For discussion
on 26 June 2020

FCR(2020-21)25

ITEM FOR FINANCE COMMITTEE

CAPITAL WORKS RESERVE FUND
HEAD 708 – CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND EQUIPMENT
Transport Department
New Subhead "Replacement of Traffic Control and Surveillance System and Radio Communication System in the Aberdeen Tunnel"
New Subhead "Replacement of Traffic Control and Surveillance System in the Tate's Cairn Tunnel"
New Subhead "Replacement of Lane Control Signals and Variable Aspect Signs of the Traffic Control and Surveillance System in the Tseung Kwan O Tunnel"
New Subhead "Replacement of Private Automatic Branch Exchange Systems in the Eastern Harbour Crossing, Lion Rock Tunnel, Shing Mun Tunnels and Cross-Harbour Tunnel"

Members are invited to approve four new commitments for the Transport Department –

(a) $108,600,000 for the replacement of Traffic Control and Surveillance System and Radio Communication System in the Aberdeen Tunnel;

(b) $184,470,000 for the replacement of Traffic Control and Surveillance System in the Tate's Cairn Tunnel;

(c) $10,253,000 for the replacement of Lane Control Signals and Variable Aspect Signs of Traffic Control and Surveillance System in the Tseung Kwan O Tunnel; and

(d) …..

(d) $13,900,000 for the replacement of Private Automatic Branch Exchange Systems in the Eastern Harbour Crossing, Lion Rock Tunnel, Shing Mun Tunnels and Cross-Harbour Tunnel.

PROBLEM

To ensure safe and effective operation of government tunnels, the Transport Department needs to replace the traffic control and surveillance system (TCSS) and radio communication system (RCS) in the Aberdeen Tunnel (ABT), TCSS in the Tate's Cairn Tunnel (TCT), the lane control signals and variable aspect signs of TCSS in the Tseung Kwan O Tunnel (TKOT), as well as the private automatic branch exchange (PABX) systems in the Eastern Harbour Crossing (EHC), Lion Rock Tunnel (LRT), Shing Mun Tunnels (SMTs) and Cross-Harbour Tunnel (CHT).

PROPOSAL

2. The Commissioner for Transport, on the advice of the Director of Electrical and Mechanical Services, proposes to –

(a) replace TCSS and RCS in ABT at an estimated total cost of $108,600,000;

(b) replace TCSS in TCT at an estimated cost of $184,470,000;

(c) replace the lane control signals and variable aspect signs of TCSS in TKOT at an estimated total cost of $10,253,000; and

(d) replace PABX systems in EHC, LRT, SMTs and CHT at an estimated total cost of $13,900,000.

The Secretary for Transport and Housing supports the above proposals.

3. Details and financial implications of the above proposals are at Enclosures 1 to 4.

Encls. 1-4

Transport and Housing Bureau
June 2020

Replacement of Traffic Control and Surveillance System and Radio Communication System in the Aberdeen Tunnel

The traffic control and surveillance system (TCSS) in the Aberdeen Tunnel (ABT) serves to ensure the safe and effective operation of the tunnel. TCSS consists of a number of sub-systems and is mainly used for traffic management and monitoring. We propose to replace the central control system and certain sub-systems of TCSS in ABT, including the lane control signals and variable message signs under the traffic control system, as well as the closed circuit television (CCTV) system and automatic incident detection system under the traffic surveillance system. We also propose to replace the radio communication system (RCS) in ABT, which enables communication among tunnel staff within the tunnel area and control room through walkie-talkies.

JUSTIFICATION

2. ABT connects Wong Chuk Hang Road and Wong Nai Chung Gap Flyover in Happy Valley with a total length of 1.99 km. The existing RCS and TCSS in ABT commenced operation in 2001 and 2005 respectively and have been operating round-the-clock for more than 15 years. According to the Electrical and Mechanical Services Trading Fund (EMSTF), the RCS as well as the central control system and certain sub-systems of TCSS have already reached or exceeded their normal serviceable lives, increasing the risk of system malfunctioning, which may lead to traffic congestion on Hong Kong Island in case of failure to monitor and co-ordinate traffic effectively. In addition, since the equipment and critical components of these systems have become obsolete, it is increasingly difficult to procure the required spare parts in the market for maintaining and repairing the ageing systems. As such, we consider it necessary to replace the TCSS and RCS in ABT to ensure the continued operation of the tunnel in a safe and effective manner.

3. We propose to replace three sub-systems of TCSS, namely the central control system, the traffic control system and the traffic surveillance system. Key features of the new systems are as follows –

(a) the new central control system will be a fully computerised system which integrates various tunnel traffic management functions into a single platform. It will also be capable of implementing more programmed traffic management schemes for enhancing operational efficiency;

/(b) …..

(b) the new traffic control system will provide enhanced capability in controlling remote traffic message signs, traffic signs and other field equipment to cope with prevailing traffic conditions; and

(c) the new CCTV and automatic incident detection systems under the new traffic surveillance system will adopt digital cameras and monitors for providing clearer images for more effective traffic monitoring. Also, with more cameras to be installed on the approach roads, the new traffic surveillance system will provide full coverage of the tunnel area of both open road sections and tunnel tubes, thereby enhancing traffic monitoring and management efficiency. The new system will use image processing techniques to detect vehicles which have stopped inside the tunnel tube due to traffic incidents and alert the control room correspondingly. It will also enhance the capability in identifying prevailing traffic situations (e.g. smoke detection inside the tunnel tube).

4. As regards the proposed new RCS, it will adopt digital radio communication technology to provide more voice channels with enhanced sound quality and reduced interference for better communication among tunnel staff. Further, the coverage of indoor and in-tunnel radio communication will be enhanced.

FINANCIAL IMPLICATIONS

Capital Expenditure

5. We estimate that the replacement of TCSS and RCS in ABT will incur a total capital expenditure of $108,600,000, with breakdown as follows –

			$'000	
(a)	Replacement of TCSS and RCS in ABT			86,190
	(i)	central control system	19,700	
	(ii)	traffic control system (including variable message signs, lane control signals, etc.)	12,000	
	(iii)	traffic surveillance system (including CCTV system and automatic incident detection system)	11,450	
	(iv)	data communication network	6,040	
	(v)	RCS	1,000	

/(vi) …..

			$'000
	(vi)	associated civil engineering and building services works, engaging relevant engineering consultants, cables and accessories	36,000
(b)		EMSTF project management charges	13,790
(c)		Contingency (about 10% of item (a) above)	8,620
		Total	**108,600**

6. On paragraph 5(a) above, the estimated expenditure of $86,190,000 is for the supply and installation of the new TCSS and RCS, including the central control system, traffic control system (covering lane control signals and remote-controlled traffic signs, variable message signs, traffic lights, various field equipment such as over-height vehicle detectors), traffic surveillance system (covering CCTV system and automatic incident detection system), computer hardware and software, data communication network, RCS and the associated cables and accessories; building services works for the traffic control room and replacement works for associated control facilities, together with the dismantling and removal of old equipment; and the removal and reinstatement of tunnel wall panels.

7. On paragraph 5(b) above, the estimated expenditure of $13,790,000 is for meeting the charges for EMSTF's management of the project, which includes carrying out feasibility study on different proposals; preparing system specifications, system design and project programme; preparing tender documents; tendering and selecting a contractor; engaging relevant engineering consultants; supervising site inspection, installation, testing and commissioning of the systems; and monitoring the operation of the systems and the rectification work within the defects liability period.

8. On paragraph 5(c) above, the estimated expenditure of $8,620,000 represents a 10% contingency on the items set out in paragraph 5(a) above.

9. The estimated cash flow is as follows –

/**Financial** …..

Financial Year	$'000
2020-21	1,100
2021-22	3,500
2022-23	7,500
2023-24	8,000
2024-25	88,500
Total	**108,600**

Recurrent Expenditure

10. The annual recurrent expenditure of the proposed system replacement will constitute about $4,800,000 of the overall management fee payable annually to the operator for the management, operation and maintenance of ABT. The said amount of recurrent expenditure is broadly the same as that for the existing systems. No additional recurrent expenditure will be incurred by the replacement of the systems.

IMPLEMENTATION PLAN

11. Subject to Finance Committee's funding approval in mid-2020, we plan to implement the proposal according to the following timetable –

	Activity	Target Completion Date
(a)	Tendering and selection of consultants	January 2021
(b)	Site investigation (such as conducting cable duct survey and underground utilities investigation, studying and modifying the number and location of field equipment)	November 2021
(c)	Preparation of tender documents	June 2022
(d)	Tendering and selection of contractor	January 2023
(e)	System design by contractor	July 2023
(f)	Procurement and installation of associated equipment	October 2024
(g)	Testing, commissioning and changeover of systems	February 2025

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12. To minimise the impact on traffic as far as possible, all installation work will be carried out during non-peak hours such that normal tunnel operation will not be affected.

PUBLIC CONSULTATION

13. We consulted the Legislative Council Panel on Transport on the proposal on 15 March 2019. The Panel had no objection to the Government's submission of this funding proposal to the Finance Committee for consideration. In response to the request of a Panel Member, the statistics on traffic accidents of ABT in the past three years are provided at Annex to Enclosures 1 to 4.

Annex to Encls. 1-4

BACKGROUND

14. ABT is a government tolled tunnel. The management, operation and maintenance of ABT are undertaken by an operator engaged by the Government through open tendering. The Transport Department, in consultation with EMSTF, is responsible for the timely replacement of major tunnel systems to ensure the safe, reliable and efficient operation of the tunnel.

Replacement of Traffic Control and Surveillance System in the Tate's Cairn Tunnel

The traffic control and surveillance system (TCSS) in the Tate's Cairn Tunnel (TCT) serves to ensure the safe and effective operation of the tunnel. TCSS consists of a number of sub-systems and is mainly used for traffic management and monitoring. We propose to replace the central control system and certain sub-systems of TCSS in TCT, including the lane control signals and variable message signs under the traffic control system, as well as the closed circuit television (CCTV) system, automatic incident detection system and environmental monitoring system under the traffic surveillance system.

JUSTIFICATION

2. TCT connects Sha Tin and Diamond Hill with a total length of 3.95 km. It is one of the major traffic links between the New Territories and Kowloon East. The existing TCSS in TCT commenced operation when the tunnel was commissioned in 1991 and has been operating round-the-clock for around 29 years. According to the Electrical and Mechanical Services Trading Fund (EMSTF), the central control system and certain sub-systems of TCSS have far exceeded their normal serviceable lives, increasing the risk of system malfunction, which may lead to traffic congestion on the trunk roads in Sha Tin and Kowloon East in case of failure to monitor and co-ordinate traffic effectively. In addition, since the equipment and critical components of the system have become obsolete, it is increasingly difficult to procure the required spare parts in the market for maintaining and repairing the ageing system. As such, we consider it necessary to replace TCSS in TCT to ensure the continued operation of the tunnel in a safe and effective manner.

3. We propose to replace three sub-systems of TCSS in TCT, namely the central control system, traffic control system and traffic surveillance system. Key features of the new systems are as follows –

(a) the new central control system will be a fully computerised system which integrates various tunnel traffic management functions into a single platform. It will also be capable of implementing more programmed traffic management schemes for enhancing operational efficiency;

(b) the new traffic control system will provide enhanced capability in controlling remote traffic message signs, traffic signs and other field equipment to cope with prevailing traffic conditions; and

/(c) …..

(c) the new CCTV and automatic incident detection systems under the traffic surveillance system will adopt digital cameras and monitors for providing clearer images for more effective traffic monitoring. Also, with more cameras to be installed on the approach roads, the new traffic surveillance system will provide full coverage of the tunnel area of both open road sections and tunnel tubes, thereby enhancing traffic monitoring and management efficiency within the tunnel area. The new system will use image processing techniques to detect vehicles which have stopped inside the tunnel tube due to traffic incidents and alert the control room correspondingly. It will also enhance capability in identifying prevailing traffic situations (e.g. smoke detection inside the tunnel tube). Further, we propose to replace the environmental monitoring system under the traffic surveillance system to monitor the pollutants (i.e. carbon monoxide (CO) and nitrogen dioxide (NO_2)) and visibility levels in the tunnel tube to ensure compliance with the latest standards stipulated by the Environmental Protection Department, to better protect the health of the motorists and enhancing road safety.

FINANCIAL IMPLICATIONS

Capital Expenditure

4. We estimate that the replacement of TCSS in TCT will incur a total capital expenditure of $184,470,000, with breakdown as follows –

			$'000
(a)	Replacement of TCSS in TCT		146,400
	(i) central control system	20,000	
	(ii) traffic control system (including variable message signs, lane control signals, etc.)	33,700	
	(iii) traffic surveillance system (including CCTV system, automatic incident detection system and environmental monitoring system)	27,500	
	(iv) data communication network	19,200	
	(v) associated civil engineering and building services works, engaging relevant engineering consultants, cables and accessories	46,000	
(b)	EMSTF project management charges		23,420
(c)	Contingency (about 10% of item (a) above)		14,650
	Total		**184,470**

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5. On paragraph 4(a) above, the estimated expenditure of $146,400,000 is for the supply and installation of the new TCSS, including the central control system, traffic control system (covering lane control signals and remote-controlled traffic signs, variable message signs, traffic lights, various field equipment such as over-height vehicle detectors), traffic surveillance system (covering CCTV system, automatic incident detection system and environmental monitoring system), computer hardware and software, data communication network and the associated cables and accessories; building services works for traffic control room and replacement works for associated control facilities, together with the dismantling and removal of old equipment; and the removal and reinstatement of tunnel wall panels.

6. On paragraph 4(b) above, the estimated expenditure of $23,420,000 is for meeting the charges for EMSTF's management of the project, which includes carrying out feasibility study on different proposals; preparing system specifications, system design and project programme; preparing tender documents; tendering and selecting a contractor; engaging relevant engineering consultants; supervising site inspection, installation, testing and commissioning of the system; and monitoring the operation of the system and the rectification work within the defects liability period.

7. On paragraph 4(c) above, the estimated expenditure of $14,650,000 represents a 10% contingency on the items set out in paragraph 4(a) above.

8. The estimated cash flow is as follows –

Financial Year	**$'000**
2020-21	3,000
2021-22	4,000
2022-23	9,700
2023-24	12,000
2024-25	155,770
Total	**184,470**

Recurrent Expenditure

9. The annual recurrent expenditure of the proposed system replacement will constitute about $4,700,000 of the overall management fee payable annually to the operator for the management, operation and maintenance of TCT. The said amount of the recurrent expenditure is broadly the same as that for the existing system. No additional recurrent expenditure will be incurred by the replacement of the system.

/IMPLEMENTATION …..

IMPLEMENTATION PLAN

10. Subject to Finance Committee's funding approval in mid-2020, we plan to implement the proposal according to the following timetable –

	Activity	Target Completion Date
(a)	Tendering and selection of consultants	January 2021
(b)	Site investigation (such as conducting cable duct survey and underground utilities investigation, studying and modifying the number and location of field equipment)	November 2021
(c)	Preparation of tender documents	June 2022
(d)	Tendering and selection of contractor	January 2023
(e)	System design by contractor	July 2023
(f)	Procurement and installation of associated equipment	October 2024
(g)	Testing, commissioning and changeover of system	February 2025

11. To minimise the impact on traffic as far as possible, all installation work will be carried out during non-peak hours such that normal tunnel operation will not be affected.

PUBLIC CONSULTATION

12. We consulted the Legislative Council Panel on Transport on the proposal on 15 March 2019. The Panel had no objection to the Government's submission of this funding proposal to the Finance Committee for consideration. In response to the request of a Panel Member, the statistics on traffic accidents of TCT in the past three years are provided at Annex to Enclosures 1 to 4.

BACKGROUND

13. TCT is a government tolled tunnel. The management, operation and maintenance of TCT are undertaken by an operator engaged by the Government through open tender. The Transport Department, in consultation with EMSTF, is responsible for the timely replacement of major tunnel systems to ensure the safe, reliable and effective operation of the tunnel.

Replacement of Lane Control Signals and Variable Aspect Signs of the Traffic Control and Surveillance System in the Tseung Kwan O Tunnel

The traffic control and surveillance system (TCSS) in the Tseung Kwan O Tunnel (TKOT) consists of a number of sub-systems. We propose to replace the lane control signals and variable aspect signs under the traffic control system of TCSS in TKOT, including lane control signals inside the tunnel, speed limit signs, tunnel control signs, etc., primarily used for traffic management.

JUSTIFICATION

2. TKOT connects Kwun Tong and Tseung Kwan O with a total length of 0.9 km. The existing in-tunnel lane control signals and variable aspect signs of TCSS (including the variable speed limit signs and "tunnel closed" signs) in TKOT commenced operation when the tunnel was commissioned in 1990 and have been operating round-the-clock for around 30 years. According to the Electrical and Mechanical Services Trading Fund (EMSTF), such equipment has far exceeded its normal serviceable life, increasing the risk of system malfunction, which may lead to traffic accidents and congestion on the major road networks on both sides of the tunnel in case of failure to disseminate appropriate traffic control information to motorists. In addition, since the equipment has become obsolete, it is increasingly difficult to procure the required spare parts in the market for maintaining and repairing the ageing equipment. As such, we consider it necessary to replace the equipment to ensure the continued operation of the tunnel in a safe and effective manner.

3. As in other government tunnels and control areas in which the lane control signals and variable speed limit signs are newly installed/replaced, we propose to adopt new Light Emitting Diode (LED) type lane control signals and variable speed limit signs for TKOT as they have significantly wider viewing angle and are much brighter. These LED displays will provide a clearer display of signals and information to motorists. Besides, LED displays will consume less electricity, have a longer serviceable life and are more reliable. Hence, they will be more environmental-friendly than the existing equipment.

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FINANCIAL IMPLICATIONS

Capital Expenditure

4. We estimate that the replacement of the lane control signals and variable aspect signs of TCSS in TKOT will incur a total capital expenditure of $10,253,000, with breakdown as follows –

			$'000
(a)	Replacement of the in-tunnel lane control signals and variable aspect signs of the TCSS in TKOT		8,140
	(i) in-tunnel lane control signals	4,000	
	(ii) variable aspect signs	4,140	
(b)	EMSTF project management charges		1,300
(c)	Contingency (about 10% of item (a) above)		813
	Total		**10,253**

5. On paragraph 4(a) above, the estimated expenditure of $8,140,000 is for the replacement of the lane control signals and variable aspect signs in the tunnel, including dismantling and disposal of the existing signs as well as the supply, installation, testing and commissioning of the new signals and signs with associated local controller, interface equipment and accessories.

6. On paragraph 4(b) above, the estimated expenditure of $1,300,000 is for meeting the charges for EMSTF's management of the project, which includes carrying out feasibility study on different proposals; preparing equipment specifications, equipment design and project programme; preparing tender documents; tendering and selecting a contractor; supervising site inspection, installation, testing and commissioning of the equipment; and monitoring the operation of the equipment and rectification work within the defects liability period.

7. On paragraph 4(c) above, the estimated expenditure of $813,000 represents a 10% contingency on the items set out in paragraph 4(a) above.

8. The estimated cash flow is as follows –

/**Financial** …..

Financial Year	$'000
2020-21	300
2021-22	350
2022-23	699
2023-24	8,904
Total	**10,253**

Recurrent Expenditure

9. The annual recurrent expenditure of the proposed equipment replacement will constitute about $115,000 of the overall management fee payable annually to the operator for the management, operation and maintenance of TKOT. The said amount of the recurrent expenditure is broadly the same as that for the existing equipment. No additional recurrent expenditure will be incurred by the replacement of equipment.

IMPLEMENTATION PLAN

10. Subject to Finance Committee's funding approval in mid-2020, we plan to implement the proposal according to the following timetable –

	Activity	Target Completion Date
(a)	Site investigation	June 2021
(b)	Preparation of tender documents	November 2021
(c)	Tendering and selection of contractor	July 2022
(d)	Equipment design by contractor	November 2022
(e)	Procurement and installation of associated equipment	November 2023
(f)	Testing, commissioning and changeover of equipment	February 2024

11. To minimise the impact on traffic as far as possible, all installation work will be carried out during non-peak hours such that normal tunnel operation will not be affected.

/**PUBLIC** …..

PUBLIC CONSULTATION

12. We consulted the Legislative Council Panel on Transport on the proposal on 15 March 2019. The Panel had no objection to the Government's submission of this funding proposal to the Finance Committee for consideration. In response to the request of a Panel Member, the statistics on traffic accidents of TKOT in the past three years are provided at Annex to Enclosures 1 to 4.

BACKGROUND

13. TKOT is a government tolled tunnel, the tolls of which will be waived upon the commissioning of the Tseung Kwan O – Lam Tin Tunnel as announced in the 2019 Policy Address. The management, operation and maintenance of TKOT are undertaken by an operator engaged by the Government through open tendering. The Transport Department, in consultation with EMSTF, is responsible for the timely replacement of major tunnel systems to ensure the safe, reliable and effective operation of the tunnel.

Replacement of Private Automatic Branch Exchange Systems in the Eastern Harbour Crossing, Lion Rock Tunnel, Shing Mun Tunnels and Cross-Harbour Tunnel

The private automatic branch exchange (PABX) system, an automatic telephone switching system capable of centralised processing of telephone extensions and fax lines within the tunnel area, enables the operators engaged for the management, operation and maintenance (MOM) of the tunnels to maintain communication with the Transport Department (TD), Hong Kong Police Force (HKPF), Fire Services Department (FSD) and other regulatory government departments (such as the Electrical and Mechanical Services Department and Highways Department), as well as other tunnel operators and outside parties. The PABX system is crucial to the external communication and co-ordination in the operation of tunnels.

JUSTIFICATION

2. The existing PABX system of the Eastern Harbour Crossing (EHC) has been in use for over 30 years, whereas those of the Cross-Harbour Tunnel (CHT), Lion Rock Tunnel (LRT) and Shing Mun Tunnels (SMTs) have been in use for 25 years or more since their last replacement in 1990 (for CHT and SMTs) and 1995 (for LRT) respectively. According to the Electrical and Mechanical Services Trading Fund (EMSTF), the PABX systems of these tunnels have far exceeded their normal serviceable lives, increasing the risk of malfunction. Since the equipment and critical components of the systems have become obsolete, it is increasingly difficult to procure the required spare parts in the market for maintaining and repairing the ageing systems. To maintain prompt and effective communication and co-ordination among tunnel staff, government departments or other tunnel control centres and facilitate liaison with TD's Emergency Transport Co-ordination Centre, HKPF and FSD during emergencies in particular, we consider it necessary to replace these PABX systems to ensure the continued operation of the tunnels in a safe and effective manner.

3. The proposed new systems will connect the intercoms of the administration buildings, tunnel tubes, tunnel portal facilities and ventilation buildings to certain telephone lines of public telephone exchanges. Subject to the operational needs of the respective tunnels, the new systems will provide appropriate telecommunication features (e.g. control room direct lines) so as to facilitate the MOM work of tunnel operators and the operation of regulatory government departments. For better traffic management and incident handling, the new systems will also provide a new dedicated telephone network among these

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four tunnels to enhance the communication among the tunnel operators, particularly in case of emergency. We therefore bundle the replacement of the PABX systems in these four tunnels, and it is the Government's long-term goal to expand the telephone network to other tunnels when the relevant systems in other tunnels are replaced.

FINANCIAL IMPLICATIONS

Capital Expenditure

4. We estimate that the replacement of the PABX systems in CHT, EHC, LRT and SMTs will incur a total capital expenditure of $13,900,000, with breakdown as follows –

			$'000
(a)	Replacement of the PABX system in CHT		2,700
	(i) central system (including central processing unit, interface cards, etc.)	1,400	
	(ii) associated cable distribution systems, telephone sets and accessories	1,300	
(b)	Replacement of the PABX system in EHC		3,310
	(i) central system (including central processing unit, interface cards, etc.)	1,700	
	(ii) associated cable distribution systems, telephone sets and accessories	1,610	
(c)	Replacement of the PABX system in LRT		2,206
	(i) central system (including central processing unit, interface cards, etc.)	1,100	
	(ii) associated cable distribution systems, telephone sets and accessories	1,106	
(d)	Replacement of the PABX system in SMTs		2,816
	(i) central system (including central processing unit, interface cards, etc.)	1,400	
	(ii) associated cable distribution systems, telephone sets and accessories	1,416	
(e)	EMSTF project management charges		1,765
(f)	Contingency (about 10% of items (a) to (d) above)		1,103
	Total		**13,900**

/5. …..

5. On paragraphs 4(a) to (d) above, the estimated expenditure of $11,032,000 is for the supply and installation of the new PABX systems (including telephone sets) as well as the dismantling and removal of old equipment.

6. On paragraph 4(e) above, the estimated expenditure of $1,765,000 is for meeting the charges for EMSTF's management of the project, which includes carrying out feasibility study on different proposals; preparing system specifications, system design and project programme; preparing tender documents; tendering and selecting a contractor; supervising site inspection, installation, testing and commissioning of the systems; and monitoring the operation of the systems and the rectification work within the defects liability period.

7. On paragraph 4(f) above, the estimated expenditure of $1,103,000 represents a 10% contingency on the items set out in paragraphs 4(a) to (d) above.

8. The estimated cash flow is as follows –

Financial Year	**$'000**
2020-21	400
2021-22	900
2022-23	3,310
2023-24	9,290
Total	**13,900**

Recurrent Expenditure

9. The annual recurrent expenditure of the proposed replacement of the systems will constitute about $104,000 of the overall management fees payable annually to the tunnels' MOM operators. The said amount of the recurrent expenditure is broadly the same as that for the existing systems. No additional recurrent expenditure will be incurred by the replacement of the systems.

IMPLEMENTATION PLAN

10. Subject to Finance Committee's funding approval in mid-2020, we plan to implement the proposal according to the following timetable –

/**Activity** …..

	Activity	Target Completion Date
(a)	Site investigation	June 2021
(b)	Preparation of tender document	November 2021
(c)	Tendering and selection of contractor	August 2022
(d)	System design by contractor	November 2022
(e)	Procurement and installation of associated equipment	December 2023
(f)	Testing, commissioning and changeover of system	February 2024

11. To minimise the impact on the daily MOM of the tunnels as far as practicable, all installation work will be carried out during non-peak hours such that normal tunnel operation will not be affected.

PUBLIC CONSULTATION

12. We consulted the Legislative Council Panel on Transport on the proposal on 15 March 2019. The Panel had no objection to the Government's submission of this funding proposal to the Finance Committee for consideration. In response to the request of a Panel Member, the statistics on traffic accidents of EHC, LRT, SMTs and CHT in the past three years are provided at Annex to Enclosures 1 to 4.

BACKGROUND

13. EHC, LRT, SMTs and CHT are government tolled tunnels. The MOM of these four tunnels are undertaken by operators engaged by the Government through open tendering. TD, in consultation with EMSTF, is responsible for the timely replacement of major tunnel systems to ensure the safe, reliable and effective operation of the tunnels.

Annex to Enclosures 1 to 4

Statistics on Traffic Accidents of the Seven Government Tunnels Concerned from 2017 to 2019

The numbers of traffic accidents of the Aberdeen Tunnel, Cross-Harbour Tunnel, Eastern Harbour Crossing, Lion Rock Tunnel, Shing Mun Tunnels, Tate's Cairn Tunnel and Tseung Kwan O Tunnel from 2017 to 2019 are tabulated below –

Tunnel	2017	2018	2019
1. Aberdeen Tunnel	137	133	157
2. Cross-Harbour Tunnel	523	487	367
3. Eastern Harbour Crossing	155	176	208
4. Lion Rock Tunnel	233	162	161
5. Shing Mun Tunnels	84	66	69
6. Tate's Cairn Tunnel[#]	N/A	47	92
7. Tseung Kwan O Tunnel	155	170	154

[#] As the ownership of the Tate's Cairn Tunnel was reverted to the Government on 11 July 2018, statistics on traffic accidents of the Tunnel prior to the takeover were not available. The 2018 figure only covers the period after the takeover (i.e. from 11 July 2018).
