

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 706 - HIGHWAYS

Transport - Roads

519TH - Route 10 - North Lantau to Yuen Long Highway

Members are invited to recommend to Finance Committee –

- (a) to upgrade part of **519TH**, entitled "Route 10 - North Lantau to Yuen Long Highway - detailed design of the southern section" to Category A at an estimated cost of \$454.5 million in money-of-the-day prices; and
- (b) to retain the remainder of **519TH** in Category B.

PROBLEM

There is no alternative external road link to Lantau in case emergency incidents occur on the Lantau Link. Moreover, the existing road network connecting Lantau to the rest of the territory will not be able to cope with future traffic demand.

PROPOSAL

2. The Director of Highways (DH_y), with the support of the Secretary for Transport, proposes to upgrade part of **519TH** to Category A at an estimated

cost of \$454.5 million in money-of-the-day (MOD) prices to employ consultants to undertake detailed design of the southern section (i.e. from North Lantau to So Kwun Wat) of the proposed Route 10 from North Lantau to Yuen Long Highway (Route 10 (NL-YLH)), and to carry out the associated site investigation.

PROJECT SCOPE AND NATURE

3. The scope of works of **519TH** includes -

(a) Southern section

- (i) the construction of about 2.6 kilometres of dual 3-lane road on North Lantau (which includes a toll plaza) from the future Pa Tau Kwu interchange to Kwai Shek;
- (ii) the construction of about 1.7 kilometres of dual 3-lane bridge (Tsing Lung Bridge) spanning across the Ma Wan Channel from Kwai Shek to Tsing Lung Tau;
- (iii) the construction of about 4.0 kilometres of dual 3-lane road from Tsing Lung Tau to So Kwun Wat (which includes a 1.8-kilometre long dual 3-lane tunnel section);
- (iv) the construction of about 2.0 kilometres of dual 2-lane link road from So Kwun Wat to Tuen Mun Road (So Kwun Wat Link Road);
- (v) the construction of about 2.2 kilometres of dual 2-lane link road from So Kwun Wat to Siu Lam (Siu Lam Link Road); and
- (vi) the construction of Siu Lam interchange, So Kwun Wat interchange, and So Kwun Tan interchange;

(b) Northern section

the construction of about 4.8 kilometres of dual 3-lane road from So Kwun Wat to Yuen Long Highway near Lam Tei (which includes a 4.1-kilometre long dual 3-lane tunnel section) and an interchange at Lam Tei;

/(c)

- (c) For both southern and northern sections
 - (i) associated civil, geotechnical, landscape, road and drainage works, ancillary buildings, toll facilities, electrical and mechanical installations, and environmental mitigation measures; and
 - (ii) traffic control and surveillance system (TCSS).

4. The part of the project we now propose to upgrade to Category A comprises -

- (a) detailed design of all the proposed works described in paragraph 3 (a) and (c)(i) above for the southern section from Pa Tau Kwu in North Lantau to So Kwun Wat, and
- (b) detailed design of the proposed TCSS described in paragraph 3 (c)(ii) above for the whole Route 10 (NL-YLH);
- (c) associated site investigation and supervision; and
- (d) preparation of contract documents.

Site plan is at Enclosure 1 for Members' reference.

JUSTIFICATION

5. At present the only external road access for Lantau and the new airport at Chek Lap Kok is the Lantau Link. There will be no road access between Lantau and the rest of the territory in the event of closure of the Lantau Link. Therefore, we need to plan for an alternative road link between Lantau and the rest of the territory. Route 10 (NL-YLH) will serve as such a link between Lantau and the North West New Territories (NWNT). The Route will connect Yuen Long South to Northeast Lantau via So Kwun Wat and Tsing Lung Tau.

6. Apart from providing an alternative road link to Lantau, Route 10 (NL-YLH) is also required to meet the forecast traffic demand generated by cross boundary activities and by the anticipated population and employment growth in NWNT.

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7. Cross-boundary vehicular traffic between Hong Kong and the Mainland has been growing at a rapid rate in line with the rapid economic development of the Pearl River Delta Region. The average annual increase of cross-boundary vehicle flow was 9.5% since 1992. Together with Deep Bay Link, Route 10 (NL-YLH) will form part of the strategic road network to accommodate the increasing cross-boundary traffic.

8. In the light of committed developments under existing plans and strategic growth under the Territorial Development Strategy Review (TDSR), we envisage that the population in NWNT will increase from 800 000 in 1996 to 1.4 million by 2011. The NWNT has also been identified as a potential area of new employment with possible business estates and office nodes at Au Tau/Yuen Long and Hung Shui Kiu. Together with the plan to establish a fourth industrial estate in Tuen Mun West, we estimate that the total number of jobs in NWNT will increase from 190 000 in 1996 to 440 000 in 2011. All the above developments in the NWNT will generate traffic demand impacting on the design capacity for Route 10 (NL-YLH).

9. Taking into account the above developments, the Feasibility Study¹ for **519TH** concluded that a number of strategic routes within the NWNT, including the Lantau Link, Country Park Section of Route 3 and Tuen Mun Road east of So Kwun Wat will be operating at or beyond their capacity by 2007 and confirmed the need of the route to relieve the congestion. The volume/capacity² (V/C) ratios of these road links during morning peaks with and without the proposed Route 10 from North Lantau to Yuen Long Highway are as follows –

	Year		
	2007	2011	2016
Lantau Link	1.48 (1.04)	1.85 (1.26)	2.05 (1.29)
			/Route

¹ We charged the Feasibility Study at the cost of \$17 million to **Head 706 Subhead 6008TX** - 'Consultants' design fees and charges and major in-house investigations for highways projects', which has been replaced by **Subhead 6100TX** - 'Highway works, studies and investigations for items in Category D of the Public Works Programme' since April 1996. Before 1 June 1995, DHy had delegated authority to approve expenditure on any single item under **Subhead 6008TX** up to the total provision approved by the Finance Committee.

² The capacity here refers to the design of the road. A V/C ratio equal to or less than 1.0 means that the road has sufficient capacity to cope with the volume of vehicular traffic under consideration. A V/C ratio above 1.0 indicates the onset of mild congestion; above 1.2 indicates more serious congestion with traffic speeds progressively deteriorating with further increase in traffic.

		Year	
	2007	2011	2016
Route 3 Country Park Section	1.25 (1.12)	1.33 (1.20)	1.38 (1.23)
Tuen Mun Road East of So Kwun Wat	1.20 (0.74)	1.29 (0.84)	1.35 (0.82)

Note - Figures in bracket denote V/C ratios with Route 10 (NL-YLH) in place.

10. The Investigation and Preliminary Design (I&PD) Study for **519TH** commenced in March 1998. We have already completed investigations and preliminary design on the southern section and established its preferred alignment together with the associated land, environmental, marine, drainage, traffic and other impacts on the affected areas.

11. The design and construction of the southern section are lengthy tasks, particularly for the construction of Tsing Lung Bridge which will take almost five years to complete. In order not to affect its timely commissioning in 2007, we propose to undertake the detailed design for the southern section now rather than in conjunction with the northern section. As we do not have the necessary in-house resources, we need to employ consultants to undertake the tasks and to supervise the associated site investigation works.

12. The northern section of the Route 10 (NL-YLH) is less complicated than the southern section in terms of engineering and technicalities and hence requires lesser time for design and construction. We have commenced the I&PD Study on the northern section in May 1999 for completion in August 2000 to meet the completion date of 2007.

13. There is a need to provide a comprehensive traffic control and surveillance system (TCSS) along Route 10 (NL-YLH), as Route 10 (NL-YLH), when complete, will form part of the critical route to the new airport at Chek Lap Kok. To ensure the efficient and effective operation of Route 10 (NL-YLH) under all conditions, it has been decided that the TCSS should operate as one integrated system for the Route 10 (NL-YLH) as a whole. The detailed design of the TCSS for the Route 10 (NL-YLH) is therefore best carried out as a route-

wide

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assignment encompassing both southern and northern sections. This TCSS design needs to commence soon after the southern section detailed design starts. We therefore also apply for funding for the TCSS detailed design.

FINANCIAL IMPLICATIONS

14. We estimate the cost of this part of the project to be \$454.5 million in MOD prices (see paragraph 15 below) made up as follows -

	\$million
(a) Consultants' fees for	333.8
(i) detailed design (including review of investigation and preparation of contract documents)	308.3
(ii) supervision of site investigation and wind tunnel tests	3.5
(iii) independent assessment of the design of Tsing Lung Bridge ³	20.0
(iv) Electrical and Mechanical Services and Office of Telecommunication Authority Trading Fund charges ⁴	2.0

/(b).....

³ The proposed Tsing Lung Bridge (TLB) is a suspension bridge of a slightly longer span than the existing Tsing Ma Bridge (TMB) with similar structural complexity. It is therefore important to carry out an independent assessment of the design of the TLB, similar to that carried out for the TMB to ensure the adequacy of the structure during both the design and construction of the TLB.

⁴ The Electrical and Mechanical Services Trading Fund (EMSTF) and Telecommunication Trading Fund (TTF) were established on 1 August 1996 and 1 June 1995 respectively under the Trading Fund Ordinance. Government departments are charged for design and technical services for electrical and mechanical (E&M) and telecommunication installations provided by Electrical and Mechanical Services Department and Office of the Telecommunication Authority respectively. The services rendered for this project include checking consultants' submissions on all E&M and telecommunication installations, and providing technical advice to government on all E&M works and their impacts on the project.

	\$million	
(b) Site investigations	35.0	
(c) Wind tunnel tests ⁵	10.0	
(d) Contingencies	37.2	

Sub-total	416.0	(at December 1998 prices)
(e) Provisions for price adjustment	38.5	

Total	454.5	(in MOD prices)

A breakdown by man-months of the estimate for consultants' fees is at Enclosure 2.

15. Subject to approval, we will phase the expenditure as follows -

Year	\$ million (Dec 1998)	Price adjustment factor	\$ million (MOD)
1999 – 2000	3.5	1.02625	3.6
2000 – 2001	213.5	1.06217	226.8
2001 – 2002	101.9	1.09934	112.0
2002 – 2003	57.0	1.13782	64.9

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⁵ The proposed Tsing Lung Bridge has a central span of about 1 418 metres and will be subject to strong wind loads. The aerodynamic stability of this type of long span bridge under strong wind conditions is an important element for consideration in its design. The use of wind tunnel tests is currently the most effective method of analysing the wind loads and aerodynamic effects on long span bridges.

Year	\$ million (Dec 1998)	Price adjustment factor	\$ million (MOD)
2003 – 2004	40.1	1.17765	47.2
	<hr/> 416.0 <hr/>		<hr/> 454.5 <hr/>

16. We have derived the MOD estimate on the basis of Government's latest forecast of trend labour and construction prices for the period 1999 to 2004. We will employ consultants on a lump sum basis with provision for price fluctuation because the duration of the detailed design will exceed 12 months. The consultants will supervise the site investigation works under contracts to be awarded through the normal competitive tendering process.

17. The proposed detailed design has no additional annually recurrent financial implications.

PUBLIC CONSULTATION

18. We consulted the Tsuen Wan and Tuen Mun Provisional District Boards on 5 May 1998, and the Yuen Long Provisional District Board on 25 June 1998 on the findings of the Feasibility Study for **519TH**. They supported the project. The Tsuen Wan and Tuen Mun Provisional District Boards requested us to investigate the provision of an interchange at Tsing Lung Tau for Route 10/Tuen Mun Road/Route 3 Country Park Section. We investigated the request in the I&PD consultancy and found that there would be limited traffic demand at this location. Given the engineering constraints and the costs involved, the I&PD consultants recommended that no connection be provided at the Tsing Lung Tau location. Instead, we developed an alternative proposal of providing a new Siu Lam Link Road to connect Route 10 south of the So Kwun Wat interchange with Tuen Mun Road. This link road will provide a more direct and shorter link between Tuen Mun Road and Route 10.

19. We further consulted the Tsuen Wan and Tuen Mun Provisional District Boards on the findings of the southern section investigation on 4 May 1999. The two Provisional District Boards supported the proposed road scheme except that some Members of the Tsuen Wan Provisional District Board expressed reservation on not providing an interchange at Tsing Lung Tau.

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20. At the request of Members at the Public Works Subcommittee meeting held on 3 November 1999, we briefed the Panel on Transport and Panel on Planning, Lands and Works on 12 November 1999. An information paper for the joint panel meeting (with all relevant Annexes except Annex A) is at Enclosure 3. At the meeting, we explained in further detail the engineering difficulties of providing an interchange at Tsing Lung Tau, the programme of the project and the possibility of adopting the “Design and Build” and “Build-Operate-Transfer” arrangements. Members noted the explanations of the Administration. Members also requested for additional information regarding the population projection in the Tai Lam Chung area, the “Design and Build” arrangements, detailed procedures involved and critical path of the project programme and the marine navigation situation at the Ma Wan Channel. The Administration will produce a supplementary paper to provide the above information.

ENVIRONMENTAL IMPLICATIONS

21. The proposed detailed design will not give rise to any adverse environmental implications. The project is a designated project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and environmental permits are required for the construction and operation of the project. We have completed the EIA for the southern section under the I&PD consultancy to identify, predict and assess the potential environmental impacts arising from the project. The EIA recommends the necessary environmental mitigation measures during the construction and operation phases of the project to control the impacts to within the established standards. We will consult the Advisory Council on the Environment on the environmental aspects of the project. We will incorporate the recommended mitigation measures in the detailed design. We will submit the EIA report for the Director of Environmental Protection’s approval under the EIA Ordinance and obtain environmental permits prior to construction. The proposed site investigation will not give rise to any adverse environmental implications as we will control short-term impacts to within the established standards and guidelines through pollution control clauses in the site investigation contracts.

LAND ACQUISITION

22. The proposed detailed design and site investigation do not require any land acquisition.

/BACKGROUND

BACKGROUND INFORMATION

23. We upgraded **519TH** to Category B in August 1997. We upgraded part of **519TH** to Category A in December 1997 as **715TH** “Route 10 – North Lantau to Yuen Long Highway – investigation and preliminary design” at an estimated cost of \$353.8 million in MOD prices to undertake investigation and preliminary design of the proposed Route 10 (NL-YLH).

24. We plan to start the detailed design for the southern section as soon as practicable, in any case not later than February 2000. We will complete the detailed design for the southern section in 2001, followed by tendering exercises for the construction stage. The tendering exercises for Tsing Lung Bridge and the section from Pa Tau Kwu Interchange to Kwai Shek will be completed in early 2002 as the Tsing Lung Bridge will take the longest time to complete. The tendering exercise for the section from Tsing Lung Tau to So Kwun Wat will be completed in late 2003. We intend to commence construction of the southern section in early 2002 for completion in mid 2007.

25. For the northern section, we plan to commence its detailed design in early 2001 for completion in end 2002, followed by tendering exercises for completion in late 2003. We plan to start construction in early 2004 for completion by end 2007.

Enclosure 2 to PWSC(1999-2000)71

519TH - Route 10 - North Lantau to Yuen Long Highway

Breakdown of the estimates for consultants' fees

Consultants' staff costs		Estimated man months	Average MPS* salary point	Multiplier factor	Estimated fee (\$ million)
(a) Review of the findings of the investigation and preliminary design	Professional	208	40	2.4	31.3
	Technical	163	16	2.4	8.2
(b) Detailed design	Professional	978	40	2.4	147.3
	Technical	1013	16	2.4	51.1
(c) Preparation of contract documents and assessment of tenders	Professional	355	40	2.4	53.5
	Technical	336	16	2.4	16.9
(d) Supervision of site investigation and wind tunnel tests	Professional	25	40	1.7	2.7
	Technical	21	16	1.7	0.8
(e) Independent assessment of the Design	Professional	109	40	2.4	16.4
	Technical	71	16	2.4	3.6
(f) Charges by EMSD & OFTA Trading Funds					2.0
<i>Total consultants' staff costs</i>					333.8
Out-of-pocket expenses					
(a) Site investigations					35.0
(b) Wind tunnel tests					10.0
Total out-of-pocket expenses					45.0
<i>Total</i>					378.8

* MPS = Master Pay Scale

Notes

1. A multiplier factor of 2.4 is applied to the average MPS point to arrive at the full staff costs including the consultants' overheads and profit, as the staff will be employed in the consultant's offices (at 1.4.98, MPS pt. 40 = \$62,780 p.m., and MPS pt. 16 = \$21,010 p.m.). A multiplier factor of 1.7 is applied in the case of site staff supplied by the consultants.
2. Out-of-pocket expenses are the actual cost incurred. The consultants are not entitled to any additional payment for the overheads or profit in respect of these items.
3. The figures given above are based on estimates prepared by the Director of Highways. We will only know the actual man months and actual fees when we have selected the consultants through the usual competitive lump sum fee bid system.

For discussion on
12 November 1999

**Panel on Transport and
Panel on Planning, Lands and Works of the
Legislative Council**

Route 10 – North Lantau to Yuen Long Highway

Purpose

This paper provides Members' with detailed information regarding the project Route 10 – North Lantau to Yuen Long Highway.

Background

2. We included the project in Category B in August 1997 and the Finance Committee approved the part upgrading of the investigation and preliminary design for the project to Category A. We briefed panel members on the project in January 1998.

3. In discussing paper PWSC(1999-2000)67 (copy at **Annex A**) on 519TH 'Route 10 - North Lantau to Yuen Long Highway' on 3 November 1999, members of the Public Works Subcommittee requested that the following information should be given to panel members for further discussion -

- (a) possibility of providing an interchange with Tuen Mun Road at Tsing Lung Tau;
- (b) possibility of providing an interchange with North Lantau Highway at Kwai Shek;
- (c) possibility of advancing the current planned completion date of 2007;
- (d) possibility of adopting "Design and Build" and "Build-Operate-Transfer" arrangements;
- (e) management of construction waste for the project;

- (f) the procedures of the Environmental Impact Assessment Ordinance as applied to the project; and
- (g) the justifications for the consultant's staff cost for preparation of contract documents and tender assessment.

Provision of an interchange with Tuen Mun Road at Tsing Lung Tau

4. The Administration is aware of the request of some members of the Tsuen Wan Provisional District Board to provide an interchange between Route 10 and Tuen Mun Road at Tsing Lung Tau. The Director of Highways had earlier on undertaken a detailed study on the feasibility of the proposal. The study report examined the possibility of three options for the design of the interchange and connecting roads. They include –

- (a) an all-movement interchange whereby traffic to and from Tsing Lung Bridge could be connected to all directions (see **Annex B**). The estimated cost of this interchange is about \$2,300 million;
- (b) a two-movement interchange through a tunnel whereby traffic from Tsing Lung Bridge could join Tuen Mun Road eastbound at Tsing Lung Tau (see **Annex C**). The estimated cost is about \$700 million; and
- (c) a two-movement interchange also joining Tuen Mun Road eastbound but through a viaduct alignment (see **Annex D**). The estimated cost is about \$500 million.

5. However, all the above connections are subject to serious topographic constraints and as a result the connections are sub-standard and unacceptable from the safety point of view. These constraints include –

- (a) the hill between Castle Peak Road and Tuen Mun Road at Tsing Lung Tau is very steep. The provision of an interchange here would require significant earthworks to remove the steep hill. This would create adverse environmental impact upon the adjacent residential developments;

- (b) the rock slopes of Tai Lam Country Park immediately north of Tuen Mun Road at Tsing Lung Tau are very steep. Provision of an interchange and connecting roads would require extensive tunneling work at these rock slopes. The works would intrude into the Tai Lam Country Park through difficult terrain. They would also require protracted lane closures on Tuen Mun Road which is unacceptable given that Tuen Mun Road is a busy trunk road for Northwest New Territories;
- (c) the short horizontal distance (only 350 m) between the north tower of Tsing Lung Bridge and Tuen Mun Road and the substantial difference in level between Tuen Mun Road and the proposed Route 10 make it impracticable to provide an interchange. The north tower of Tsing Lung Bridge will need to be located 220 m to 270 m into the Ma Wan Channel to accommodate the slip road merging length. This would have great impact on marine navigation and will pose a serious danger of ship impact on the tower. Even if the north tower could be relocated, the slip road from Route 10 connecting to Tuen Mun Road which is some 30 m above would have an uphill gradient of about 12% (as opposed to the minimum acceptable standard of 8%) with sharp turning radius. As a result, the interchange would have an unacceptable configuration and would cause safety hazard to motorists;
- (d) the provision of an interchange at Tsing Lung Tau would require extensive construction works to be carried out above Tuen Mun Road. These activities would be subject to operational constraints of this primary route. A large number of construction vehicles would need to access Tuen Mun Road and the local road network during construction therefore causing traffic congestion and adverse environmental impact.

6. An artist's impression and a photomontage of the site at Tsing Lung Tau which may be helpful in visualising the problems discussed above are at **Annexes E and F**.

7. We have also predicted the traffic flows of the various interchanges for Route 10. Results indicate that the demand for traffic at Tsing Lung Tau via the two-movement connection is low (about 400 to 800 passenger car units/hour) as shown at **Annex G**. For comparison, forecasts of traffic volume at Lam Tei Interchange and So Kwun Wat/Siu Lam Interchange are shown at **Annexes H and I**.

8. Given the engineering constraints, sub-standard highway geometry, environmental impacts, disruptions to Tuen Mun Road traffic flow and impacts on the Ma Wan navigation channel, we do not consider it practicable and desirable to provide an interchange at Tsing Lung Tau. Moreover, the traffic demand at this interchange is relatively low and alternative routes are/will be available. Currently, traffic to Lantau from Tsuen Wan and Kwai Chung areas need to use Ting Kau Bridge and Rambler Channel Bridge to access Lantau Link. When the Tsing Yi North Coastal Road is completed in end 2001, a more direct access will be available for such traffic via Tsing Tsuen Bridge and Tsing Yi North Coastal Road.

Provision of an interchange with North Lantau Highway at Kwai Shek

9. We have also looked into the possibility of providing an interchange with North Lantau Highway at Kwai Shek. It is concluded that it is impractical to provide an interchange at this location. As shown at the plan at **Annex J**, a link road to North Lantau Highway will have to be built in a tunnel above the existing tunnel of the Airport Railway. The geological conditions of this area are extremely unstable. There were several incidents of collapse when the tunnel for the Airport Railway was built. We have grave concern about building another tunnel which may bring risk to the operation of the Airport Railway.

10. Moreover, to provide a link road connection between the two major expressways of design speed 100 km/hour, the minimum curvature of the link roads dictates that the connection at North Lantau Highway will be beyond the existing toll plaza because of the level difference between Route 10 and North Lantau Highway.

Advancing the planned completion date of 2007

11. Route 10 North Lantau to Yuen Long Highway is a mega scale project comprising over 17 km of road, including two tunnels (1.8 km and 4.1 km) and a long span suspension bridge of 1,418m span (Tsing Lung Bridge) which is of similar scale to Tsing Ma Bridge.

12. As shown in the implementation timetable at **Annex K**, various tasks are involved in planning for the project. They include the detailed design of the bridge, the completion of the statutory procedures of the Environmental Impact Assessment Ordinance and the Roads (Works, Use and Compensation) Ordinance, land acquisition and funding application processes. We envisage that the earliest start date for construction would be April 2002.

13. In view of the scale of the project, construction will be carried out under

several packages. The Tsing Lung Bridge and some advance works for the section of elevated road in North Lantau forms one of the packages. The construction of the bridge is estimated to take at least five years and even this is tight as construction activities of a long suspension bridge can be prone to disruption by typhoon and require continuous working round the clock. We therefore envisage that the earliest completion date barring any unforeseen situations and adverse inclement weather is mid 2007.

14. The following is a list of recently completed suspension bridges and the time taken for their construction for reference purpose -

Name of Bridge	Location	Span (m)	Year of Completion	Construction Period (Yrs)
Jiangyin Yangtse River Bridge	China	1385	1999	5
Akashi-Kaikyo Bridge	Japan	1991	1998	10
Great Belt East Bridge	Denmark	1624	1998	7
Tsing Ma Bridge	Hong Kong	1377	1997	5

15. We recognise the need to complete the route as soon as possible. We would take every possible step to expedite each of the procedures with a view to completing the project at the earliest possible date.

“Design and Build” and “Build-Operate-Transfer” arrangements

16. We have examined the possibility of adopting the “Design and Build” (D&B) and “Build-operate-Transfer” (BOT) arrangements for the construction of Route 10. The major benefit of D&B is the shortening of the programme as some design and construction activities can be undertaken concurrently. However, for this project we could conduct the detailed design in parallel with the statutory procedures. The time we could gain by adopting the D&B arrangements is very limited, if any. Moreover, we would not have a direct control on the detailed design under the D&B arrangements because the designer of the bridge would be employed by the D&B contractor. From experience on similar previous projects, the potential risk of substantial contractual dispute is very high. In view of the complexity of the project, it is desirable for the Administration to maintain a direct control over the detailed design.

17. We have also examined the possibility of BOT arrangement. We conclude that the potential for the private sector being interested is limited because of the high construction cost (\$24.8 billion). For the BOT to be financially viable, the toll may need to be pitched at a high level, which would not be acceptable to the public and traffic attraction would be reduced as alternative routes are available.

Management of construction waste for the project

18. It is estimated that the Route 10 project would generate about 3 million m³ of construction waste which needs to be disposed of off-site.

19. The following measures will be taken in the planning and preliminary design stage to reduce the generation of construction waste -

- The project will be predominantly constructed on hillsides and in rural areas. Site clearance waste generated will therefore mainly consist of low-grade natural vegetation such as scrub and grass.
- The majority of the excavated material will be rock and soil and they will be re-used for reclamation.
- Dredging of marine deposits has been minimised by adopting drained reclamation as far as possible.

20. The following measures will be taken in the construction stage to reduce the generation of construction waste -

- Designation of areas for the segregation and temporary storage of reusable and recyclable materials.
- Minimising the generation of waste through adopting best practices and design.
- Reuse, recovery and recycling of materials, thus avoiding disposal. For example, excavated material would be reused as fill in the construction of seawalls.

21. We will take the following measures in the construction stage for waste disposal -

- Handle and store wastes in a manner which ensures that it is held securely without loss or leakage, thereby minimising the potential for pollution.

- Use waste hauliers to collect specific categories of wastes.
 - Remove wastes in a timely manner.
 - Maintain and clean waste storage areas regularly.
 - Minimise windblown litter and dust during transportation by either covering trucks or transporting waste in enclosed containers.
 - Dispose of waste at licensed waste disposal facilities.
 - Develop procedures such as a ticketing system to facilitate tracking of loads, particularly for chemical waste, and to ensure that illegal disposal of waste does not occur.
 - Maintain records of the quantities of waste generated, recycled and disposed.
22. We shall dispose of the construction waste through the following methods
-
- The majority of the excavated material will be re-used on site as fill in the construction of seawalls and road embankment.
 - Surplus excavated material will be re-used as fill material for other reclamation projects.
 - Principal means of disposal will be via marine route. Excavated material from the Tai Lam Chung Tunnel and Siu Lam cutting will be transported via the southern portal to barging points at Tsing Lung Tau by means of an enclosed conveyor belt.

The Environmental Impact Assessment Ordinance (EIAO) procedures

23. Under the EIAO, the approval of the EIA report is subject to the procedures as set out at **Annex L**, which essentially includes a period of 150 days to complete the EIAO process before the approval of the Final EIA Report.

24. After introduction of the EIAO, the approval of the EIA report or the permission to apply directly for the environmental permit has to be obtained before gazetting a road project under the Roads (Works, Use and Compensation) Ordinance.

25. The EIAO procedures as applied to the Route 10 project is set out below -

Commencement of the EIA Study	April 1998
Circulation of the Draft EIA Report	January 1999
DB consultation	May 1999
Submission of EIA Report under EIAO	September 1999
Review of EIA Report	Before end November 1999
Public Inspection	Before end December 1999
ACE Consultation	Before end January 2000
Approval of EIA Report	Before end February 2000

Consultant's staff cost for preparation of contract documents and tender assessment

26. During the preparation of contract documents and tender assessment, the following activities will be undertaken –

- (a) preparation of tender documents (including drawings);
- (b) assisting in tender queries/clarifications and tender negotiations;
- (c) finalisation of contract documents; and
- (d) contract award.

27. It is currently anticipated that the section of Route 10 between North Lantau and So Kwun Wat will be undertaken under eleven contracts. Each of the contracts will have its own peculiarities and will require particular inputs. The contract for the Tsing Lung Bridge is likely to require the greatest effort and examples of required inputs are -

- (a) the tender documents will include a large number of drawings (in the case of the similar Tsing Ma Bridge there were approximately 400 drawings);
- (b) many of the construction activities will fall outside the scope of the standard specifications and thus special clauses and whole sections (e.g. cable wire) will need to be developed;

- (c) conditions of tender need to be developed which allow tenderers maximum flexibility in their choice of construction techniques whilst ensuring the Government getting the finished structure that it requires. The conditions must also ensure that the tenderers provide sufficient information on such aspects to enable them to be assessed during the tender evaluations and defined to a sufficient extent in the Contract;
- (d) during the tender assessment stage, the consultant will need to carefully review the information received and discuss with the tenderer further;
- (e) also during the tender assessment stage, all pricing and programming submissions must be reviewed and views developed on the adequacy or otherwise of the tenderers allowances for plant and equipment. Such analysis could be crucial in any arising dispute later since arguments may centre on the tenderers allowances at the time of contract award; and
- (f) the results of the tender assessment must be collated into the Contract documents for award.

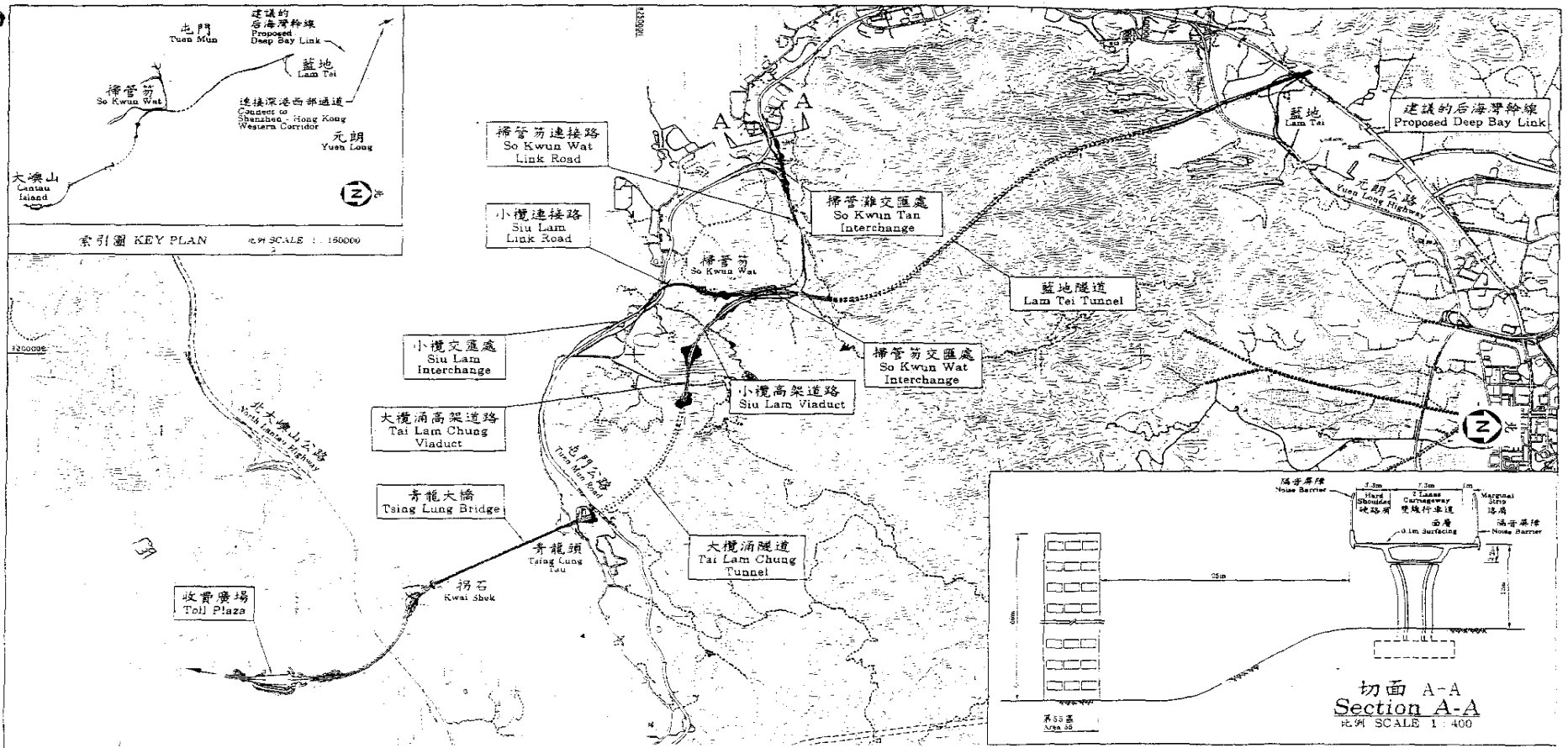
28. While many of the above activities are common to “normal” contracts, the size and technical complexity of this project will make these matters far more complex and time consuming. In the case of the Tsing Ma Bridge, the tender period was 6 months and the tender assessment period was 5 months involving a very considerable input from the consultant’s team. Preparation of drawings and documents and the development of Conditions of Contract all required substantial effort in addition to this in the course of detailed design which in itself could take up to 18 months.

29. The contracts for the tunnel, electrical & mechanical services and the traffic control and surveillance system will also require similar levels of input.

ADVICE SOUGHT

30. Members are requested to note the contents of this paper.

**Transport Bureau
November 1999**



索引圖 KEY PLAN
SCALE 1:150000

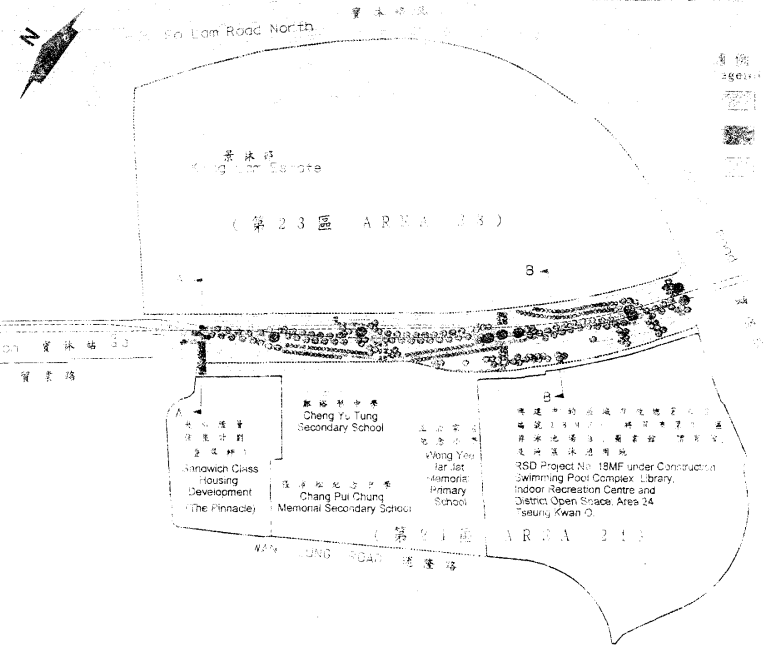
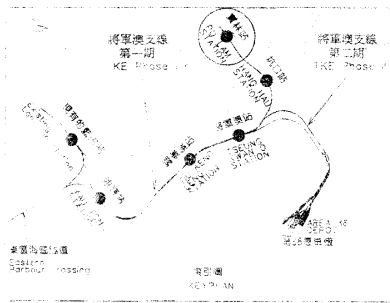
切面 A-A
Section A-A
SCALE 1:400

- | | | | | | |
|--|---|--|--|------------------------------|------------------------|
| PACKAGE 1 組合一
次頭坑交匯處至拐石
Pa Tau Kwu Interchange to Kwai Shek | PACKAGE 2 組合二
拐石至青龍頭
Kwai Shek to Tsing Lung Tau | PACKAGE 3 組合三
青龍頭至掃管笏
Tsing Lung Tau to So Kwun Wat | 掃管笏至元朗公路
So Kwun Wat to Yuen Long Highway | 藍地交匯處
Lam Tai Interchange | 后海灣幹線
Deep Bay Link |
| 十號幹線 - 北大嶼山至元朗公路
Route 10 - North Lantau to Yuen Long Highway | | | | | |

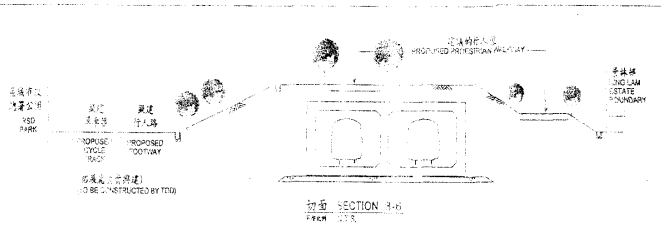
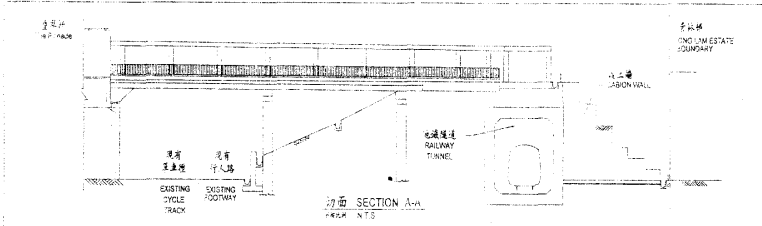
十號幹線 - 北大嶼山至元朗公路

Route 10 - North Lantau to Yuen Long Highway

設計人 P. S. LAM	日期 21.10.1999	圖號 R10 / 007A	比例 1:40000
校核人 C. S. WONG	日期 14.9.1999	HIGHWAYS DEPARTMENT HONG KONG	
工程經理 Major Works Project Management Office			



地鐵將軍澳支線
MTR Tseung Kwan O
Extension Alignment

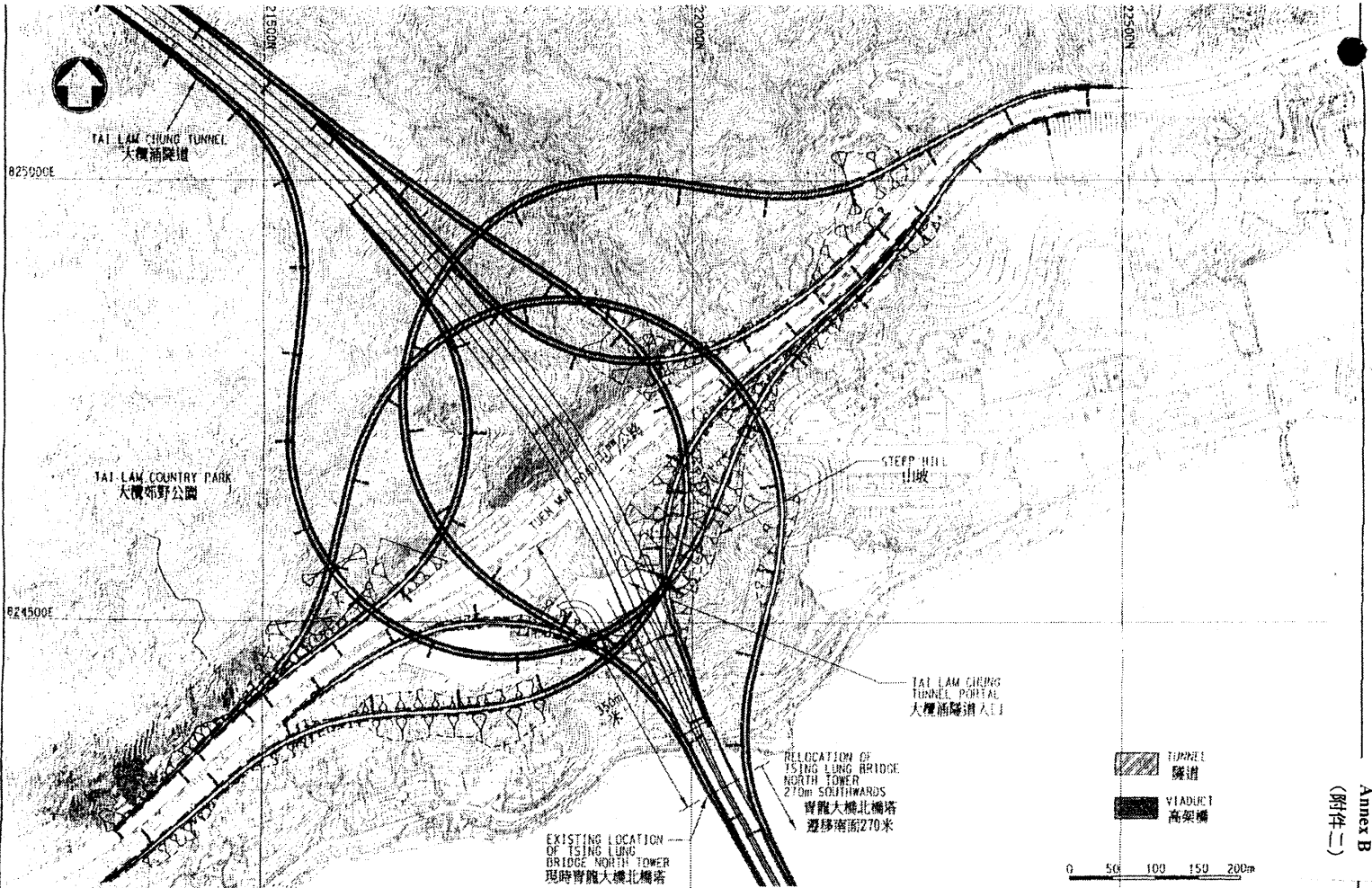


PROJECT NO. 工程編號		41TR		Drawn by	Y. Y. NG	Date	23/7/20	Working No.	RW9732	Scale	AS SHOWN
PROJECT TITLE 工程名稱		地下鐵路將軍澳支線 寶林主要基建工程		Approved by							
PROJECT DESCRIPTION 工程描述		MTR Tseung Kwan O Extension Essential Public Infrastructure Works at Po Lam		SIGNED 簽署		DATE 日期		DRAWN 繪圖		CHECKED 校核	
DRAWN BY 繪圖人		Y. Y. NG		SIGNED 簽署		DATE 日期		DRAWN 繪圖		CHECKED 校核	
DRAWN BY 繪圖人		Y. Y. NG		SIGNED 簽署		DATE 日期		DRAWN 繪圖		CHECKED 校核	
DRAWN BY 繪圖人		Y. Y. NG		SIGNED 簽署		DATE 日期		DRAWN 繪圖		CHECKED 校核	

SWYOK\BRIAN@ap

鐵路發展處
RAILWAYS DEVELOPMENT OFFICE

路政署
HIGHWAYS
DEPARTMENT



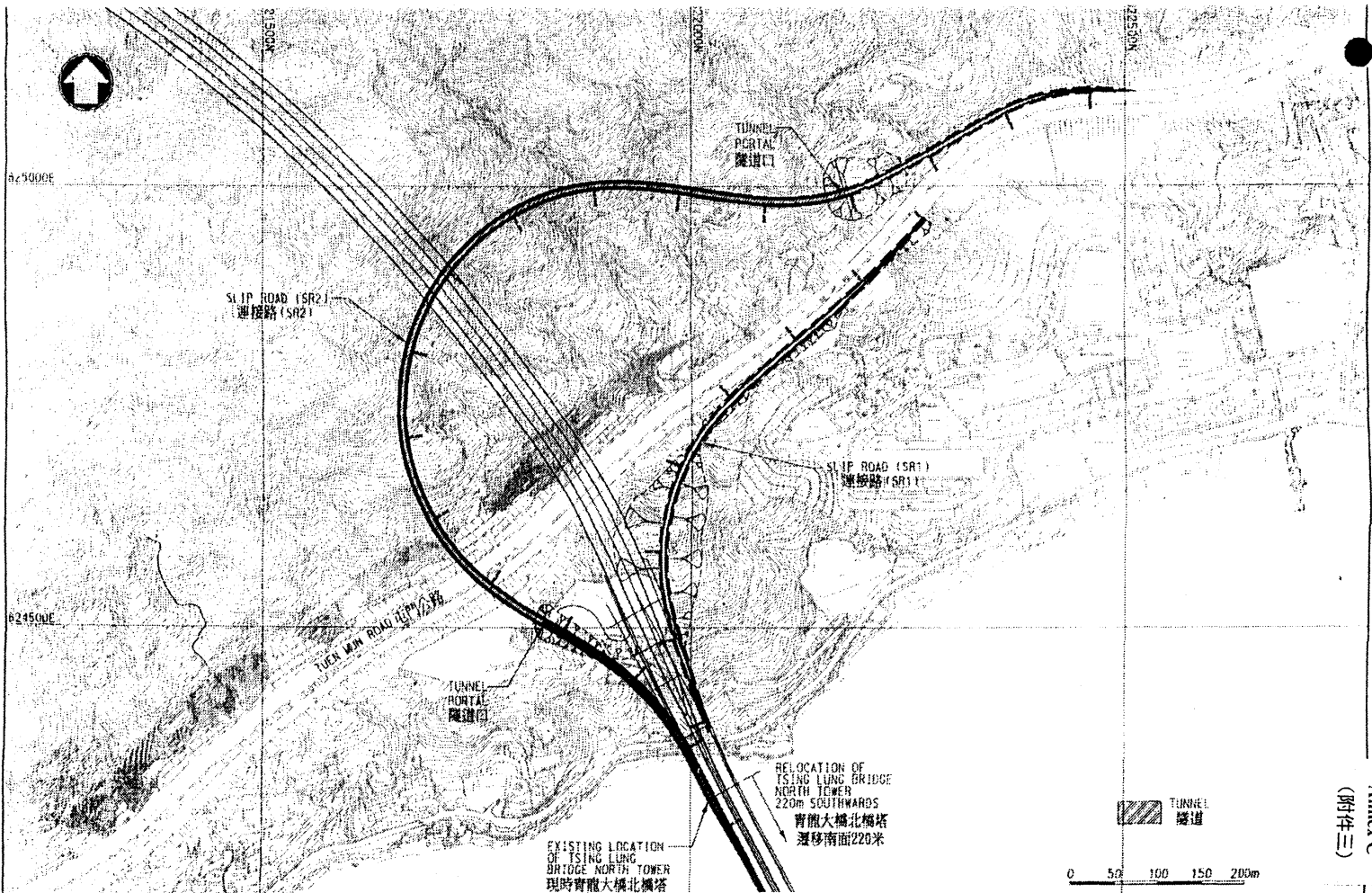
EXISTING LOCATION OF TSING LUNG BRIDGE NORTH TOWER
現時青龍大橋北橋塔

RELOCATION OF TSING LUNG BRIDGE NORTH TOWER
270m SOUTHWARDS
青龍大橋北橋塔
遷移南面270米

Title 8 - MOVEMENT
TSING LUNG TAU INTERCHANGE 八方向青龍頭交匯處
(PROPOSED SCHEME) (建議圖)

Figure No. 524/RPT/TLT02
CAD File: I:\PROJ\FREEL\MPV\TLT02.dgn



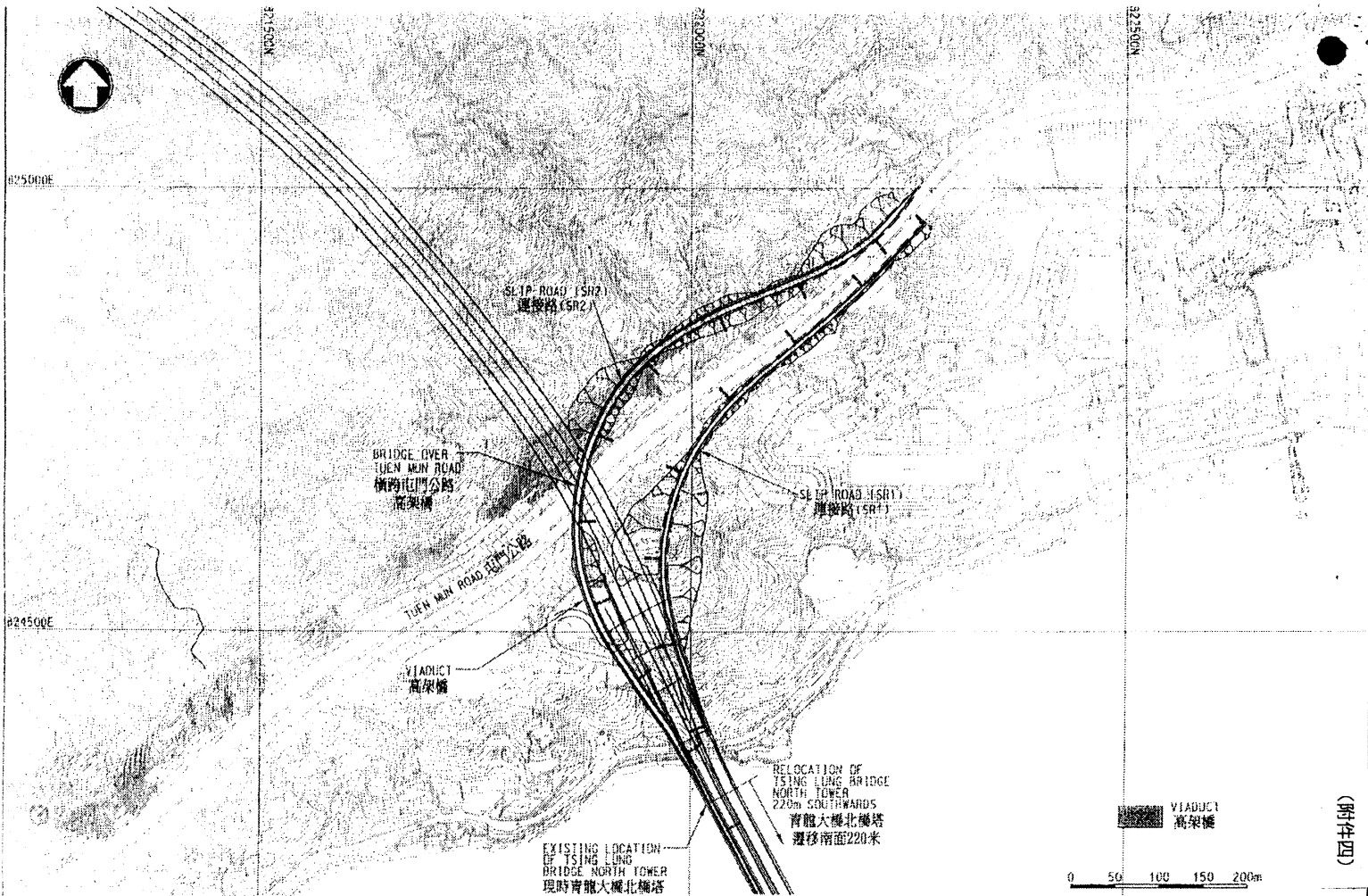


Annex C
(附件三)

Title: 2 - MOVEMENT
TSING LUNG TAU INTERCHANGE (TUNNEL SCHEME) 兩方向青龍頭交匯處
(隧道連接路建議圖)

Figure No. 524/RPT/TLT03
CAD File: \APRO\PREL\RPTELTLT031.dgn



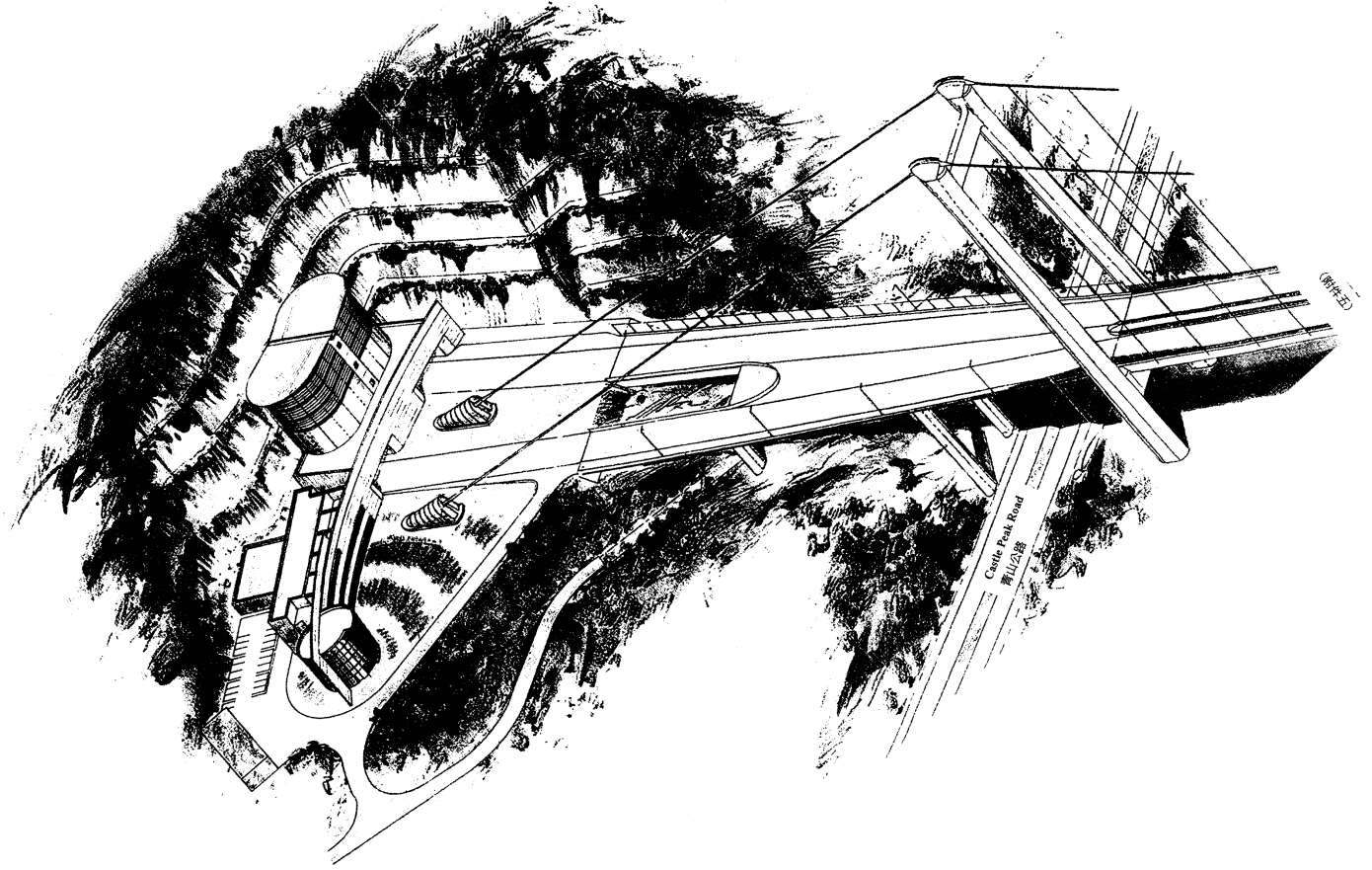


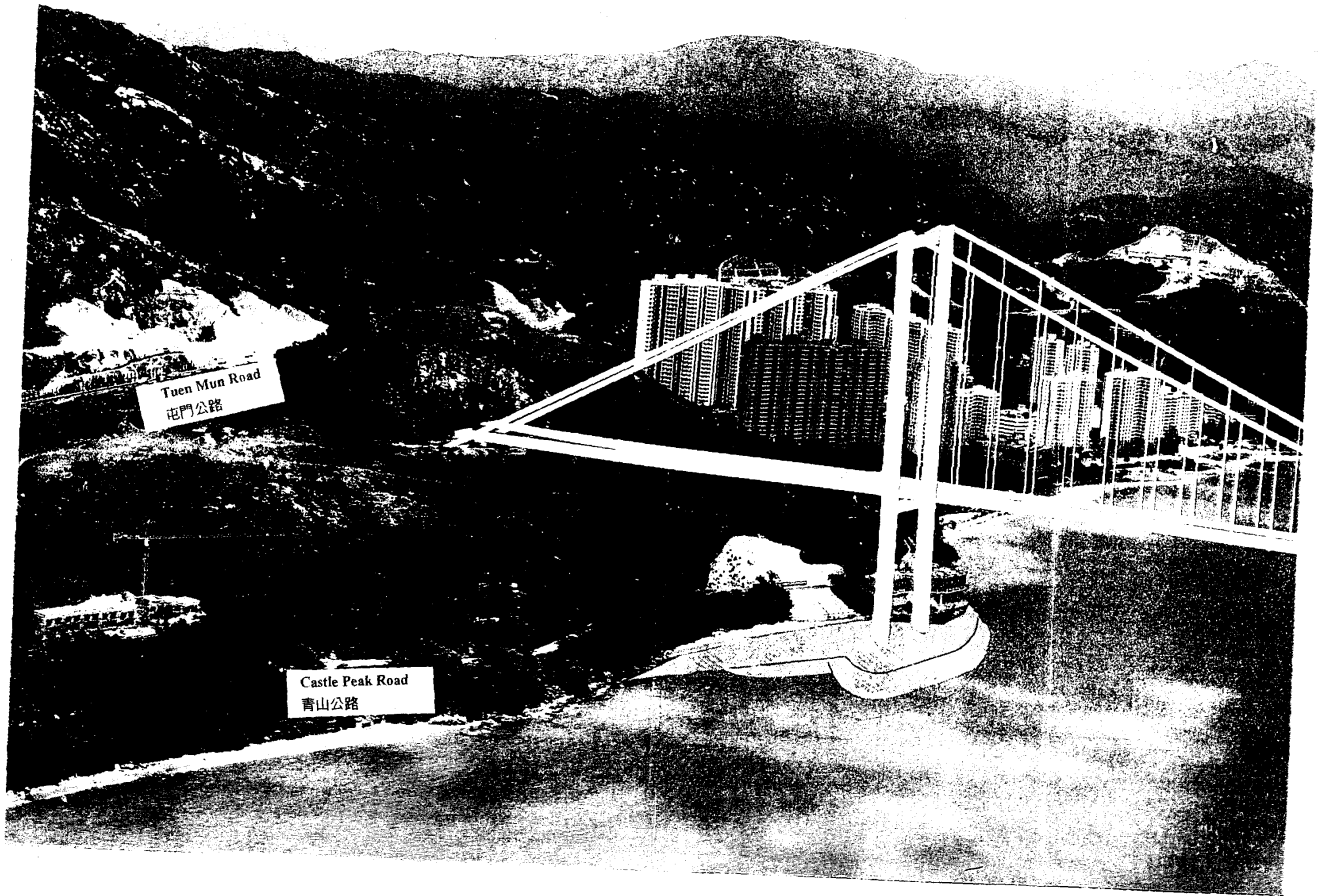
Title: 2 - MOVEMENT
 TSING LUNG TAU INTERCHANGE (VIADUCT SCHEME) 兩方向青龍頭交匯處
 (高架橋連接路建議圖)

Figure No.: 524/RPT/TLT04

CAD File: ENPRD\APR\SRP1\TLT04P1.dgn



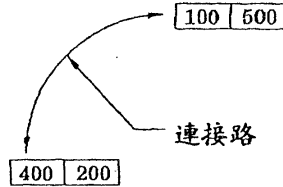




十號幹線 (北)

屯門公路 (西)

屯門公路 (東)




圖例:

上午 下午

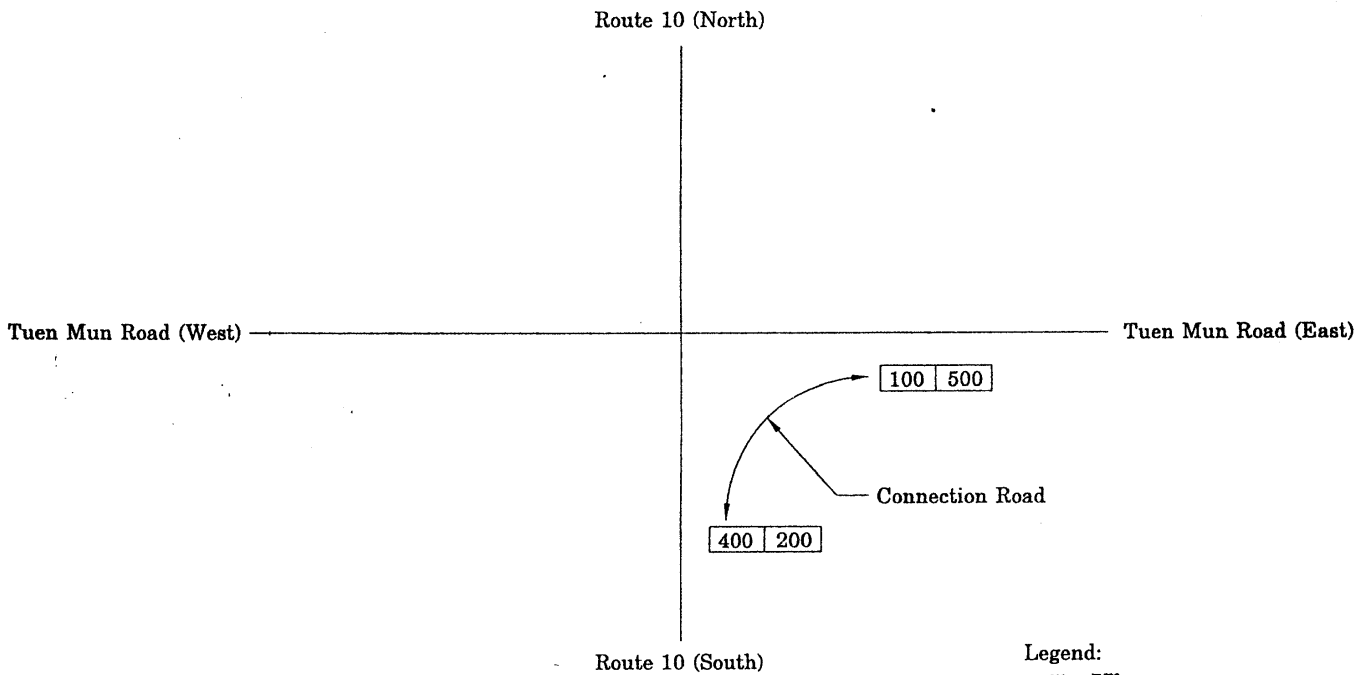
100 | 500

小客車每小時流量單位

十號幹線 (南)

圖則名稱 青龍頭交匯處之2016年繁忙時段交通流量	Drawn by Ivan Yip	Date 8-11-1999	Drawing no. 圖號 Figure 2.6	Scale 比例 N.T.S
	Approved by	Date	 HIGHWAYS DEPARTMENT HONG KONG 路政署	
	Office 辦事處 主要工程督理處 Major Works Project Management Office			

(附件七)



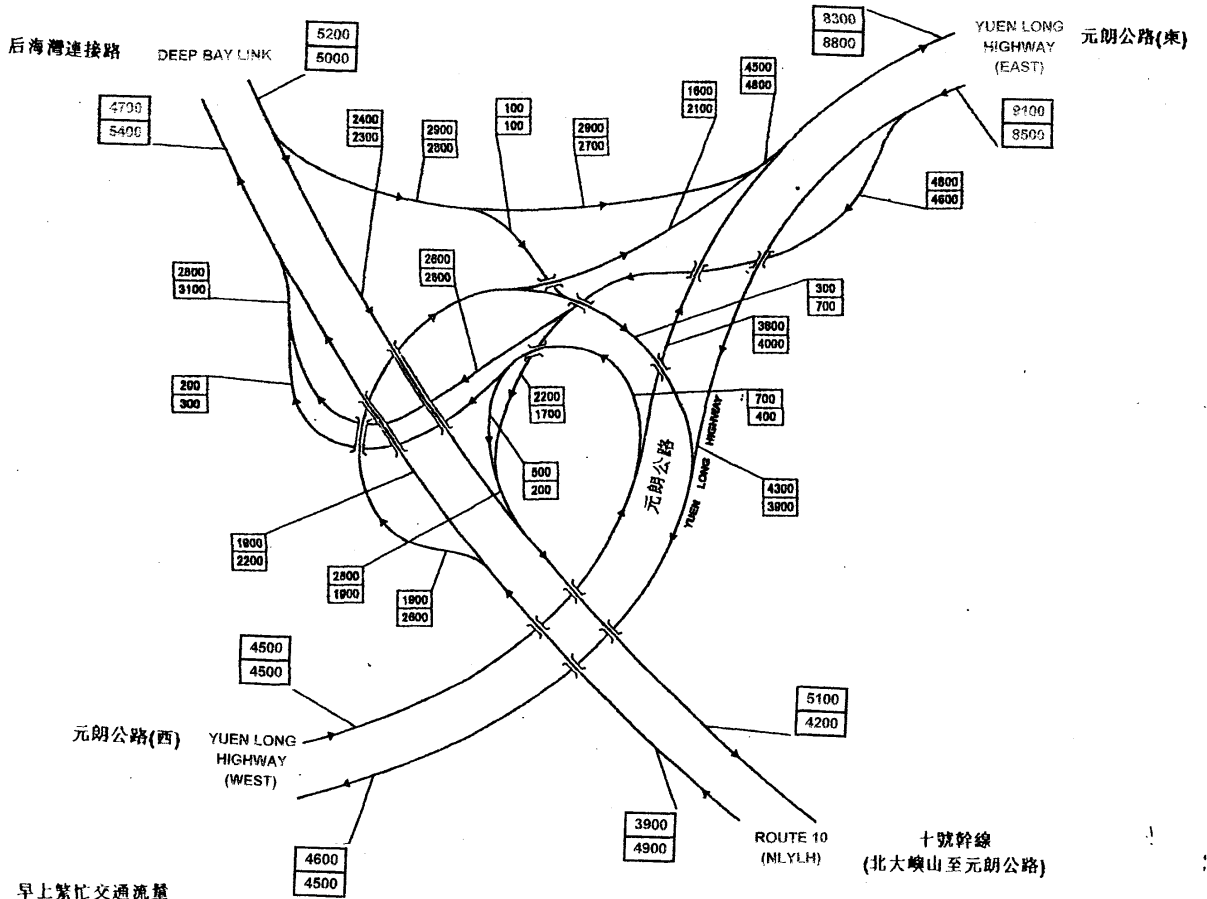
Legend:
 am pm
 100 500
 Flows are in pcus / hour

圖則名稱

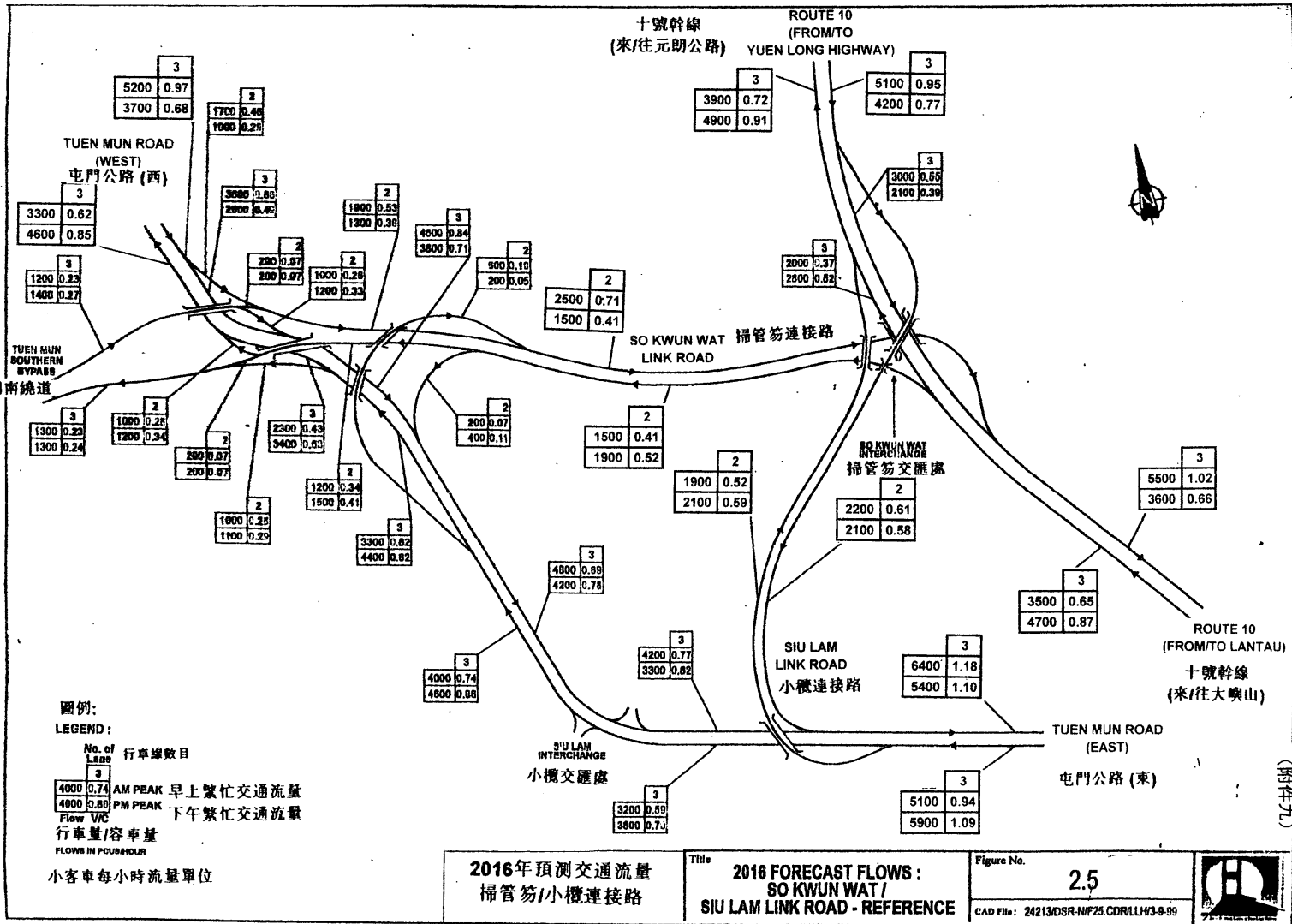
2016 Peak Hour Flows at Tsing Lung Tau Interchange

drawn by Ivan Yip	date 8-11-1999	drawing no. 圖號 Figure 2.6	scale 比例 NTS
approved by	date	HIGHWAYS DEPARTMENT HONG KONG 路政署	
office 辦事處 Major Works Project Management Office			

Annex C



<p>2016年預測交通流量 藍地交匯處</p>	<p>Title 2016 FORECAST FLOWS : LAM TEI INTERCHANGE - REFERENCE</p>	<p>Figure No. 2.4 CAD File : 24213DSR-NF24.CDR/LLH/3-9-99</p>	
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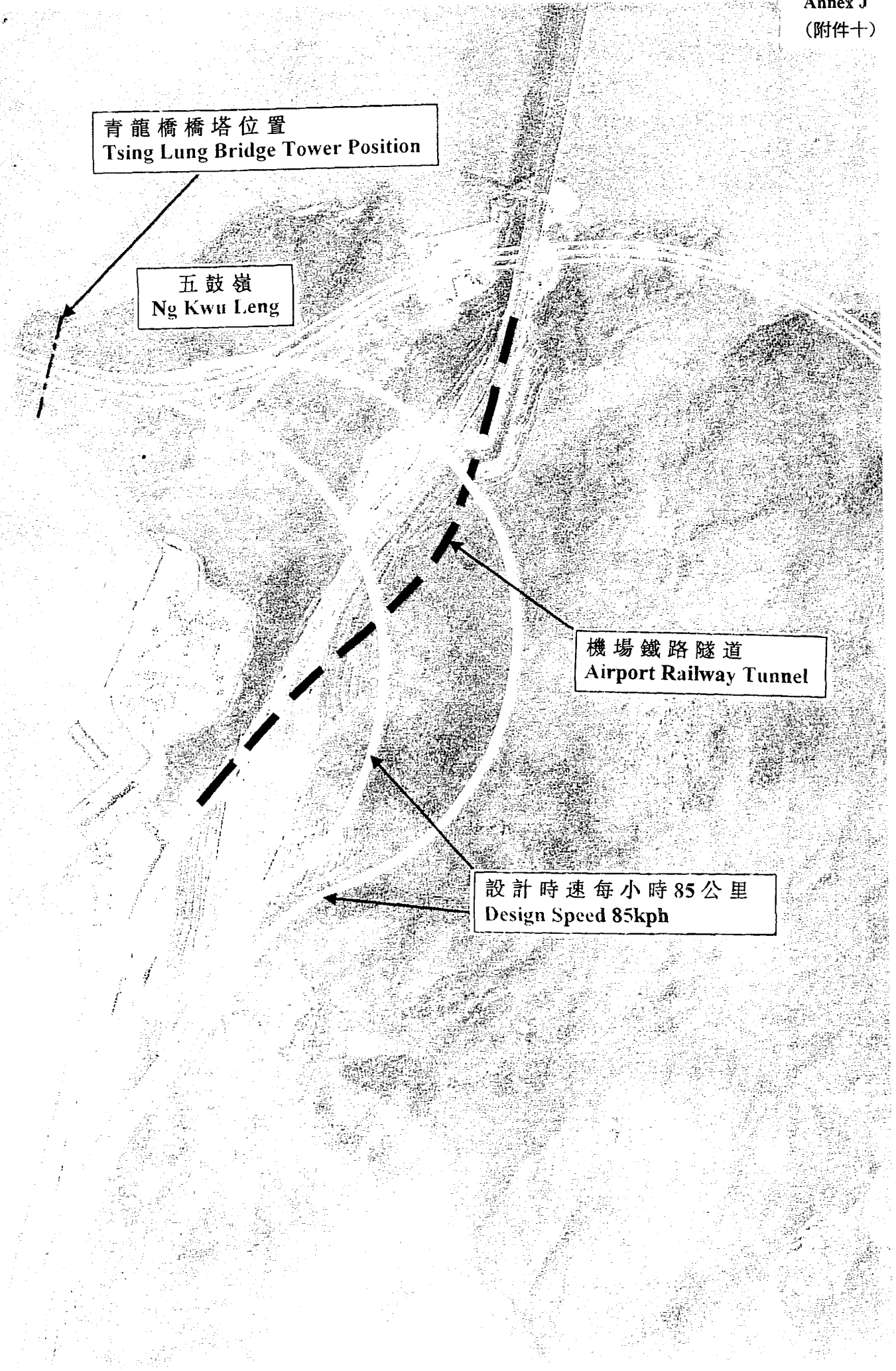
Annex I
 (附件九)

青龍橋橋塔位置
Tsing Lung Bridge Tower Position

五鼓嶺
Ng Kwu Leng

機場鐵路隧道
Airport Railway Tunnel

設計時速每小時85公里
Design Speed 85kph



Act ID 工作編號	Description 內容	Duration 期間	Start 開始	Finish 完成	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1000	Investigation and Preliminary Design 勘察及初步設計	74 w (星期)	31.03.98	08.09.99	■	■	■							
1100	Conduct EIA 進行環境影響評估	77 w (星期)	31.03.98	29.09.99	■	■	■							
1200	EIAO Process 環境影響評估條例程序	16 w (星期)	30.09.99	19.01.00			■							
1300	Roads Ordinance Process 道路(工程、使用及補償)條例程序	61 w (星期)	20.01.00	26.03.01			■	■						
1350	Land Resumption 土地回收	52 w (星期)	27.03.01	28.03.02				■	■					
1400	Upgrade to Cat. A for detailed design 提升工程計劃為甲級使進行詳細設計	0		10.12.99		◆								
1500	Consultants Selection for D&C 選擇工程顧問	28 w (星期)	03.08.99	14.02.00		■								
1600	Conduct detailed design 進行詳細設計	80 w (星期)	15.02.00	31.08.01			■	■						
1650	Upgrade to Cat. A for construction 提升工程計劃為甲級使進行施工	0		23.03.01				◆						
1700	Pre-qualification and Tendering 預判投標資格及投標	64 w (星期)	02.01.01	28.03.02				■						
1800	Construction 施工	272 w (星期)	29.03.02	28.06.07						■	■	■	■	■

Start Date 開工日期	31.03.98
Finish Date 完工日期	28.06.07
Page Number 頁碼	1A

Summary Implementation Programme
 R10 - NLYLH Tsing Lung Bridge
 Highways Department
 施工程序表摘要
 十號幹線 - 北大嶼山至元朗公路 青龍大橋
 路政署

表一 署長，公眾及環境問題諮詢委員會回應時間上的規限

	署長的時間規限	公眾的時間規限	環境問題諮詢委員會的時間規限
申請准許直接申請環境許可證	署長須在接獲申請或根據第(4)款提供的進一步資料的45天內 - 1. 向申請人發出環境影響評估研究概要; 及 2. 將他已發出環境影響評估研究概要一事通知環境問題諮詢委員會; 或 3. 藉書面通知准許申請人直接申請環境許可證。	任何人可在刊登關於工程項目簡介的廣告的14天內，向署長提出關於該工程項目簡介的意見	環境問題諮詢委員會在刊登關於工程項目簡介的廣告的14天內，向署長提出關於該工程項目簡介的意見
環境影響評估報告的檢討	署長須在接獲環境影響評估報告的60天內，決定該項評估符合或不符合環境影響評估研究概要及技術備忘錄的規定		
公眾查閱報告		該報告的廣告刊登後，公眾可在30天內查閱	環境問題諮詢委員會可在接獲該報告文本的60天內，將其對該報告的意見給予署長
環境影響評估報告的批准	公眾查閱期屆滿，或收環境問題諮詢委員會的意見，或收到進一步資料後的30天內，署長須批准環境影響評估		
環境許可證的申請	署長須在30天內將批予或拒絕批予環境許可證一事告知申請人		
新的環境許可證的申請	署長須在30天內將批予或拒絕批予環境許可證一事告知申請人		
更改環境許可證的申請	署長須在30天內將批予或拒絕批予環境許可證一事告知申請人		

Table 1 Time Limits for the Director, the Public and the Advisory Council on the Environment to respond

	Time Limit for the Director	Time Limit for the Public	Time Limit for the Advisory Council on the Environment
Application for approval to apply directly for an environmental permit	45 days of receiving the application or further information	14 days of placing the advertisement	14 days of placing the advertisement
Review of EIA report	60 days of receiving the EIA report		
Public inspection of EIA report		30 days of placing the advertisement	60 days of receiving the EIA report
Approval of EIA report	30 days of the expiry of the public inspection period, or the receipt of comments from the Advisory Council on the Environment, or the receipt of further information		
Application for environmental permit	30 days of receipt of the application (the same time limit as the approval of EIA report if the two applications are submitted at the same time)		
Application for a further environmental permit	30 days of receipt of the application		
Application for variation of an environmental permit	30 days of receipt of the application		