

1. INTRODUCTION

1.1 Background

1.1.1 The Tseung Kwan O Feasibility Study of Opportunity for Further Development (TKOOFD), completed in 1990 and endorsed by the then LDPC for implementation, identified amongst other infrastructure works the widening of Road P2 between Roads D1 and D2 and the construction of a grade separated road junction T1/P1/P2. The TKO Town Centre Traffic Review (1997) has also confirmed that the capacity of the existing roundabout would be exceeded by 2001 as a result of increasing traffic flows. Therefore, Project Manager/NT East of Territory Development Department further commissioned Maunsell Consultants Asia Limited under Agreement No. CE 13/90 to undertake the design of Contract F - Grade Separated Interchange T1/P1/P2 (formerly known as Improvement of Road P2 (Part) and Interchange T1/P1/P2, hereinafter called the Project"). Figure 1-1 shows the location of the Study Area.

1.1.2 Road P2 is one of the primary distributor roads in Tseung Kwan O and the construction is being implemented in stages in line with the development of the New Town. Tseung Kwan O Tunnel Road is the major access to Tseung Kwan O via the Tseung Kwan O Tunnel and the road junction is the most important road junction. As the southern portion of Tseung Kwan O New Town is developed and populated, it is therefore necessary to upgrade the existing at-grade interchange at Roads T1/P1/P2 junction to a grade-separated interchange, and widen the section of Road P2 between Roads D1 and D2 so as to cope with the increasing traffic demand.

1.1.3 The proposed works have been identified as a designated project under Schedule 2, Part I (A.1) of the EIA Ordinance, so an Environmental Permit is required prior to the construction and operation of the Project. Since the proposed works are likely to have adverse impacts on the environment, the Study Brief requires an Environmental Impact Assessment (EIA) Study to determine the nature and extent of environmental impacts arising from the construction, operation of the proposed road alignment and all related activities taking place concurrently.

1.2 Purpose of the Environmental Impact Assessment (EIA) Study

1.2.1 In view of the close proximity of the existing and future receivers to the proposed improved junction, the purpose of this EIA Study is to provide information on the nature and extent of the potential environmental impacts arising from the construction and operation of the Project. The following itemises the key objectives:

- to identify any environmental impacts, e.g. noise, air quality, visual and landscape, etc. that are likely to arise as a result of the construction and operation of the Project;
- to determine any conditions and requirements for the detailed design, construction, and operation of the Project including any necessary environmental mitigation measures;
- to determine the residual impacts after the proposed mitigation measures to be within the established standards are implemented;
- to specify the environmental monitoring and audit requirements necessary to ensure the implementation and the effectiveness of the environmental protection and pollution control measures adopted;

- to identify any additional studies necessary to fulfill the objectives to the requirements of this EIA Study.

1.3 The Approach

1.3.1 The EIA Study has been carried out based on information available at the time. Relevant reports and drawings to the Project have been reviewed and findings have been incorporated where appropriate in this EIA Report. For examples, the findings of the EIA Studies on *Widening and Improvements of Wan Po Road*, *Tseung Kwan O Feasibility Study of Opportunities for Further Development (TKOOFD)*, and *Tseung Kwan O Development, TKO Town Centre North - Roads, Bridge & Subway* have been reviewed and incorporated in this study.

1.3.2 In accordance with the requirements of the EIA Study Brief, the EIA covers the following aspects of impact assessment:

- Construction noise and air quality impacts
- Traffic noise and vehicle emissions impacts
- Visual and landscape impact
- Land use impact

1.3.3 The assessment results have been used as the basis for the evaluation of their respective impacts arising from the proposed Project on both existing and planned sensitive developments, as well as for the identification of locations where the acceptable criteria limits are exceeded and appropriate mitigation measures are required.

1.3.4 Considering the nature and environment of the project, impacts arising from construction waste, water quality and cultural heritage are considered to be minimal and have not been included in the EIA Study Brief. No detailed assessment is therefore required.

1.3.5 The report has been prepared in accordance with the requirements stipulated in the Technical Memorandum on Environmental Impact Assessment Process. This covers relevant project information and legislation, existing environmental conditions, assessment criteria and methods, assessment findings and proposed mitigation measures.

1.3.6 The Environmental Monitoring and Audit (EM&A) programme is presented in a separate EM&A Manual.

1.4 Report Structure

1.4.1 This EIA Report consists of 11 sections, as follows:

- (1) Introduction
- (2) Description of the Project
- (3) Environmental Legislation, Policies, Standards & Criteria
- (4) Description of Assessment Methodologies
- (5) Description of the Environment
- (6) Identification, Prediction and Evaluation of Environmental Impacts
- (7) Mitigation of Adverse Environmental Impacts
- (8) Evaluation of Residual Environmental Impacts
- (9) Environmental Monitoring and Audit Requirements

- (10) Conclusions and Recommendations
- (11) Schedule of Recommended Mitigation Measures

2. DESCRIPTION OF THE PROJECT

2.1 Key Project Requirements

2.1.1 The key issues of this Project is to upgrade the existing roundabout T1/P1/P2 of which its capacity would be exceeded by year 2001 as a result of increasing traffic flows. A grade separated interchange is found necessary to cater for the different traffic movements at that time.

2.2 Site Location and Site History

2.2.1 This project comprises mainly the upgrading of the existing at-grade interchange at Road T1/P1/P2 junction to a grade-separated interchange and the widening of section of Road P2 between Road D1 and D2.

2.2.2 Section of Road T1 (i.e. Tseung Kwan O Tunnel Road) to be widened and upgraded is located adjacent to the existing park at Area 25 and the proposed recreational development at Area 24 along the downhill carriageway whilst its affected uphill carriageway is located adjacent to an existing telephone exchange station and a proposed bus depot at Area 26.

2.2.3 The affected section of Road P1 (i.e. Wan Po Road) is overlooked by On Ning Garden at Area 40 and proposed residential development at Area 37 along its eastbound carriageway where its affected westbound carriageway is running adjacent to the proposed Town Park at Area 45.

2.2.4 The section of Po Shun Road (i.e. Road P2) to be upgraded is sandwiched between King Lam Estate at Area 23 and Chung Ming Court at Area 41; the proposed recreational development at Area 24 and open space at Area 40; the proposed bus depot at Area 26 and the proposed Town Park at Area 45; and Haven of Hope Hospital at Area 27 and Area 59.

2.2.5 The site at which this project to be implemented was reclaimed under previous Contract Nos. 2/JB/82, JB17/84, JB25/86 and TK30/89, whilst the existing at-grade interchange was constructed under Contract Nos. JB19/85, TK30/89, TK37/93, TK39/93 and TK46/97. The details of these Contracts are listed as follows:

<u>Contract No.</u>	<u>Title</u>	<u>Anticipated Completion/ Completion Date</u>
2/JB/82	Po Lam Road Improvement and of Platforms, Roads and Reclamation	5/87
JB17/84	Hang Hau Area - Stage I	11/90
JB25/86	Hang Hau, Stage 2 - Engineering Works	11/92
TK30/89	Tseung Kwan O Area 48, 59 & Head of Bay Remainder - Reclamation and Roadworks	2/94
JB19/85	Junk Bay Head of Bay Stage II Engineering Works and Eastern Approaches Stage I	8/91
TK37/93	Tseung Kwan O - Hang Hau Remaining Roads, Footbridges & Subways	3/99
TK39/93	Town Centre North - Roads, Bridge and Subways	7/98

TK46/97 Completion Contract for Contract No. 3/99
TK37/93

2.3 Nature, Scope and Benefit of the Project

2.3.1 The project comprises mainly the upgrading of the existing at-grade interchange at Roads T1/P1/P2 junction to a grade separated interchange and the widening of the section of Road P2 between Roads D1 and D2. The improvement works will help better facilitate the increasing traffic demand as the southern portion of the New Town is developed and populated. The scope of works proposed for this Project consists of the following items:

- Construction of widened Road P2 between Road D1 and D2, modified Tseung Kwan O Tunnel Road and P1 near Road P2 and Slip Road A to G, together with all associated footpaths, cycle tracks or amenity strips and retaining walls
- Provision of necessary surface drainage systems in the form of gullies, channels, catpits, pipes and manholes to collect road runoff which will be diverted to Western Box Culvert under Road P2
- Construction of three vehicular bridge and extension of existing underpass to carry Tseung Kwan O Tunnel Road above Road P2 (Bridge B); Slip Road C from Tseung Kwan O Tunnel Road (Bridge C) to Road P2 and Slip Road A from Road P2 and T1 (Bridge A)
- Construction of a pedestrian subway under Slip Road B and extension of two existing pedestrian/cyclist subways under Road P2
- Erection of noise barriers/canopies and enclosure along Slip Road A, Slip Road C and Road P2 as recommended in this report
- Provision of all necessary services including Cable TV, water, electricity gas and telephone etc.

2.3.2 The TKO Town Centre Central Traffic Review (1997) has confirmed that the capacity of the existing at-grade interchange at junction T1/P1/P2 would be exceeded by year 2001 as a result of increasing traffic flows. Thus, this Project is considered essential and beneficial to the whole Tseung Kwan O New Town to prevent the at-grade interchange itself approach roads in the vicinity to the at-grade interchange from operating at over-capacity rate by year 2001.

2.4 Project Timetable and Phasing of the Project

2.4.1 Figure 2-2 shows a preliminary construction programme for the improvement works. According to this programme, the works would commence in October 2000 and complete by March 2003. Table 2.1 lists the type and total number of equipment items required for each construction activity.

2.5 Implementation Strategy

2.5.1 The Project needs to be gazetted under the Roads (Works Use and Compensation) Ordinance. The key administrative steps are highlighted as follows:

- Obtaining Environmental Permit
- Resolving Roads Ordinance Matters
- Upgrading of Project to Category A for construction to proceed
- Submission of Clearance Application Form to Lands Department
- Submission to District Lands Conference, as required for transplantation and felling of trees
- Gazette for tender
- Award tender
- Construction

2.5.2 Detailed design and supervision of the construction for the Project will be via Agreement No. CE 13/90 with Maunsell Consultants Asia Limited. The fees for site investigation, design and contract stage would be funded under a Block Vote. At the construction stage, the construction fees and resident site staff costs would be paid under the Project Vote.

2.5.3 There is no need to take advantage of the design and build contracts because there would be adequate lead time for detailed design and tender documentation. Lump sum contract with bill of quantities should be adopted in line with the current government policy.

2.6 Related Projects

2.6.1 Major development and related project to be constructed in the vicinity of this Project is as follows:

- Mass Transit Railway (MTR) Tseung Kwan O Extension (Tseung Kwan O, Po Lam and Hang Hau)

2.7 Background and History of the Project

2.7.1 The Tseung Kwan O Feasibility Study of Opportunity for Further Development (TKOOFD), completed in May 1990 and endorsed by the then LDPC for implementation, identified amongst other infrastructure works, the widening of Road P2 between Roads D1 and D2 and the construction of a grade separated interchange T1/P1/P2. The TKO Town Centre Traffic Review (1997) has also confirmed that the capacity of the existing roundabout would be exceeded by 2001 as a result of increasing traffic flows.

2.7.2 The existing roundabout T1/P1/P2 connects major corridors including Tseung Kwan O Tunnel Road (Road T1), Wan Po Road (Road P1) and Po Shun Road (Road P2) in Tseung Kwan O constructed under Contract Nos. JB19/85, TK30/89, TK37/93, TK39/93 and TK46/97 was an interim measures to meet the opening of Tseung Kwan O Tunnel and early provision of Road P2 link. It also allows easy traffic diversion and minimise abortive work when constructing this fully grade separated interchange recommended in TKOOFD.

2.7.3 The proposed alignment and sitting of the proposed interchange of this Project were based on the recommendation of TKOOFD with further review of the following considerations/constraints:

- areas adjacent to this roundabout are either developed or to be developed under designated programme;
- no headroom constraint has been found for upgrading the roundabout to be a grade separated interchange;
- Western Culvert was found running underneath Road P2 across the roundabout for discharge the storm water into Tiu Ken Wan;
- rather significant existing utilities and underground services such as 1200 ϕ and 800 ϕ watermains were found running across Road P1 adjacent to the roundabout; and
- the existing vehicular underpass running across Road T1 at Wan Lung Road and the existing pedestrian/cyclist subways running across Road P1 and P2 further confine the vertical profile of the interchange.

2.7.4 An alternative scheme of upgrading the roundabout to vehicular underpass has also been considered, however, this option would not be practical in view of the abovementioned considerations/constraints like existence of underground structures and other considerations such as flooding problems.

2.7.5 Project Manager/NT East of Territory Development Department commissioned Maunsell Consultants Asia Limited under Agreement No. CE 13/90 to undertake the design of Contract F - Grade Separated Interchange T1/P1/P2 in year 1997.

2.7.6 Details of this interchange and associated slip roads, subway system, etc. are further refined to cope with the current code of practices, standards and updated traffic data.

2.8 Description of Do-Nothing Scenario

2.8.1 As the southern portion of Tseung Kwan O New Town is developed and populated, the existing at grade interchange at Roads T1/P1/P2 junction and the associated approach roads will be heavily congested with the increasing traffic flow from the new TKO Town Centre. Therefore, the approach roads in the vicinity to the roundabout at Roads P1, T1 and P2 are predicted to operate at over-capacity rate in the near future.

Table 2.1 Total Equipment Requirements for the Engineering Works

Construction Activity	Equipment & Quantity	
Drainage Works for Roads B, D, E, F, G, P1 and P2	Backhoe	2
	Dump Truck	2
	Concrete Lorry Mixer	2
	Vibratory Compactor	2
	Air Compressor, silenced	1
Roadworks for Roads B, D, E, F, G, P1 and P2	Backhoe	1
	Concrete Pump	2
	Road Roller	1
	Asphalt Paver	1
Drainage Works for Roads A & C	Backhoe	2
	Dump Truck	1
	Concrete Lorry Mixer	1
	Vibratory Compactor	1
	Air Compressor, silenced	1
Roadworks for Roads A & C	Backhoe	1
	Concrete Pump	2
	Road Roller	1
	Asphalt Paver	1
Foundation Works for Bridges A, B, C, D & E	Large Diameter Bored Piling Rig (Oscillator or Grab-&-Chisel)	2
	Backhoe	1
	Dump Truck	2
	Concrete Lorry Mixer	1
	Vibratory Compactor	1
	Air Compressor, silenced	1
Substructure and Superstructure for Bridges A, B, C, D & E	Concrete Lorry Mixer	3
	Vibratory Compactor	3
	Concrete Pump	3
	Crane, Mobile Diesel	2
Excavation for Retaining Walls, Subway A under Slip Road B and Subways B & C (extension works) under Road P2	Excavator	1
	Dump Truck	1
Structural Works for Retaining Walls and Subways A, B & C	Concrete Lorry Mixer	3
	Vibratory Compactor	3
	Concrete Pump	3
	Air Compressor, silenced	2