For discussion **CB(1)638/13-14(01)**
on 7 January 2014

Legislative Council Panel on Development

19GB – Liantang/Heung Yuen Wai Boundary Control Point and associated works – site formation and infrastructure works

PURPOSE

This paper briefs Members on our proposal to increase the approved project estimate (APE) of **19GB** ("the Project") by $8,550.0 million from $16,253.2 million to $24,803.2 million in money-of-the-day (MOD) prices.

BACKGROUND

2. The Hong Kong Special Administrative Region (HKSAR) Government and the Shenzhen Municipal Government jointly announced after the second meeting of the Hong Kong-Shenzhen Joint Task Force on Boundary District Development in September 2008 the implementation of the Liantang/Heung Yuen Wai Boundary Control Point (BCP) for operation in 2018[1]. Since then, we have been taking forward the planning, design and construction of various components of the BCP progressively to meet the scheduled completion date. In July 2012, the Finance Committee (FC) of the Legislative Council approved the upgrading of part of **13GB** "Liantang/Heung Yuen Wai Boundary Control Point and associated works" to Category A as **19GB** at an estimated cost of $16,253.2 million in MOD prices. The approved scope of **19GB** comprises -

(a) site formation of about 23 hectares of land for the development of the BCP;

(b) provision of a 1.8 kilometre (km) long perimeter patrol road at the BCP together with the associated gates and fencing;

(c) construction of a pedestrian subway linking the BCP to Lin Ma Hang Road;

(d) construction of an approximately 11 km long dual two-lane

[1] The BCP is featured in the Framework Agreement of Hong Kong/Guangdong Cooperation signed in April 2010 and included as one of the seven major cooperation projects in the National 12th Five-Year Plan.

Connecting Road (CR) (with about 1.0 km of at-grade road, 4.3 km of viaduct and 5.7 km of tunnel) connecting the BCP with Fanling Highway (with four interchanges along the CR at the junctions with Fanling Highway, Sha Tau Kok Road, Ping Yuen Road and Lin Ma Hang Road) and the associated administration building, ventilation adit and buildings, electrical and mechanical (E&M) works and traffic control and surveillance system;

(e) design and construction of the HKSAR portion of four vehicular bridges and one pedestrian bridge[2] crossing Shenzhen River (cross boundary bridges);

(f) associated diversion/modification works at existing local roads and junctions including Lin Ma Hang Road, access road to the resite of Chuk Yuen Village, Tai Wo Services Road East and West, Sha Tau Kok Road, and Wo Keng Shan Road, etc.;

(g) provision of sewage collection, treatment and disposal facilities for the BCP and the resited Chuk Yuen Village;

(h) provision of resite area(s) with supporting infrastructure for reprovisioning of the affected village houses;

(i) reprovisioning of the affected government facilities including Wo Keng Shan Road garden and a public toilet, the Architectural Services Department's depot at Lin Ma Hang Road and footbridges crossing Ng Tung River;

(j) ancillary works such as the associated footpaths, slopes, retaining structures, drainage, sewerage, waterworks and landscaping works; and

(k) associated environmental mitigation measures, and Environmental Monitoring and Audit programme for the works.

——— Plans showing the proposed works are at **Enclosure 1**.

[2] The project scope does not include interior fitting works for the pedestrian bridge (HKSAR portion), which will be carried out separately under the BCP building works of the remaining parts of **13GB**.

PROGRESS OF THE PROJECT

3. The Project is divided into a number of construction contracts[3] for implementation. Tenders for Contract 1, Contract 3 and Contract 2 were invited in July, September and November 2012 respectively and tenders for Contract 4 are scheduled to be invited in 2014-15. The returned tender price of Contract 1, however, significantly exceeded the original estimate. To protect public funds, we cancelled the tender exercise for Contract 1 in December 2012 and re-packaged the works of Contract 1 into two contracts, namely Contract 5 and Contract 6[4], with a view to enlarging the scope of contractors capable of undertaking the works and thus resulting in more competitive tender prices. We also introduced cost-saving measures to reduce risks to the tenderers and facilitate contractor's works on site (e.g. inviting alternative designs so that tenderers can submit a more competitive tender price for better utilization of their resources and expertise; providing a barging point to facilitate delivery of the precast bridge deck segments to reduce handling and transportation cost; providing more working areas for the contractors' use; and reviewing the designs by taking into account feedback from the tenderers) in these two contracts as well as Contract 2 and Contract 3. Tenders for Contract 5 and Contract 6 were invited in January and July 2013 respectively.

4. The works under Contract 2, Contract 3 and Contract 5 have already commenced in 2013. At present, tender assessment for Contract 6 is in progress.

REVISION OF PROJECT ESTIMATE

5. Despite our efforts of arranging re-tender of Contract 1 and incorporating appropriate cost saving measures in the contracts as mentioned above, the overall prices of the returned tenders were still higher than the original estimates. According to our analysis, the high tender prices are due to the recent surge in construction prices in heavy civil engineering works and E&M works, the poor ground condition for tunnelling works and tenderers' perception on the higher risks associated with construction constraints. After reviewing the financial position of **19GB** and the tendering results of the contracts, we consider it necessary to increase the APE of **19GB** by $8,550.0 million from $16,253.2 million to $24,803.2 million in MOD prices to cover the additional costs of the Project and the associated increase in provision for price adjustment and contingencies.

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[3] The original Contract 1 mainly included the site formation works for the BCP and construction of a section of CR from Sha Tau Kok Road to the BCP. The scopes of Contracts 2 and 3 comprise mainly the construction of a section of CR from Fanling Highway to Sha Tau Kok Road including Lung Shan Tunnel and construction of Fanling Highway Interchange respectively. The scope of Contract 4 covers the traffic control and surveillance system.

[4] Contract 5 mainly includes the site formation works for the BCP and the scope of Contract 6 covers the construction of the section of CR from Sha Tau Kok Road to the BCP.

Recent surge in construction prices

6. When we applied for the funding for **19GB** in 2012, our cost estimate was based on the market situation and data available up to early 2012 by making reference to the cost information of similar infrastructure projects. However, since then, there has been a surge in the construction prices, in particular for the sectors of heavy civil engineering works (such as viaduct and tunnelling works) and E&M works, leading to the higher-than-expected increase in tender prices of the Project.

Heavy civil engineering works

7. The heavy civil engineering works experienced a surge in construction prices during 2012-13[5]. The substantial surge in tender prices for heavy civil engineering works was attributable to the factors detailed in paragraphs 8 to 10 below.

Construction workers

8. According to the statistics released by the Census and Statistics Department (C&SD), there has been a higher-than-expected increase in the wages of construction workers since mid-2012. The relevant C&SD's wage information of key trades of workers involving in viaduct works (including concretor, bar bender and fixer, rigger/metal formwork erector, carpenter (formwork) and construction plant mechanic) is in **Enclosure 2**. The average daily wages of these trades of workers have substantially increased (ranging from about 18% to 46%) within 12 months from August 2012, which is much more profound than the corresponding increases during the periods in 2010-12. While no specific C&SD's statistics for tunnel workers are available, given the more demanding working environment inside tunnels and the recent abundant job opportunities for tunnel workers, the magnitude of increase in wages of tunnel workers was anticipated to be at least comparable, if not higher, than that of their counterparts working in viaduct field. Thus tenderers, having taken the most updated trend for labour cost into account, have made prudent projection and reflected the wage factor in their tender prices.

Construction plant

9. The market prices of construction plant have also substantially increased since mid-2012. Within a year, the hiring rates of crawler cranes for

[5] For instance, in two recent mega infrastructure projects, namely Hong Kong – Zhuhai – Macao Bridge Hong Kong Link Road (**844TH**) and Tuen Mun – Chek Lap Kok Link – construction works (**825TH**), which were tendered in early 2012 and early 2013 respectively, the average unit cost of the land-based viaduct in **825TH** is some 100% higher than that of **844TH**.

heavy civil engineering works (for construction of viaducts) and plant for bored piling increased by about 30% and 40% respectively. Currently there are a number of major heavy civil engineering works projects involving viaduct and tunnelling works under construction in Hong Kong and adjacent regions. As a result, there is a strong demand for similar construction plant needed for the Project. Tenderers envisaged that the supply of construction plant in the market might become even tighter and therefore have allowed additional costs in their tender prices accordingly.

Specialist sub-contractors

10. The installation of precast bridge segments requires prestressing operation which can only be carried out by specialist sub-contractors. Similarly, tunnel construction in the Project requires specialist sub-contractors to carry out both drill-and-blast tunnelling activities and to handle the sophisticated tunnel boring machine (TBM). The supply of prestressing and tunnel specialist sub-contractors is tight in the current market where many viaduct and tunnelling works are being carried out in Hong Kong and adjacent regions, resulting in the higher-than-expected tender prices for precast bridge deck works and tunnelling works.

Electrical and mechanical works

11. The tunnel works under this Project involve extensive E&M works including tunnel ventilation, power supply, fire services and lighting systems. The Building Services Tender Price Index compiled by the Architectural Services Department is a reference for the general trend of tender prices on Government building services including E&M works. The indices of the first quarter of 2012 and the second quarter of 2013 stand at 149 and 230 respectively, representing an increase of some 54% in the tender prices for building service works during the period concerned. Besides, as the majority of the E&M works would only be carried out at the late stage of the Project (i.e. 2017/18), tenderers might have put additional risk premium to cater for possible further market surge for the E&M works in their tenders.

12. Based on the factors mentioned in paragraphs 6 to 11, we estimate that the recent surge in construction prices has contributed an increase of about $3,974.7 million, comprising $3,321.2 million for the heavy civil engineering works and $653.5 million for the E&M works. The increase in the heavy civil engineering works represents 20.4% of the original APE of **19GB** or 38.8% of the proposed total increase, whereas the increase in the E&M works represents 4.0% of the original APE of **19GB** or 7.6% of the proposed total increase.

Poor ground condition for tunnelling works

13. The works under **19GB** include the construction of the 4.8 km long Lung Shan Tunnel between the proposed interchanges at Fanling Highway and Sha Tau Kok Road. Upon completion, it will be the longest land road tunnel ever built in Hong Kong. When further site investigation was conducted in late 2011, part of its progress was affected by access problems and adverse weather. The project estimate for **19GB** was prepared in early 2012 with the design of the tunnel being based on the ground information and site investigation results available at that time. Hence, part of the results of the further site investigation could not be timely incorporated in the tunnel design and the additional cost in tunnelling works due to poor ground condition was not reflected in the cost estimate prepared for the funding application of **19GB** in early 2012.

14. The results of the further site investigation revealed that the ground conditions were poorer than we envisaged. A number of faults were found to be straddling a stretch of tunnel of some 1.4 km long. This calls for more extensive temporary works such as grouting, shotcreting, temporary supporting structures and strengthening works of the permanent lining along this tunnel section. For example, additional 20% of rock bolts and 15% of rock anchors have to be installed to withstand the poor ground conditions in the fault zones. Moreover, the extent of mixed ground, which is more difficult for tunnel construction, in the section of tunnel to be excavated by TBM was found to be longer by about 120% from some 0.3 km to some 0.7 km. This would lead to a higher construction cost due to a slower rate of construction, higher construction risk, more wear and tear problem associated with the operation of TBM and the need of more temporary grouting work when working in the more difficult ground condition.

15. In summary, the poor ground condition encountered for tunnel construction has caused an additional cost of about $698.6 million, which represents 4.3% of the original APE of **19GB** or 8.2% of the proposed total increase.

Tenderers' perception on higher risks associated with construction constraints

16. Construction of the 4.8 km long Lung Shan Tunnel is very complex and technically demanding in nature, and is highly constrained by limited access. Moreover, its construction programme is already very tight in order to meet the handing over dates of interfacing contracts and the target commissioning date of the BCP in 2018. As mentioned in paragraphs 13 and 14 above, as a result of the poor ground condition along the tunnel alignment revealed from the further site investigation, the tunnel construction would become more difficult than originally

anticipated. The contractor would need to plan the tunnelling very prudently and to carry out more site investigation works to better appraise the ground condition before tunnel construction works start. All these measures would put pressure to the programme. To cater for the tight programme, tenderers may have to increase labour resources and plant as well as to arrange for overtime work. This would then lead to increase in tender prices. Moreover, tender analysis revealed that tenderers placed a high risk premium than expected to cater for the tight programme, as they may have to face heavy liquidated damages and regulatory actions if they cannot complete the works on time.

17. Apart from the programme issue, there are some other construction constraints that may result in higher tender prices of the Project. For instance, the restrictive construction duration for viaduct works over the East Rail Line, the constraints imposed to the temporary traffic arrangements at Fanling Highway, the remoteness of the site of the Project, the loss of attraction to labourers due to abundant job opportunities in the market etc. may lead to additional risk premiums to be placed by tenderers in their returned tenders.

18. Tenderers' higher-than-expected risk assessment to cater for the tight works programme and other construction constraints have led to an additional cost of about $387.3 million, which represents 2.4% of the original APE of **19GB** or 4.5% of the proposed total increase.

Increase in provision for price adjustment

19. According to the current Government practice, generally monthly payments to contractors for construction contracts are adjusted to cover market fluctuation in labour and material costs, which are known as contract price fluctuation payment. The price adjustment is assessed based on the price adjustment factors derived from the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output together with the cash flow of the project to arrive at the MOD prices of a project.

20. When the project estimate of **19GB** was prepared in 2012, based on the Government's price adjustment factors available at that time and the original cash flow pattern, $3,821.1 million was allowed for as the provision for price adjustment. As there is a difference between the original and current cash flow of the Project to take account of the actual tender schedule of various works contracts, works procedures adopted by the contractors, as well as the current works progress of the Project as of now, such change in cash flow would increase the provision for price adjustment. Based on the latest project estimate, updated

cashflow and the latest price adjustment factors[6] adopted in October 2013, the provision for price adjustment has to be increased by $2,983.1 million from $3,821.1 million to $6,804.2 million, which represents 18.4% of the original APE of **19GB** or 34.9% of the proposed total increase. The latest cash flow of the project and the detailed assessment of the latest provision for price adjustment is at **Enclosure 3**.

Increase in contingencies

21. When we applied for the funding for **19GB** in 2012, an amount of contingencies at $1,130.0 million has been allowed for in the APE. With the increase in construction costs mentioned in paragraphs 12, 15 and 18 above, we consider it necessary to reserve $1,636.3 million (about 10% of the revised estimated value of works) as contingencies, similar to other public works projects, to cater for unforeseen situations arising during the implementation of the Project.

Summary of Financial Position

22. In sum, the proposed increase of $8,550.0 million is broken down as follows –

	Factors	**Proposed increased amount ($ million)**	**% of the total increase**
	Increase due to –		
(a)	Recent surge in construction prices	3,974.7	46.5%
(b)	Poor ground condition for tunnelling works	698.6	8.2%
(c)	Tenderers' perception on higher risks associated with construction constraints	387.3	4.5%
(d)	Increase in provision for price adjustment	2,983.1	34.9%

[6] The price adjustment factors for **19GB** in PWSC(2012-13)26 are based on the projected movement of prices for public sector building and construction output at that time, which are assumed to increase by 5.5% per annum from 2012 onwards. The updated price adjustment factors are based on the latest movement of prices for public sector building and construction output, which are assumed to increase by 6.0% per annum from 2013 to 2017 and 5.0% per annum from 2018 onwards.

(e)	Increase in contingencies	506.3	5.9%
(f)	Total increase (f = a + b + c + d + e)	8,550.0	100.0%

A comparison of the cost breakdown of the APE and the latest project estimate in MOD prices is at **Enclosure 4**.

FINANCIAL IMPLICATIONS

23. Subject to FC's approval, we will phase the expenditure as follows –

Year	$ million (in MOD prices)
Up to 31 March 2013	4.6
2013 – 2014	584.4
2014 – 2015	2,344.1
2015 – 2016	4,356.0
2016 – 2017	4,986.2
2017 – 2018	4,835.7
2018 – 2019	3,646.0
2019 – 2020	2,235.2
2020 – 2021	1,811.0
Total	24,803.2

24. The proposed increase in the APE will not give rise to any additional recurrent expenditure.

PUBLIC CONSULTATION

25. As the proposed increase in the APE does not involve any change in project scope, we consider further public consultation on the proposed cost

increase unnecessary.

WAY FORWARD

26. Members are invited to comment on our proposal for increasing the APE of **19GB** by $8,550.0 million from $16,253.2 million to $24,803.2 million in MOD prices. We plan to submit our proposal for consideration by the Public Works Subcommittee in January 2014 and seek FC's approval in February 2014.

Development Bureau
December 2013

圖例 LEGEND:

擬建連接路（地面行車道部分）
PROPOSED CONNECTING ROAD
(AT-GRADE SECTION)

擬建連接路（高架行車道部分）
PROPOSED CONNECTING ROAD
(VIADUCT SECTION)

擬建連接路（隧道部分）
PROPOSED CONNECTING ROAD
(TUNNEL SECTION)

838800 N
842800 N
846800 N
832800 E
836800 E

上水
SHEUNG SHUI
FANLING HIGHWAY
粉嶺公路
粉嶺
FANLING
和合石
WO HOP SHEK
流水響
LAU SHUI HEUNG
八仙嶺郊野公園
PAT SIN LENG COUNTRY PARK
SHA TAU KOK ROAD
沙頭角公路
坪輋
PING CHE
坪輋路 PING CHE ROAD
蓮麻坑路
LIN MA HANG ROAD
香園圍
HEUNG YUEN WAI
打鼓嶺
TA KWU LING

香港
HONG KONG
深圳
SHENZHEN
香港特別行政區邊界
BOUNDARY OF HKSAR
深圳市
SHENZHEN SHI
邊界禁區界線
BOUNDARY OF FRONTIER CLOSED AREA

BCP-112
BCP-110
BCP-111

擬建龍山隧道
PROPOSED LUNG SHAN TUNNEL

擬建粉嶺公路交匯處
PROPOSED FANLING HIGHWAY INTERCHANGE

擬建污水處理設施
PROPOSED SEWAGE TREATMENT FACILITIES

擬建口岸工地平整及邊界巡邏道路
PROPOSED SITE FORMATION WORKS AND PERIMETER PATROL ROAD AT BOUNDARY CONTROL POINT

竹園村
CHUK YUEN VILLAGE

擬建蓮麻坑路交匯處
PROPOSED LIN MA HANG ROAD INTERCHANGE

擬建坪洋交匯處
PROPOSED PING YEUNG INTERCHANGE

竹園村重置區
RESITE FOR CHUK YUEN VILLAGE

擬建長山隧道
PROPOSED CHEUNG SHAN TUNNEL

擬建沙頭角公路交匯處
PROPOSED SHA TAU KOK ROAD INTERCHANGE

drawing title 圖則名稱

蓮塘/香園圍口岸與相關工程 - 擬建口岸及連接路之平面圖

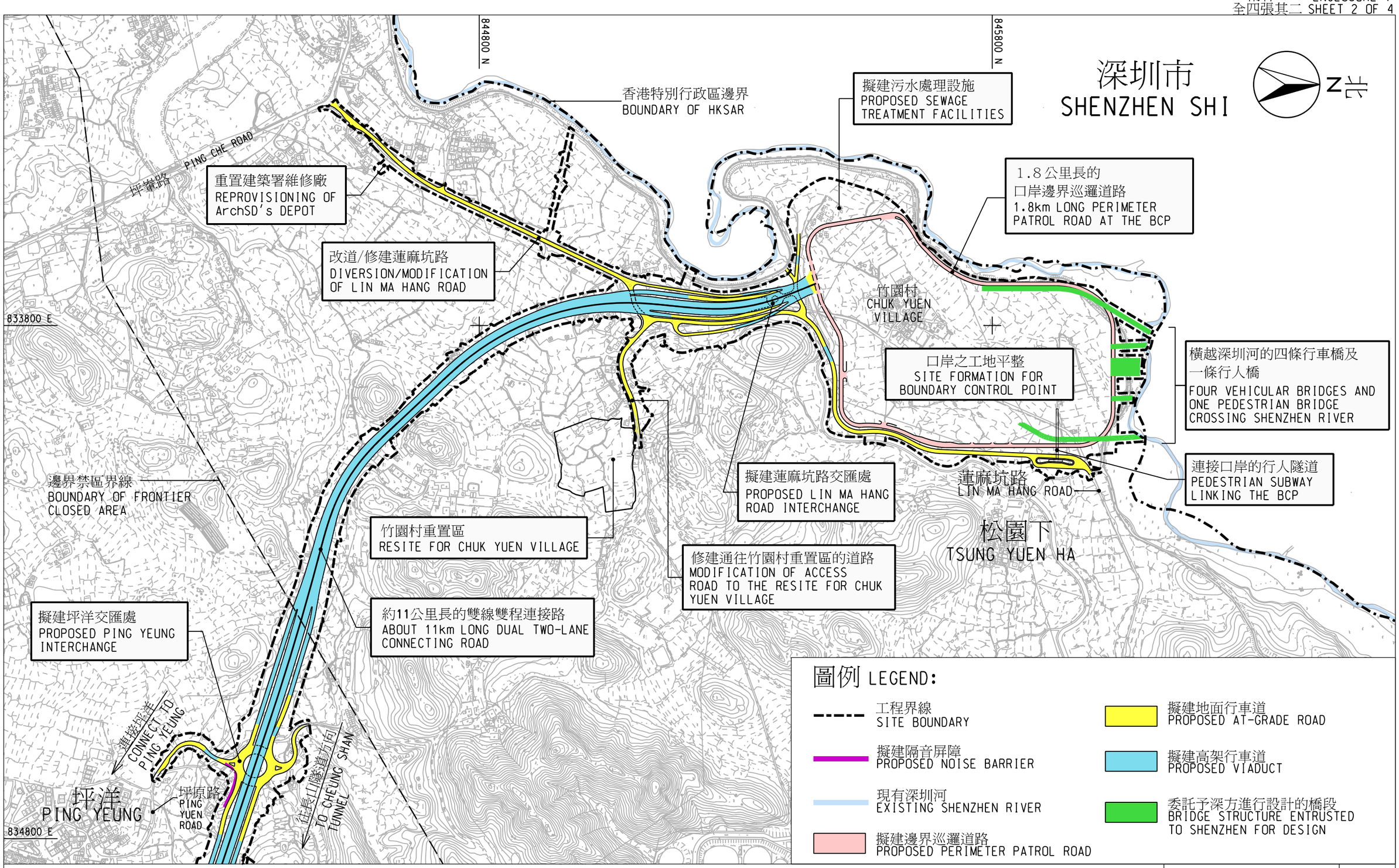
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS - LAYOUT OF THE PROPOSED BOUNDARY CONTROL POINT AND CONNECTING ROAD

drawing no. 圖則編號
BCP - 109

scale 比例
1 : 30 000

CEDD
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
HONG KONG

A3 420 X 297



drawing title 圖則名稱

擬建蓮塘/香園圍口岸工地平整及相關連接路
PROPOSED SITE FORMATION FOR LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED CONNECTING ROAD

drawing no. 圖則編號 BCP - 110

scale 比例 1 : 7 000

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HONG KONG

A3 420X 297

圖例LEGEND:

- 工程界線 SITE BOUNDARY
- 擬建隔音屏障 PROPOSED NOISE BARRIER
- 擬建地面行車道 PROPOSED AT-GRADE ROAD
- 擬建高架行車道 PROPOSED VIADUCT
- 擬建通風大樓 PROPOSED VENTILATION BUILDING
- 擬建行政大樓 PROPOSED ADMINISTRATION BUILDING

842200 N
842400 N
842600 N
842800 N
843000 N
836600 E
836800 E

大塘湖
TAI TONG WU

SHA TAU KOK ROAD - WO HANG

往長山隧道方向
TO CHEUNG SHAN TUNNEL

重置禾徑山路公園及公廁
REPROVISIONING OF THE WO KENG SHAN ROAD GARDEN AND PUBLIC TOILET

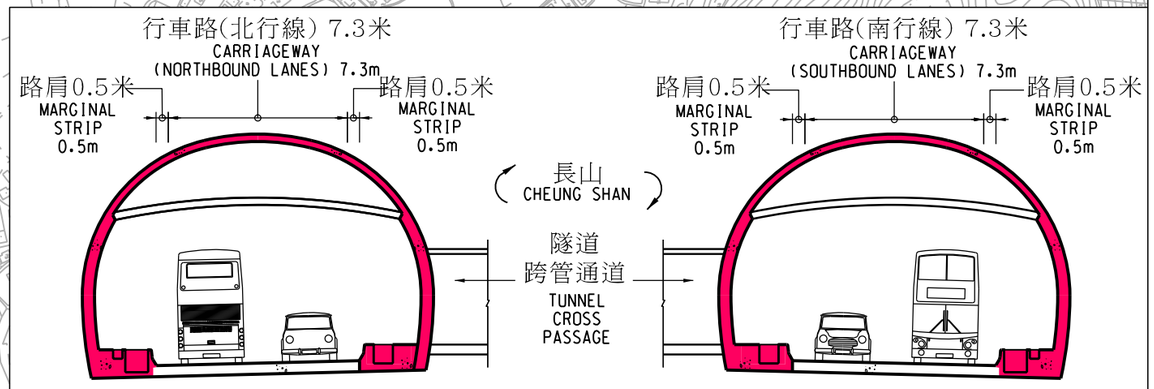
禾徑山路 WO KENG SHAN ROAD

往龍山隧道方向
TO LUNG SHAN TUNNEL

重置行人路橫跨梧桐河
REPROVISIONING OF FOOTWAY CROSSING NG TUNG RIVER

沙頭角公路 - 禾坑段

萊洞
LOI TUNG



切面圖 1 - 1
SECTION 1 - 1
(不按比例 NOT TO SCALE)

(隧道路段典型切面圖)
(TUNNEL TYPICAL SECTION)

drawing title 圖則名稱

擬建沙頭角公路交匯處
PROPOSED SHA TAU KOK ROAD INTERCHANGE

drawing no. 圖則編號: BCP - 111

scale 比例: 1 : 3 500

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HONG KONG

A3 420X 297

南華莆
NAM WA PO

837600 N

838000 N

833800 E

修建大窩西支路
MODIFICATION OF
TAI WO SERVICE ROAD WEST

修建大窩東支路
MODIFICATION OF
TAI WO SERVICE
ROAD EAST

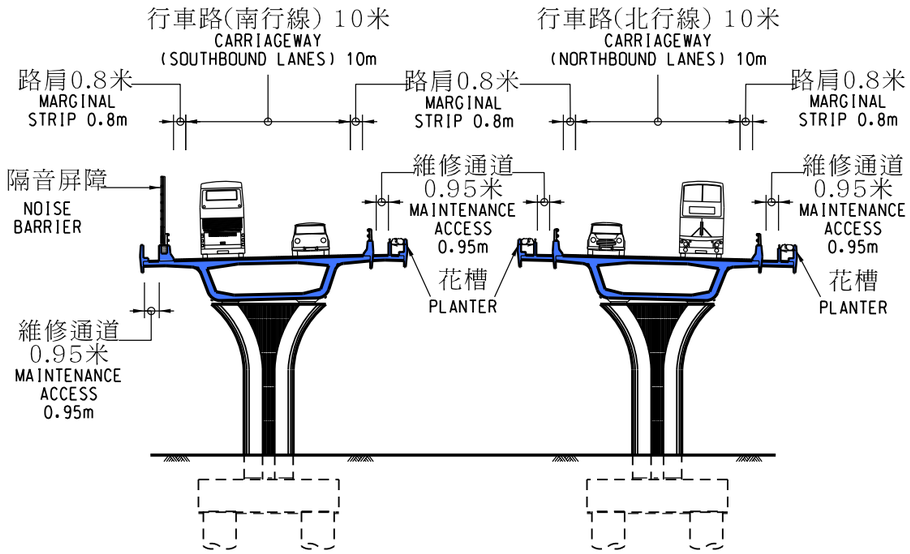
往粉嶺方向
TO FANLING

粉嶺公路
FANLING HIGHWAY

往大埔方向
TO TAI PO

往龍山隧道方向
TO LUNG SHAN TUNNEL

九龍坑新圍
KAU LUNG HANG
SAN WAI



切面圖 2 - 2
SECTION 2 - 2
（不按比例 NOT TO SCALE ）

（高架路段典型切面圖）
(VIADUCT TYPICAL SECTION)

圖例LEGEND:

- 工程界線 SITE BOUNDARY
- 擬建隔音屏障 PROPOSED NOISE BARRIER
- 擬建地面行車道 PROPOSED AT-GRADE ROAD
- 擬建高架行車道 PROPOSED VIADUCT
- 擬建通風大樓 PROPOSED VENTILATION BUILDING

drawing title 圖則名稱

擬建粉嶺公路交匯處
PROPOSED FANLING HIGHWAY INTERCHANGE

drawing no. 圖則編號
BCP - 112

scale 比例
1 : 3 000

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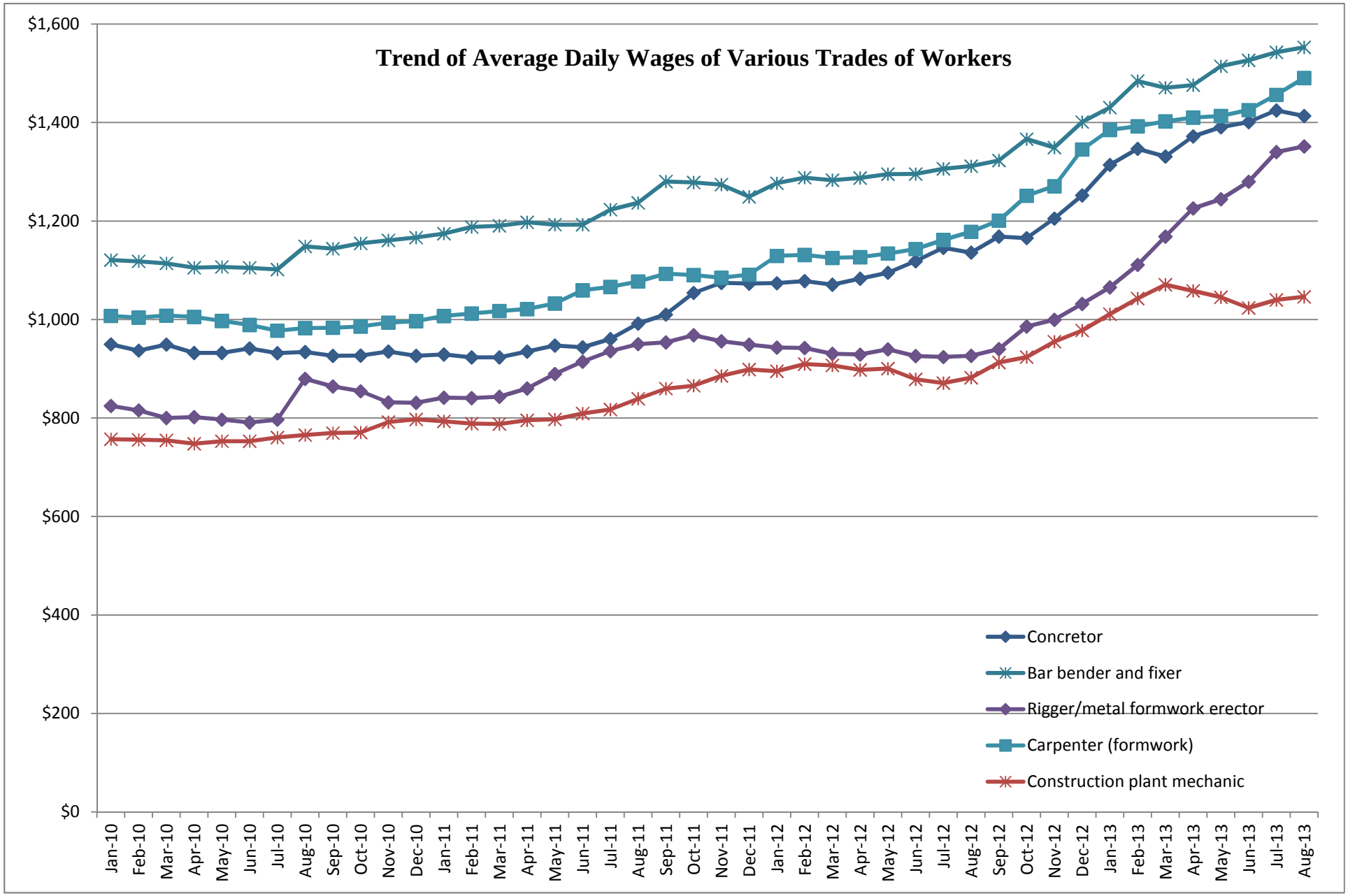
DEPARTMENT
HONG KONG

A3 420X 297



Enclosure 2
(Sheet 1 of 2)

Average Daily Wages of Various Trades of Workers

	Trade	8/2010 ($/day)	8/2011 ($/day) [%increase per year]	8/2012 ($/day) [%increase per year]	8/2013 ($/day) [%increase per year]
(a)	Concretor	934.0	991.9 [6.2%]	1,136.0 [14.5%]	1,413.5 [24.4%]
(b)	Bar bender and fixer	1,148.6	1,237.0 [7.7%]	1,311.5 [6.0%]	1,552.9 [18.4%]
(c)	Rigger/metal formwork erector	879.7	950.2 [8.0%]	926.4 [-2.5%]	1,351.6 [45.9%]
(d)	Carpenter (formwork)	982.7	1,077.4 [9.6%]	1,178.3 [9.4%]	1,490.7 [26.5%]
(e)	Construction plant mechanic	765.4	839.2 [9.6%]	881.9 [5.1%]	1,046.2 [18.6%]

Enclosure 3

19GB – Liantang/Heung Yuen Wai Boundary Control Point and associated works – site formation and infrastructure works

Table 1 – Cash flow and provision for price adjustment in PWSC(2012-13)26

Year	Original project estimate ($ million, in September 2011 prices) X	Original price adjustment factors (March 2012)# Y	Approved project estimate ($ million, in MOD prices) Z	Provision for price adjustment ($ million) A = Z – X
2012-2013	11.0	1.05325	11.6	0.6
2013-2014	525.9	1.11118	584.4	58.5
2014-2015	2,410.0	1.17229	2,825.2	415.2
2015-2016	2,578.0	1.23677	3,188.4	610.4
2016-2017	2,450.0	1.30479	3,196.7	746.7
2017-2018	1,973.0	1.37656	2,716.0	743.0
2018-2019	1,400.0	1.45227	2,033.2	633.2
2019-2020	650.0	1.53214	995.9	345.9
2020-2021	434.2	1.61641	701.8	267.6
Total	**12,432.1**		**16,253.2**	**3,821.1**

Table 2 – Latest cash flow and provision for price adjustment due to latest project estimate (PE) and latest adjustment factors

Year	Latest PE ($ million, in September 2011 prices) a	Latest PE ($ million, in September 2013 prices) ^^ b	Latest price adjustment factors (October 2013)## c	Latest PE ($ million, in MOD prices) d	Latest provision for price adjustment ($ million) e	Net increase in provision for price adjustment ($ million) f
Up to March 2013	4.1^	4.6^	1.00000	4.6^		
2013-2014	518.8	584.4	1.00000	584.4		
2014-2015	1,963.0	2,211.4	1.06000	2,344.1		
2015-2016	3,441.4	3,876.8	1.12360	4,356.0	**e = d – a**	**f = e - A**
2016-2017	3,716.3	4,186.5	1.19102	4,986.2		
2017-2018	3,400.1	3,830.3	1.26248	4,835.7		
2018-2019	2,435.7	2,743.9	1.32876	3,646.0		
2019-2020	1,422.2	1,602.1	1.39519	2,235.2		
2020-2021	1,097.4	1,236.2	1.46495	1,811.0		
Total	**17,999.0**	**20,276.2**		**24,803.2**	**6,804.2**	**2,983.1**

Notes:

Price adjustment factors adopted in March 2012 were based on the projected movement of prices for public sector building and construction output at that time, which were assumed to increase by 5.5% per annum from 2012 onwards.

Price adjustment factors adopted in October 2013 are based on the latest movement of prices for public sector building and construction output, which are assumed to increase by 6.0% per annum from 2013 to 2017 and 5.0% per annum from 2018 onwards.

^ $4.0 million was the actual expenditure excluding price adjustment up to March 2013; whereas $4.6 million was the actual expenditure including price adjustment.

^^ The latest project estimate (in September 2011 prices) is multiplied by 1.12652 for conversion to September 2013 prices. The figure of 1.12652 represents the changes in price movement for public sector building and construction output between September 2011 and September 2013.

Enclosure 4

19GB – Liantang/Heung Yuen Wai Boundary Control Point and associated works – site formation and infrastructure works

Comparison between Approved Project Estimate (APE) and the Latest Project Estimate

		(A) Approved Project Estimate ($ million)		(B) Latest Project Estimate ($ million)		(B) – (A) Difference ($ million)
(a)	Site formation and construction of perimeter patrol road with associated fencing and pedestrian subway linking the BCP to Lin Ma Hang Road		217.9		245.6	27.7
(b)	Dual two-lane connecting road		9,282.5		14,203.3	4,920.8
	(i) about 1 km at-grade road	756.5		832.1		75.6
	(ii) about 4.3km viaduct	2,828.2		3,886.6		1,058.4
	(iii) about 5.7km tunnel	3,935.1		6,345.9		2,410.8
	(iv) at-grade roadworks of four interchanges	100.3		132.6		32.3
	(v) administration buildings for tunnel	332.5		430.2		97.7
	(vi) ventilation adit and buildings for tunnel	622.5		1,177.5		555.0
	(vii) traffic control and surveillance system	226.6		351.2		124.6
	(viii) electrical and mechanical (E&M) works	480.8		1,047.2		566.4
(c)	Diversion/modifications at existing local roads		110.6		131.1	20.5
(d)	Sewage collection, treatment and disposal		208.5		112.8	(95.7)
(e)	Reprovisioning of affected government facilities		48.6		66.7	18.1
(f)	Design and construction of cross boundary bridges (HKSAR portion)		268.0		361.8	93.8
(g)	Provision of resite area(s) and ancillary works		98.0		134.3	36.3

			(A) Approved Project Estimate ($ million)		(B) Latest Project Estimate ($ million)		(B) – (A) Difference ($ million)
(h)	Additional energy conservation measures		20.0		22.0		2.0
(i)	Environmental mitigation measures and EM&A programme		150.8		187.9		37.1
(j)	Consultants' fees[1] for		77.0		80.3		3.3
	(i)	contract administration	40.3		42.3		2.0
	(ii)	management of resident site staff	31.7		33.0		1.3
	(iii)	independent environmental checker service	5.0		5.0		0.0
(k)	Remuneration of resident site staff		792.5		799.0		6.5
(l)	On-cost payable to Shenzhen Municipal Government (SZMG)		11.0		1.2		(9.8)
(m)	Electrical and Mechanical Services Trading Fund (EMSTF) charges[2]		16.7		16.7		0.0
(n)	Contingencies		1,130.0		1,636.3		506.3
		Sub-total	12,432.1 (in September 2011 prices)		17,999.0 (in September 2011 prices)		5,566.9
(o)	Provision for price adjustment		3,821.1		6,804.2		2,983.1
		Total	16,253.2 (in MOD prices)		24,803.2 (in MOD prices)		8,550.0

[1] Excluding consultants' fees for the design and construction of the cross boundary bridges (HKSAR portion) (item (f) of paragraph 16 in PWSC(2012-13)26). Please also refer to paragraph 11 of this Enclosure.

[2] Since the establishment on 1 August 1996 under the Trading Fund Ordinance, the EMSTF charges government departments for design and technical consultancy services provided by the Electrical and Mechanical Services Department. The services rendered for this project include checking consultants' submissions on all E&M installations and providing technical advice to Government on all E&M works and their impact on the project.

2. As regards **items 1(b)(i) and 1(b)(iv) (at-grade road and at-grade roadworks of four interchanges of dual two-lane connecting road)**, the increase of $107.9 million is mainly due to recent surge in construction prices and a higher risk premium associated with construction constraints.

3. As regards **item 1(b)(ii) (viaduct of dual two-lane connecting road)**, the increase of $1,058.4 million is mainly due to recent surge in construction prices and a higher risk premium associated with construction constraints .

4. As regards **items 1(b)(iii), 1(b)(v) and 1(b)(vi) (tunnel, administration buildings, ventilation adit and buildings for tunnel of dual two-lane connecting road)**, the increase of $3,063.5 million is mainly due to recent surge in construction prices, poor ground conditions for tunnelling works and a higher risk premium associated with construction constraints.

5. As regards **item 1(b)(vii) (traffic control and surveillance system of dual two-lane connecting road)**, the increase of $124.6 million is mainly due to recent surge in construction prices.

6. As regards **item 1(b)(viii) (E&M works of dual two-lane connecting road)**, the increase of $566.4 million is mainly due to recent surge in construction prices and a higher risk premium associated with construction constraints.

7. As regards **items 1(a), 1(c), 1(d), 1(e) and 1(g) (site formation, perimeter patrol road, subway, diversion/modifications at existing local roads, sewage collection, treatment and disposal, reprovisioning of affected government facilities and provision of resite area(s) and ancillary works)**, the net increase of $6.9 million is mainly due to a higher risk premium associated with construction constraints.

8. As regards **item 1(f) (cross boundary bridges (HKSAR portion))**, the increase of $93.8 million is mainly due to recent surge in construction prices.

9. As regards **item 1(h) (additional energy conservation measures)**, the increase of $2.0 million is mainly due to recent surge in construction prices.

10. As regards **item 1(i) (environmental mitigation measures and EM&A programme)**, the increase of $37.1 million is mainly due to a higher risk premium associated with construction constraints.

11. As regards **item 1(j)(i), 1(j)(ii), 1(k) and 1(l) (consultants' fees for contract administration and management of resident site staff, remuneration of resident site staff, and on-cost payable to SZMG)**, we agreed with SZMG in June 2013 that each side will construct the portion of the cross boundary bridges within its own territory. As such, there is no entrustment of the construction of the cross boundary bridges (HKSAR portion) to SZMG. The on-cost payable to SZMG is reduced by $9.8 million. The consultants' fees and remuneration of resident site staff are correspondingly increased by $9.8 million.

12. As regards **item 1(n) (contingencies)**, the increase of $506.3 million is due to the increased estimate of the works items mentioned in paragraphs 2 to 10 above, to cater for possible additional costs due to remeasurement, variations of works and possible claims in the construction and finalization stages of the Project.

13. As regards **item 1(o) (provision for price adjustment)**, the increase of $2,983.1 million is due to the increased estimate of the works items mentioned in paragraphs 2 to 10 and contingencies in paragraph 12 above, the latest cashflow and the increase of the latest price adjustment factors.