For discussion
on 23 May 2016

Legislative Council Panel on Transport

Installation of Traffic Detectors

PURPOSE

This paper seeks Members' views on a proposal to install 400 sets of traffic detectors along some of the strategic routes[1]. This will provide the public and the Transport Department ("TD") with more real-time traffic information for enhancing transport efficiency.

BACKGROUND

Existing Traffic Detectors

2. The Government endeavours to provide a safe, efficient, reliable and environmentally friendly transport system which meets the economic, social and recreational needs of the community. One of our policy initiatives is to make good use of technology to enhance transport efficiency. Installation of traffic detectors to collect real-time traffic data is one of the keys to the effective implementation of this policy initiative.

3. Currently, traffic detectors are installed as part of a Traffic Control and Surveillance System ("TCSS")[2]. TCSS helps monitor and manage traffic to improve road safety and efficiency. Currently not all the strategic routes in Hong Kong are equipped with TCSS. TCSSs are usually installed

[1] Strategic routes are major traffic corridors connecting major districts with high traffic flow, e.g. Route 1 connecting Shatin and Hong Kong Island.

[2] TCSS comprises CCTV cameras, vehicle detectors, variable speed limit signs, lane control signals and variable message signs installed on highways and bridges with central computer facilities to help monitor and control traffic flows.

as part of the road projects when new strategic routes are built, or existing routes are reconstructed[3].

4. In addition to TCSS, traffic detectors are installed along the parts of strategic routes covered by Journey Time Indication Systems[4] and Speed Map Panels[5]. These traffic detectors, together with those for TCSS, cover only about 45% of the strategic routes in Hong Kong.

Overseas Practice

5. It is increasingly common for overseas jurisdictions to deploy advanced technology for traffic monitoring and management. By installing extensive traffic detectors on main and important roads to continuously collect real-time traffic data, transport authorities can be more effective in traffic monitoring and management as well as provision of more information to commuters to make informed route or modal choices to avoid congested areas. For instance, in the United Kingdom, detectors are installed on motorways and most of the trunk roads, normally at a spacing of 500 metres, to collect data on traffic flows, speed and travel times.

PROPOSAL

6. The Financial Secretary announced in the 2016-17 Budget that $200 million will be allocated to install additional traffic detectors along some strategic routes to provide the public with more real-time traffic information and enhance transport efficiency ("the project"). The locations of proposed installation of 400 sets of traffic detectors are shown in the **Enclosure**.

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[3] TCSSs have been installed in the following locations: the Aberdeen Tunnel, the Cross Harbour Tunnel, the Eastern Harbour Crossing, the Kai Tak Tunnel, the Lion Rock Tunnel, the Shing Mun Tunnels, the Tai Lam Tunnel, the Tate's Cairn Tunnel, the Tseung Kwan O Tunnel, the Western Harbour Crossing, the Shenzhen Western Corridor, the Tolo Highway between Sha Tin and Tai Po near Hong Lok Yuen, the Tsing Ma Control Area and the Tsing Sha Control Area. TCSSs will also be installed at the Central Wanchai Bypass and the Tolo Highway between Tai Po near Hong Lok Yuen and Fanling.

[4] Journey Time Indication Systems provide the estimated journey times of different cross harbour routes.

[5] Speed Map Panels provide the traffic conditions and estimated journey times of different routes from the New Territories towards Kowloon.

JUSTIFICATIONS

7. Currently, only about 45% (230 kilometres ("km") out of 500 km[6] road sections) of the strategic routes in Hong Kong are installed with traffic detectors. As a result, a complete picture of the traffic conditions along the entire strategic route network is not available, constraining TD's capability in handling traffic incidents as well as traffic management. Early action cannot be taken to minimise the adverse impact caused by traffic congestion and to disseminate latest traffic information to commuters in an effective and efficient way.

8. After completion of the project, the coverage of traffic detectors along strategic routes in Hong Kong will be increased to about 80%[7] (i.e. 400 km out of 500 km), bringing about the following benefits –

(a) Better response to traffic incidents on strategic routes

TD is developing the Traffic and Incident Management System ("TIMS") to enhance the efficiency of traffic and incident management. The project will provide more real-time traffic information to TIMS. TD staff as well as other relevant departments (e.g. the Police) will then be able to know the actual traffic conditions and the occurrence of incidents on strategic routes more efficiently. Prompt actions can be taken in response to different traffic conditions and traffic incidents for better traffic incident management.

(b) Better provision of real-time traffic information to the public

TD has been disseminating real-time traffic information through electronic platforms, such as websites and mobile applications. After additional traffic detectors have been installed under the project, more real-time traffic information will be disseminated through these electronic platforms. Commuters will be able to obtain the latest information on traffic conditions through various

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[6] The total length of strategic routes in Hong Kong is about 250 km. There are two traffic bounds on strategic routes. Since traffic detectors are required for both bounds, the total length of road sections requiring traffic detectors to be installed is 500 km.

[7] Further expansion of detector installation will be considered after completion of the project.

channels to make informed route choices and avoid congested routes.

TD has uploaded datasets containing real-time traffic information on the Government's public information portal "data.gov.hk", so that interested parties can use the datasets to develop mobile applications for wider use by the public. With the additional detectors proposed to be installed, the coverage of such information can be enhanced, and thus facilitate the development of more innovative applications relevant to commuter's travel needs and location. For instance, the rapid processing and analysing of a vast amount of traffic data can provide real-time forecast of traffic conditions to facilitate better estimation of travel time for commuters travelling along these strategic routes.

(c) Building up Big Data[8] for transport in Hong Kong

Upon completion of the project, the data collected from both the new and existing traffic detectors will be combined to form a complete picture of the traffic conditions of strategic routes. As these data are collected round the clock, such large dataset can be analysed using Big Data Analytics to uncover traffic patterns and trends, which are useful for various applications such as prediction of traffic queues, transport planning and management, etc. TD will also make available these large datasets subject to Big Data Analysis for use by academics for transport research, as well as by other interested parties to develop innovative applications.

FINANCIAL IMPLICATIONS

Capital Expenditure

9. It is estimated that the capital cost of the proposed installation of traffic detectors will be about $194,000,000. The breakdown is as follows –

[8] Big Data is a broad term for large or complex datasets which after analysis using advanced techniques, can reveal much more useful information than that can be obtained from traditional datasets.

Item	($'000)							
	2016 -17	**2017 -18**	**2018 -19**	**2019 -20**	**2020 -21**	**2021-22**	**2022 -23**	**Total**
(a) Detailed design and supervision during construction	500	3,000	1,200	3,100	2,700	950	550	12,000
(b) Traffic detectors procurement	-	-	5,500	15,000	15,000	10,500	2,000	48,000
(c) Provision of central computer system	-	-	1,000	6,500	7,500	7,500	500	23,000
(d) Provision of power and data communication	-	-	500	8,000	8,000	2,300	200	19,000
(e) Associated civil and electrical and mechanical works	-	-	5,000	30,000	30,000	9,000	1,000	75,000
(f) Contingency	-	500	6,800	2,400	1,800	4,750	750	17,000
Total	**500**	**3500**	**20,000**	**65,000**	**65,000**	**35,000**	**5,000**	**194,000**

10. On paragraph 9(a) above, the estimate of $12,000,000 is for the engagement of a consultancy service to carry out the detailed design and supervision of site works during construction stage.

11. On paragraph 9(b) above, the estimate of $48,000,000 is for the procurement of about 400 sets of traffic detector to be installed along part of strategic routes for collection of real-time traffic data including traffic flow, speed, journey time, etc.

12. On paragraph 9(c) above, the estimate of $23,000,000 is for the procurement and development of the central computer system for data processing, control and monitoring, and data fusion with the existing traffic detectors.

13. On paragraph 9(d) above, the estimate of $19,000,000 is for the provision of power supply and communication network for transfer of data from field equipment to the central computer system.

14. On paragraph 9(e) above, the estimate of $75,000,000 is for the associated civil works and electrical and mechanical works for the installation of the traffic detectors including mounting poles, roadside cabinet, cable ducts, etc.

15. On paragraph 9(f) above, the estimate of $17,000,000 represents a contingency of about 10% on items 9(a) to (e).

Other Non-recurrent Expenditure

16. The installation of traffic detectors will entail a total non-recurrent staff cost of about $6,000,000 for a period of three years from 2016-17 to 2018-19 for delivering the project during the early stage including detailed design, tendering and the initial stage of contract implementation. We have included sufficient provision in the 2016-17 Estimates to meet such requirement and will reflect the resources required in the Estimates of the relevant years.

17. The workload at the later stage of the contract implementation would be reviewed upon completion of the detailed design and staff resources to administer the implementation works will be worked out in due course.

Recurrent Expenditure

18. The on-going maintenance and support of the proposed traffic detectors will require an estimated recurrent cost of $10,382,000 from 2022-23 onwards. The recurrent cost will cover hardware and software, communication and power supply, as well as management fee for maintenance.

19. The relevant recurrent costs will be secured through established resource allocation mechanism in due course. In addition, the operation of the proposed traffic detectors will be undertaken by the relevant TD staff as part of their work. No additional recurrent staff cost will be incurred.

IMPLEMENTATION PLAN

20. If funding could be secured within this legislative year, TD plans to start the engagement of consultancy service in the detailed design of the project in early 2017 for completion by January 2018. The site installation and implementation works are targeted to commence in 2018 for completion in 2021. The proposed implementation plan is set out below –

Activity	**Target Completion Date**
(a) Preparation of consultancy brief for employment of consultancy service for detailed design	September 2016

Activity	Target Completion Date
(b) Engagement of consultancy service	Early 2017
(c) Detailed design	January 2018
(d) Invitation of tender for the installation work	April 2018
(e) Commencement of installation contract	November 2018
(f) System commissioning[9]	May 2021

WAY FORWARD

21. Subject to Members' views, we plan to seek funding approval from the Finance Committee within this legislation session.

ADVICE SOUGHT

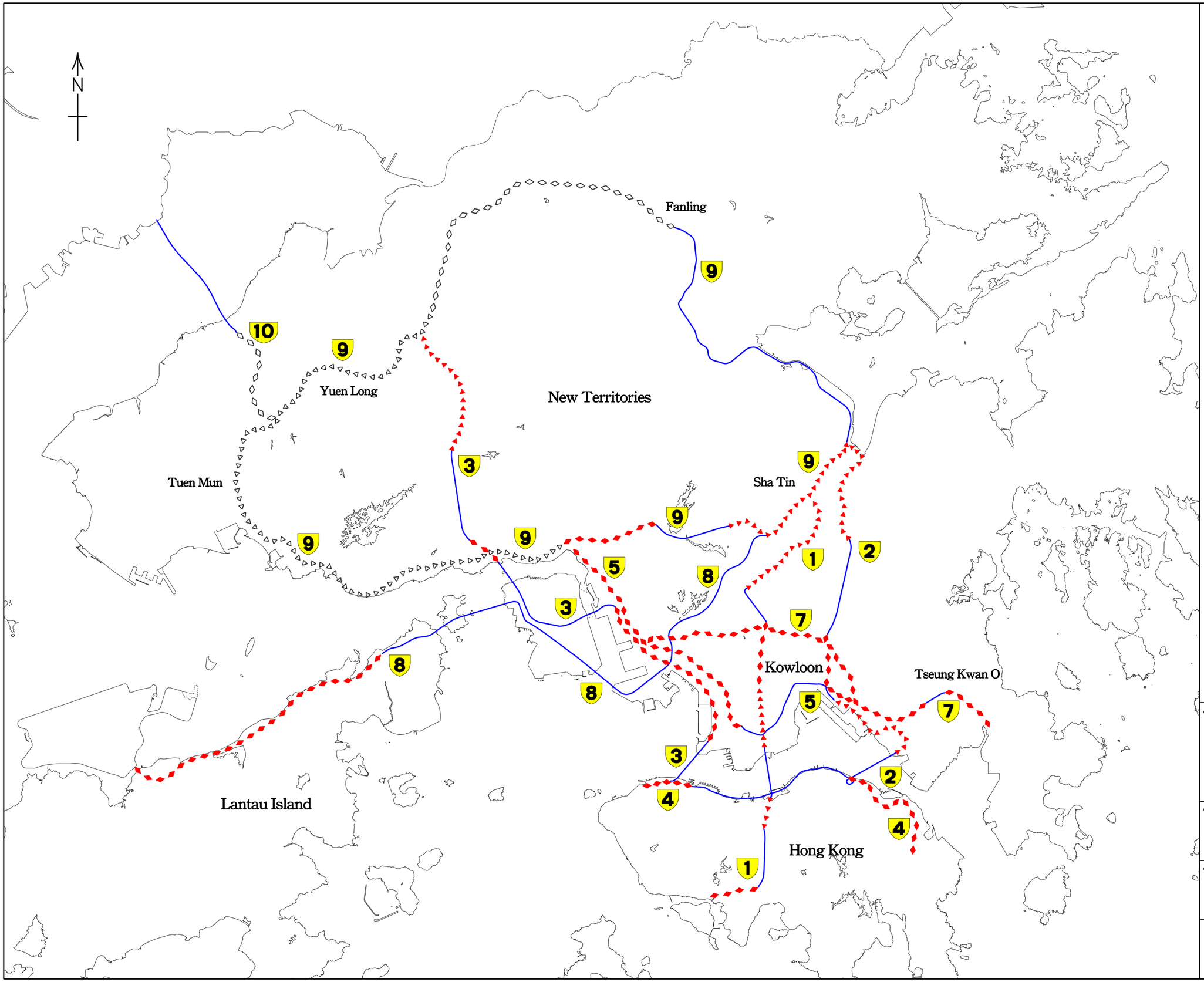
22. Members are invited to provide comments on and support the project.

Transport and Housing Bureau
Transport Department
May 2016

[9] TD will work with the consultants on the possibility of a phased commissioning of traffic detectors.

Locations of the Proposed Installation of Traffic Detectors

Enclosure



LEGEND:

- 1 — Strategic Route Number
- Both bounds of strategic route with traffic detector installation planned under the project
- One bound of strategic route with traffic detectors already installed and installation of detectors for the other bound planned under the project
- Both bounds of strategic route with traffic detectors already installed, or to be installed under committed road projects
- Both bounds of strategic route with traffic detector installation to be reviewed later
- One bound of strategic route with traffic detectors already installed, installation at other bound to be reviewed later

NOTES:

Traffic detectors installed on one bound can only collect data on that bound. Traffic detectors are required for each of the two opposite traffic bounds in order to collect data on both bounds.

drawing title

INSTALLATION OF TRAFFIC DETECTORS ON STRATEGIC ROUTES

drawing no.	scale
SRN-1A	Diagrammatic

office

TRAFFIC AND TRANSPORT SURVEY DIVISION

運輸署 Transport Department