noise has been identified as one of the major environmental concerns. Traffic noise predictions show exceedances of the HKPSG criteria at the school and residential facades facing Tuen Mun Road and improved Castle Peak Road. In order to meet the HKPSG criteria, it will be necessary to provide mitigation along Tuen Mun Road and the improved Castle Peak Road, or as a last resort, at the affected receivers. Further assessment is required at the future EIA Study to determine the form and extent of mitigation that is required to achieve full compliance with the HKPSG criteria. Possible air quality impact arising from these noise mitigation measures should also be investigated at the Feasibility Study stage.
- A preliminary air quality assessment has indicated that exceedances of AQOs at existing ASRs are not expected with the present traffic forecast. However, a detailed air quality study is recommended to take into account of increase in traffic forecast and to address the dust problem during the construction phase of the project.
- A tree survey will be required in order to obtain a felling permit for this project. Such survey is considered adequate for the purpose of assessing the vegetation on site. The proposals for mitigation of tree loss should be incorporated into the future EIA Study.
- It is necessary to employ precaution and mitigation measures during construction phase to minimise impact on the coastal water quality. An ecological survey of the existing coastline is recommended to assess the impacts on the marine ecology. It is also important to design the sea front in a more natural way so as to facilitate the re-colonization of natural organisms.

- Key issues for landscape and visual impacts are the potential cutting into existing vegetated slopes; removal of mature vegetation and woodland; increase in visual intrusion to housing; and, introduction of footbridge structure in the area. The impacts will vary in severity with each component of the proposal and the nature of the engineering solutions. Overall, the scheme will have little potential adverse impact on the landscape and visual character of the area. Mitigation measures should be established and considered as a co-ordinated approach between landscape and engineering works from the outset of the project, in order to best ameliorate the adverse impacts and reduce visual intrusion of the scheme. Levels of landscape and visual impact will be determined within the future EIA Study, with detailed recommendations for landscape and visual mitigation methods established.
- Construction impacts are expected to be within established standards/guidelines if EPD's recommended pollution control clauses are incorporated into the construction contract documents and implemented to abate noise, dust and site run-off nuisances.



**LEGEND :**

— PROPOSED ROAD ALIGNMENT

- - - - - LIMIT OF WORKS AREA

ⓐ SENSITIVE RECEIVERS

title

**IMPROVEMENT TO CASTLE PEAK ROAD BETWEEN KA LOON TSUEN AND SIU LAM  
PRELIMINARY ENVIRONMENTAL REVIEW - LOCATIONS OF SENSITIVE RECEIVERS**

drawn by  
**W K LEUNG**

date  
**JUN 98**

drawing no.

**PMHP971/15K/010**

scale

**1 : 10000**



**HIGHWAYS  
DEPARTMENT  
HONG KONG**

**MAJOR WORKS  
PROJECT MANAGEMENT OFFICE**

date  
**JUN 98**

approved  
**S S WONG**