

**For discussion  
on 17 April 2012**

## **Legislative Council Panel on Development**

### **Environmentally Friendly Linkage System for Kowloon East**

#### **PURPOSE**

This paper seeks Members' initial views on an environmentally friendly linkage system (EFLS) to enhance the connectivity of Kowloon East in light of the findings of a feasibility study and views and suggestions received in the on-going public consultation exercise. Given the significant cost implications of this system, we consider it essential to discuss thoroughly with the public and intend to consult Members at every stage of the public engagement.

#### **BACKGROUND**

2. The form and alignments of the EFLS have evolved through a number of studies conducted over the past years. The approved Kai Tak Outline Zoning Plan (OZP) in November 2007, formulated through a two-year three-stage extensive public engagement exercise between 2004 and 2006 under the Kai Tak Planning Review Study, contains a reserve for a possible elevated rail-based environmentally friendly transport system as a long term transport mode subject to detailed design. This OZP alignment (shown at **Annex A**) is mainly confined within the Kai Tak Development (KTD) area to serve the new developments.

3. In December 2009, the Civil Engineering and Development Department commissioned a study to investigate feasible EFLS network alignments (the Study) based on assessments on engineering feasibility, traffic impact, land requirement, environmental impacts, operation viability, financial performance and economic return. The scope of the Study also covered

possible extension of the EFLS to the hinterland with a view to addressing the public aspiration for enhancement of connectivity and integration between Kai Tak and the hinterland.

4. In his 2011-12 Policy Address, the Chief Executive announced that we would adopt a visionary, co-ordinated and integrated approach to transform Kowloon East, comprising the KTD, Kwun Tong and Kowloon Bay, into an attractive core business district (CBD) to sustain Hong Kong's economic development. To facilitate the transformation of the former industrial areas into another key CBD, it is important that the infrastructure works and facilities should be well-designed and relate well to the broad development strategies of enhancing connectivity, branding the place with quality urban design and promoting diversity for the Kowloon East CBD. In drawing up the EFLS network alignments, the Study has considered the important role to be played by the EFLS in "Energizing Kowloon East", i.e. to enhance inter-district and intra-district connectivity of Kowloon East, and come up with an EFLS proposal to effectively cope with the development strategies for Kowloon East CBD. The Study findings are outlined in the ensuing paragraphs.

5. In December 2011, we briefed Members on the Government's new initiative on transforming Kowloon East into a CBD. We indicated that we would commence a two-stage public consultation exercise to solicit public views on the EFLS proposal and report the initial public views to the Panel on Development in early 2012. Details of the 2-stage public consultation which has commenced in February 2012 are outlined in **Annex B**.

## **FINDINGS OF THE STUDY**

### **Alignment**

6. To facilitate the transformation of Kowloon East, we envisage the EFLS linking the KTD, Kwun Tong and Kowloon Bay with the existing Mass Transit Railway (MTR) Kwun Tong Line and the future Shatin to Central Link (SCL). The Study suggests adopting an elevated monorail system as the EFLS and proposes a 9-kilometre 12-station line linking the MTR Kowloon Bay Station, through Wang Kwong Road to the KTD Station Square, where it can

interchange with the Kai Tak Station of the future SCL, and then all the way along the former runway before crossing the Kwun Tong Typhoon Shelter (KTTS) at the tip of the runway via the Kwun Tong Transportation Link (KTTL) and terminating at the MTR Kwun Tong Station (see the proposed alignment plan at **Annex C**).

7. The proposed alignment serves all major developments in the KTD including the Tourism Node, Runway Precinct, Metro Park, Multi-purpose Stadium Complex, developments at North Apron and hospitals at South Apron. It also runs through the two Action Areas, i.e. the Hoi Bun Road Redevelopment in Kowloon Bay (Action Area 1) and Kwun Tong Ferry Pier Waterfront Redevelopment in Kwun Tong (Action Area 2) proposed under “Energizing Kowloon East”. Besides, the alignment along the KTTL would provide a direct linkage between the KTD and Kwun Tong, generating synergy on developments in these two districts.

8. The EFLS can connect to the MTR Kwun Tong Station either via Hoi Yuen Road or King Yip Street. The routing along Hoi Yuen Road provides a more direct linkage with the MTR Kwun Tong Station, however, one of the three traffic lanes will have to be closed to accommodate the EFLS and public transport diversion is necessary. The routing along King Yip Street has less traffic impact, but its connection with the MTR Kwun Tong Station will be circuitous.

9. The provision of a station is mainly determined based on the site topography and the forecast passenger demand thereat. The 12 stations proposed by the Study will capture patronages generated by major developments in Kowloon East currently not covered by the existing and planned MTR lines. The Study proposes a very simple EFLS alignment which offers a favourable condition for using monorail, which is aesthetically more appealing and has comparatively slimmer viaducts/supporting structures than other rail systems. In addition, the monorail system, being a unique landmark in Hong Kong, will enhance tourism appeal. The forecast daily patronage in 2031 is about 200,000.

10. The Study has explored the opportunities of enlarging the coverage of the EFLS to adjoining old developed districts, including To Kwa Wan, Kowloon City and San Po Kong. However, given the constraints such as noise

and visual implications on the residential areas, concerns about intrusion of privacy of the premises, financial burden due to relatively low patronages for some branch extensions and technical difficulties for incorporating branches to the monorail system, the Study suggests not extending the EFLS to To Kwa Wan, Kowloon City and San Po Kong. A brief summary of the extension alignments studied is appended at **Annex D**.

## **Train System**

11. The proposed EFLS is a light capacity elevated rail line. The Study has examined various types of rail system applicable to the KTD, in particular, rubber-tyred Automatic People Mover (APM) and monorail. APM has the edge on monorail with its ability to maneuver corners with smaller turning radius, which help penetrating into congested hinterland areas as compared with monorail of similar passenger capacity. In addition, APM is more flexible and convenient for multi-line services design which involves track sharing at junctions. However, APM requires the construction of a slab structure for mounting its guideway, which would look more bulky than the beam girder guideway for monorail. Taking into account that monorail is aesthetically more appealing and the viaducts/supporting structures of monorail are slimmer, causing less visual impact and blockage to daylight/ventilation, the monorail system is recommended for use in this EFLS proposal. The monorail, in the form of a 2-car train, could operate with the headway at an interval of 2 minutes during peak hours. The fare structure for the EFLS is assumed to be comparable with that for the MTR.

## **Financial & Economic Returns**

12. The EFLS proposal will incur substantial cost and the financial and economic returns are not satisfactory if treated as a transport infrastructure. The capital cost is broadly estimated to be \$12 billion (in 2010 prices). The anticipated revenue is unable to meet its capital cost as well as operating and maintenance expenses. We have broadly estimated that if both the capital cost and subsequent assets replacement expenses<sup>1</sup> are to be borne by the Government, the annual revenue could barely cover the running cost of the

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1 Assets replacement expenses include both electrical and mechanical and rolling stock replacement costs, which will be incurred every 15-20 years.

EFLS. Based on the quantifiable economic benefits<sup>2</sup>, the economic internal rate of return<sup>3</sup> of the EFLS proposal is estimated to be around +1%, which is lower than that of a typical transport infrastructure project, usually with a return of +4% or more.

13. However, the EFLS plays a very strategic role in the development of Kowloon East CBD and will bring about much non-quantifiable economic benefits. It will not only provide a good intra-district connection among Kwun Tong, Kowloon Bay and Kai Tak, through direct and convenient interchange connections with the nearby MTR Kowloon Bay Station and Kwun Tong Station as well as the Kai Tak Station of the future SCL, the EFLS will also facilitate inter-districts activities between the Kowloon East CBD and other business districts in Hong Kong in an effective manner. It will generate synergy for adjacent developments and should have a catalytic effect on the successful transformation of Kowloon East into another attractive CBD.

14. Taking the form of a monorail system, the EFLS will create a unique landmark in Hong Kong with high tourism appeal. It will facelift the image of Kowloon East CBD and will enhance the appeal of the KTD to tourists and local visitors. At an elevated level, passengers could enjoy the panoramic views of the Victoria Harbour, the beautiful landscape and those iconic developments in the KTD. In other words, it provides tourists/visitors with a great experience of travelling and sightseeing.

15. We have made references to overseas examples of revitalization of old areas with infrastructure investments to improve connectivity. The relevant findings on New Transit Yurikamome in Japan, Palm Jumeirah Monorail in Dubai and London Docklands Light Railway in the United Kingdom are summarized in **Annex E**. The overseas experience demonstrates that accessibility is a major factor in promoting development of a new area, similar to the KTD, and stimulating revitalization of an old area, similar to Kwun Tong and Kowloon Bay.

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2 The quantifiable economic benefits accrued to a transport infrastructure is generally measured in terms of time saving to commuters, operating cost savings for operators and cost saving due to accident reduction, amongst which time saving to commuters is usually the most significant parameter.

3 The economic internal rate of return is the net rate of return of the project calculated by subtracting the construction and operation costs during construction and the subsequent 50 years of operation from the economic benefits.

## **Implementation Programme**

16. The implementation of the EFLS is largely dependent on the development pace of some major infrastructure/developments in the KTD, for example, the SCL and the landscape deck along the former runway. Should public consensus on the EFLS be established, we anticipate that the tentative commissioning date of the EFLS would be around 2023. We will however make every endeavor to implement the project as soon as possible.

## **Implications of Kwun Tong Transportation Link**

17. The KTTL is an integral part of the EFLS. To achieve a more direct connection between Kai Tak and Kwun Tong, the KTTL, which will accommodate an EFLS cum pedestrian (and possibly cycle track), is recommended. The Study suggests to span this bridge link across the entrance of the KTTS, passing over the Kwun Tong Bypass and then sloping down to join the Kwun Tong Station, with a vertical clearance of 21 metres (m) above the sea level.

18. The suggested vertical clearance will impose a height restriction on vessels using the KTTS, and render it not possible for some high-mast dumb steel lighters to use the KTTS. According to the Marine Department's records, about 100 high-mast dumb steel lighters took refuge in the KTTS during the passage of typhoons in the past few years. Given that the KTTS has comparatively larger shelter area and is more conveniently located, it is frequently used by working vessels (including dumb steel lighters, river-trade vessels etc.) operating in Hong Kong. Any proposed restriction, which will prohibit dumb steel lighters and other types of vessels from using the KTTS, will have an impact on the port operation and efficiency as well as the cargo operation industry. To avoid causing adverse impact on the port operation and to safeguard the vessels' safety during inclement weather, we need to discuss with the affected industry to further explore effective, safe, feasible and acceptable alternative measures which can give the local fleet the needed shelter at time of typhoons. Accommodating the EFLS aside, if we could reduce the area of KTTS or limit the operation of the typhoon shelter (opening the waters for shelter during inclement weather), this will open up opportunity for co-use of the KTTS by other water sports/marina activities, an aspiration

expressed to us by some sports associations, subject to improvement in the water quality.

19. However, if the use of the KTTS by existing types of vessels is to be maintained, the KTTL has to be elevated to provide a vertical clearance of about 40 to 50 m with a long swirl approach ramp. This will encroach upon Action Area 2, therefore depriving the redevelopment opportunity of the Action Area. Such a bridge link will become a mammoth structure, which is visually intrusive. The sharp turning radius of the approach ramp will also impose technical constraint on the operation of the EFLS. Apart from the above, the extremely windy environment at height will render the bridge not suitable for pedestrians and cyclists.

### **Other Options of Road-based Green Public Transport**

20. The Study has also reviewed the use of road-based green public transport as an alternative of the proposed EFLS. Nowadays, there are various choices of green transport vehicles in the market worldwide. The latest green transport vehicles already in use in Hong Kong include ultra-low-sulphur diesel bus (Euro V Standard) and liquefied petroleum gas (LPG) mini-bus. Though the battery-electric bus, supercapacitor bus and hybrid bus are yet to be proven suitable for use in Hong Kong, the Government has planned to subsidize the franchised bus companies to conduct pilot schemes on these types of buses in order to ascertain their suitability for use in Hong Kong. The choice of an appropriate type would much depend on the feasibility of the technology and the outcomes of the pilot schemes. A brief description of the aforesaid green transport vehicles is enclosed at **Annex F**.

#### *Pros and Cons*

21. Road-based green transport vehicles will offer an advantage of lower capital cost and running cost and higher flexibility for route planning, but will occupy road space thus adding pressure to the already busy road network in the hinterland. The KTD, formerly being an airport with limited access points, is inherited with limited opportunities for significant road widening and improvements to junctions with adjoining districts. Besides, the road-based green transport vehicles are considered inferior to the rail-based EFLS in terms of carrying capacity, tourism appeal, safe, reliable and convenient intra-district

connectivity, synergy for developments and ability to enhance the visionary image of Kowloon East CBD. Having said that, given the cost and other implications associated with an elevated monorail, we remain open-minded and intend to engage the public more exhaustively in order to gauge their views on whether the road-based green transport modes should be adopted in place of the EFLS.

#### *Interim Arrangement*

22. Given that the population intake and transport demand in the KTD will start from 2013 upon completion of the cruise terminal building and the first berth and public housing development at the North Apron, some form of road-based green public transport services have to be provided. Should there be consensus for implementing the EFLS, such services could then be rationalized upon the commissioning of the EFLS to provide reasonable alternatives to the travellers.

### **INITIAL PUBLIC VIEWS AND RESPONSES**

23. We consulted Kwun Tong District Council (DC) on 2 February 2012, Housing and Infrastructure Committee of Kowloon City DC on 16 February 2012, the Local Vessels Advisory Committee (LVAC) on 22 February 2012, the Task Force on Kai Tak Harbourfront Development of the Harbourfront Commission on 12 March 2012, Wong Tai Sin DC on 13 March 2012 and the Transport Policy Committee of the Chartered Institute of Logistics and Transport on 23 March 2012.

24. District views collated were in general supportive to the EFLS proposal in the form of monorail on the ground that it would bring economic benefits to the area and regenerate Kowloon East into another CBD and they urged for the system's early implementation. There are also comments and debates on the alignment and the proposed vertical clearance of the KTTL, in particular the impact of the consequential restriction on high mast vessels in accessing the KTTS and alternative uses of KTTS. To address the concerns of the trade on the affected vessels, we have agreed to commission a survey and a study in mid 2012 to explore feasible and agreeable alternative measures. The key views collected and our initial responses are summarized in **Annex G**.



## **WAY FORWARD**

25. We will continue the Stage 1 public consultation exercise, including organization of two public engagement workshops in May/June 2012 and meeting with concern/focus groups and interested professional institutions to listen to their views. Under the Stage 2 public consultation, which will commence in the fourth quarter of 2012, views collected at the Stage 1 public consultation will be analyzed and reported to relevant stakeholders with a view to arriving at a consensus reflecting the majority of public views on the way forward for EFLS. We will commence the survey and study mentioned in paragraph 24 in mid 2012 to explore feasible and agreeable measures for the affected vessels for completion in end 2012.

## **ADVICE SOUGHT**

26. Members are invited to comment on the above Study findings. We will consult the Panel on Development again, tentatively in early 2013 during the Stage 2 public consultation process, to report the public views collected in Stage 1 public consultation.

**Development Bureau**  
**April 2012**