

1. INTRODUCTION

1.1 Preamble

In 1979, the Lantau Fixed Crossing Feasibility Study established the need for two road links between north Lantau and the mainland, one between Ma Wan and Tsing Yi and the other (called the Sham Tseng Link) between Ma Wan and Sham Tseng. The proposed links were subsequently endorsed by the Port and Airport Development Strategy (PADS) and the Route 3 Feasibility Study, with the first road link (i.e. Lantau Link) between north Lantau and Tsing Yi, via Ma Wan, completed and opened to traffic in May 1997.

Subsequently in the study referred to as the "Updating of the Second Comprehensive Transport Study" (CTS-2) it was forecast that the Sham Tseng Link (STL) would be required before 2006 in order to meet the demand of traffic generated by the new developments on Lantau and the Lantau Port Peninsula. In March 1993 a Preliminary Feasibility Study (PFS) was commissioned to review possible route alignments, structural forms and interchange requirements for the STL. The brief required that the STL be connected with Route 3 at the Ting Kau Interchange. The selection of routes was constrained also by the results of a feasibility study completed in February 1992, which pertained to Residential and Related Development on Ma Wan Island.

The PFS recommended two alignment options, C2 (bored tunnel) and C4A (bridge), to be carried forward for further development in the full feasibility study stage. These alignments connected the road network planned for the port development in Lantau with the Route 3 Country Park Section and the Tuen Mun Road at the Ting Kau Interchange. The PFS concluded that the Lantau Link was likely to be at capacity by year 2002 and that a dual 2-lane STL should be commissioned by that year.

The CTS-2 Update, which was based on a territory-wide population of 6.6 million by the year 2011, assumed a dual-2 lane road corridor with its northern end connection with Route 3 - Country Park Section at Ting Kau. Subsequently, the Territorial Development Strategy Review produced a series of revised projections with a territory-wide population ranging from 7.5 to 8.1 million by 2011 with some 630,000 people located in the northwestern New Territories (NWNT). The changes to the population forecasts necessitated a major upward revision in the traffic demand forecast between the NWNT and the urban area. As a result, the revised traffic forecasts indicated a need to extend the STL to Yuen Long to meet the future traffic demands of the NWNT.

In May 1995, a Feasibility Study (FS) was commissioned with the primary objective being to determine a single alignment and the preferred structural forms for the STL. To better serve the needs of the NWNT, the constraint to connect the STL to Route 3 at Ting Kau Interchange was removed. This opened up potential new route alignments.

A review of the PFS alignments demonstrated that the road network was unable to operate satisfactorily with the recommendations in their original form. Modifications to the geometry and extent of these options (extended options) were then incorporated to best match the demands of the surrounding road network for inclusion in the option assessment.

The FS traffic study demonstrated that a western road corridor, identified as Corridor 3, best met the functional requirements of the study area road network. The alignment ran from a future Lantau Port Expressway Interchange to the Tong Yan San Tsuen Interchange on the Yuen Long Highway. An intermediate link to Tuen Mun Road was provided at So Kwun Wat. This route catered for future growth generated by the Lantau Port Development and from within the NWNT, and gave the flexibility to provide for new western boundary crossings with the mainland.

The southern section of the route, from So Kwun Wat south including the crossing of Ma Wan Channel, was identified in the Proposed New Cross-Border Transport Links (Crosslinks) study as an essential element of the strategic highway network to cope with any of the new boundary crossing points. However, predictions of the traffic likely to use the new boundary crossings were not available at the time of the study and, therefore, could not be considered in the traffic projections for the road configuration.

It was recommended in the FS that due to the uncertainty of the future cross boundary traffic and to improve the overall operation of the route, the southern section be constructed to dual 3-lane standard. A dual 2-lane standard was recommended for the northern section from So Kwun Wat to the Yuen Long Highway. It was also recommended that further investigations be carried out at the Investigation and Preliminary Design stage, to determine if alignment changes and increased capacity on the northern section would be needed to cater for planned new boundary crossings. The Crosslinks study subsequently recommended that the northern section from So Kwun Wat to Yuen Long Highway be dual-3 standard.

With the foregoing studies as a basis, the Chief Executive pledged in his 1997 policy address, under New Commitments for major roads and bridges, that:

“We will enhance the link between Northwest New Territories and Northeast Lantau by providing a new highway between Yuen Long and the future Lantau port (the Sham Tseng Link). We plan to start investigation and preliminary design work in March 1998 for completion in 2000. The project is estimated to cost around \$22 billion, and work is scheduled to commence in 2002 for completion in 2007.”

In the 1998 Policy Address the programme for the newly named Route 10 (NLYLH) North Lantau to Yuen Long Highway, was given as:

“Route 10 (NLYLH)

- North Lantau Section - To complete the detailed design in 2001
- Tsing Lung Bridge - To complete the detailed design in 2001
- Tsing Lung Tau to So Kwun Wat; - To complete the detailed design in 2001
and
- So Kwun Wat to Yuen Long Highway - To complete the detailed design in 2002”

On 30 March 1998 Highways Department commissioned Mott Connell Ltd, in association with Scott Wilson (Hong Kong) Ltd, MVA (Asia) Ltd, ERM Hong Kong Ltd, Four Elements (Asia) Ltd, Au Posford Consultants Ltd, Townland Consultants Ltd, Yee Associates and RMJM Hong Kong Ltd to undertake the Investigation and Preliminary Design Assignment (Agreement No CE 82/97) (hereafter called the Assignment) for Route 10 (NLYLH). The scheduled completion date is July 2000 to allow the programme outlined above to be achieved.

The Study Brief for the Project has been registered (Reference SB-013/BC) with EPD under Section 15(1) (b) of the EIAO (Part I List: Brief issued prior to commencement of Ordinance). This EIA Study has followed the requirements listed in the Study Brief (SB-013/BC) and the EIAO with the findings included in subsequent sections.

According to Schedule 2 of the Technical Memorandum to the EIAO an Environmental Permit is required for the construction and operation of Route 10 (NLYLH). An EIA is required to identify and quantify environmental problems associated with the route. Potential environmental impacts, including the cumulative impacts with other activities and developments have been assessed. Mitigation measures and environmental monitoring and audit requirements to be integrated into Route 10 (NLYLH) to avert or mitigate the potential adverse impacts have been identified in order to meet appropriate environmental quality standards. Information obtained is provided in this EIA Final Assessment Report (EIA-FAR) to enable the public to understand the information and make comments, and for project acceptance assessment by the Environmental Protection Department (EPD) and relevant authorities.

1.2 The Project

Route 10 in its strategic context is shown on *Figure 1.1*. The Route 10 (NLYLH) alignment is divided into two parts, the northern and southern sections, as illustrated on *Figure 1.2*. The Route 10 (NLYLH) (Southern Section) comprises the main alignment south of So Kwun Wat and the links to the Tuen Mun Road. The Route 10 (NLYLH) (Northern Section) comprises the main alignment from So Kwun Wat to the Yuen Long Highway. Route 10 (NLYLH) will be a strategic highway providing a direct connection between Deep Bay Link Road and the new border crossing in the north and North Lantau, Chek Lap Kok and Route 10, Hong Kong Lantau Link, (HKLL) in the south. Route 10 (NLYLH) will provide a strategic second road link to Lantau.

The proposed Route 10 (NLYLH) (Southern Section) alignment comprises:

- 2.6 km of road on North Lantau (which includes 0.9 km of viaduct and a toll plaza) from the future Pa Tau Kwu Interchange to Kwai Shek;
- the 1.7 km Tsing Lung suspension bridge spanning across the Ma Wan Channel from Kwai Shek to Tsing Lung Tau;
- the 1.75 km Tai Lam Chung Tunnel from Tsing Lung Tau to Tai Lam Chung;
- 2.1 km of road (which includes 1.1 km of viaducts and the major Siu Lam cutting) from Tai Lam Chung to So Kwun Wat;

- the 2 km of dual 2 lane So Kwun Wat Link Road (the majority of which is carried on viaduct) from So Kwun Wat to Tuen Mun Road at So Kwun Tan;
- the 2.2 km dual 2-lane Siu Lam Link Road (the majority of which is carried on viaduct) from So Kwun Wat to Tuen Mun Road at Siu Lam; and
- the So Kwun Wat Interchange, and two interchanges with Tuen Mun Road at So Kwun Tan and Siu Lam.

Two separate EIA Reports are being prepared, one for the Southern Section and one for the Northern Section. An assessment of the cumulative impacts of the construction and operation of the two Sections will be provided in the Northern Section EIA report.

This EIA-FAR presents the assessment of the environmental impacts arising from Route 10 (NLYLH) (Southern Section). The assessment of Route 10 (NLYLH) (Northern Section) commenced on 16 March 1999 and a separate assessment is currently being undertaken for that section of the Project. It is pertinent to note that the Northern Section EIA will be completed before construction commences of the Southern Section. It is also important to note that possible future developments on North Lantau for tourism and other developments will be examined under a separate study which will take account of this Project when considering the cumulative impacts in the EIA.

1.3 The EIA Study Area

The Study Brief states:

“The boundary of the Study Area for the purpose of this EIA shall be 300m from either side and along the full stretch of the proposed alignment(s), except that for the air pollution assessment, where the Study Area shall be generally defined by a distance of 500 m from the proposed road alignment. Sensitive receivers in relation to the visual impact assessment and ecological impact assessment shall be assessed regardless of the distance from the proposed road alignment.

With respect to noise impact assessment, the Study Area may be reduced accordingly, if the first layer of noise sensitive receivers (NSRs), closer than 300 m from the road, provide acoustic shielding to those NSRs located further behind.

All the figures of distance mentioned above shall be measured at the edge of kerb or hard shoulder whichever is applicable.”

The Study Area applicable to marine water quality is shown on *Figure 1.3*.

1.4 Objectives of the EIA Study

The enforcement of *Environmental Impact Assessment Ordinance* (EIAO) on 1 April 1998 has meant that the Project is subject to the requirements of the Ordinance. The Project is classified as a Designated Project requiring an Environmental Permit (Part 1 of Schedule 2) under the EIAO.

The specific objectives for the Study are set out in the Study Brief, as listed below:

- i. to describe the proposed Route 10 (NLYLH) and associated works together with the requirements and environmental benefits for carrying out the proposed Project;
- ii. to identify and describe the elements of the community and environment likely to be affected by the proposed Project, and/or likely to cause adverse impacts upon the proposed Project, including both the natural and man-made environment and the associated environmental constraints;
- iii. to identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses;
- iv. to identify and quantify any potential losses or damage to flora, fauna and natural habitats;
- v. to identify any negative impacts on sites of cultural heritage and to propose measures to mitigate these impacts;
- vi. to propose the provision of infrastructure or mitigation measures to minimize pollution, environmental disturbance and nuisance during the construction and operation phases of the Project;
- vii. to identify existing landscape and visual quality in the Study Area for the purpose of evaluating the landscape and visual impacts of the proposed Project;
- viii. to investigate the feasibility, effectiveness and implications of the proposed mitigation measures;
- ix. to identify, predict and evaluate residual (i.e. after practicable mitigation) environmental impacts and the cumulative effects expected to arise during the construction and operation phases of the Project in relation to the sensitive receivers and potential affected uses;
- x. to identify, assess and specify methods, measures and standards, to be included in the detailed design, construction and operation of the Project which are necessary to mitigate these residual environmental impacts and cumulative effects and reduce them to acceptable levels;
- xi. to design and specify the environmental monitoring and audit requirements necessary to ensure the implementation and the effectiveness of the environmental protection and pollution control measures adopted; and
- xii. to identify any additional studies necessary to implement the mitigation measures or monitoring and proposals recommended in the EIA report.

1.5 Structure of the Environmental Impact Assessment Report

After this introductory section, the remainder of this EIA-FAR is arranged as follows:

- Section 2 presents a brief description of the Project;
- Section 3 describes the assessment of the air quality impacts;
- Section 4 describes the assessment of the noise impacts;
- Section 5 discusses the issues associated with waste management and disposal;
- Section 6 discusses the water quality impacts;
- Section 7 presents the terrestrial and marine ecological impacts;
- Section 8 presents the impacts on fisheries;
- Section 9 presents the hazards;
- Section 10 presents the land contamination aspects;
- Section 11 presents the landuse, landscape and visual impacts;
- Section 12 presents the assessment of the impacts on archaeological and historical monuments;
- Section 13 discusses the environmental monitoring and audit requirements; and
- Section 14 reviews the findings and presents the overall conclusions of this Report.