

LOCAL VESSELS ADVISORY COMMITTEE

Cross Bay Link, Tseung Kwan O

Purpose

1. The purpose of this paper is to advise members of the proposed alignment and form of the Cross Bay Link (CBL) in Tseung Kwan O. A Marine Impact Assessment (MIA) is presently being conducted to evaluate the marine impacts associated with the construction and operation of the bridge. This paper presents the initial findings of the MIA study.

Background

2. The proposed Cross Bay Link (CBL) bridges between TKO Area 86 and Tseung Kwan O – Lam Tin Tunnel (TKO-LTT) is to cater for the projected traffic flow generated from future population intake and developments in TKO. At present, Wan Po Road is the only road linking the southeastern part of TKO to the other areas. The CBL will provide an alternative access to the southeast TKO and significantly enhance the reliability of the road network serving this area. Moreover, heavy external traffic to and from the southeast industrial area of TKO will be able to by-pass TKO town centre and connect to Kowloon via CBL and TKO-LTT, thus minimizing adverse traffic and environmental impacts in TKO. CBL will be designed as a feature bridge across Junk Bay to become a landmark of TKO. (**Figure 1**)

Briefing on the Study

3. CBL is a dual two-lane carriageway of approximately 1.8 km long across the Junk Bay mainly on viaduct, connecting TKO-Lam Tin Tunnel to Wan Po Road at the southeastern part of TKO. The viaduct section of CBL has a cycle track and a footpath in addition to the road carriageway.

4. The distribution of marine activity, albeit sparsely, across CBL waters suggests that a Main Navigation Span for pleasure crafts, fishing vessels and, potentially, rivertrade vessel and fast ferry will be required to allow free passage of vessels through this waterspace.

5. In order to maintain the navigation channels for marine traffic, the viaduct of CBL will be designed to span over and across the channels with sufficient navigation width and clearance below the bridge.

Vessel Activity within Junk Bay

6. While the proposed CBL is specifically sited in an area of little traffic activity, its structure creates the potential for marine navigation issues. An extensive survey campaign was

undertaken to develop a comprehensive understanding of traffic patterns. The survey identified that:

- Traffic activity across the proposed CBL alignment is approximately 20 movements per day.
- The development does not impose significant diversions of the traffic or extensions of transit route.

Design Vessel Selection and Details

7. At present a series of options for the alignment are under review. For marine aspects the largest impact on vessel navigation is likely to be that associated with the longest section of CBL link span. We also note from Outline Zoning Plan that a seafront site of 16,932m² at Area 77 has been zoned by Planning Department as water sports and recreational facilities. (**Figure 1**)

8. Based on a review of VTS Radar Data, future planning and the latest vessel survey, typical vessel to transit under CBL may be summarised as Rivertrade Coastal Cargo Vessels, Small local fishing vessels, Emergency Service Patrol Launches, potential Fast Ferry and Sailing Boat to ISAF International Sailing Federation - Olympic Class. (**Figure 3**)

Proposed Navigation Bridge Span

CBL Main Navigation Span

9. The bridge span for the main CBL navigation channel is proposed to have a single 200m span to provide a 160m wide navigation channel. A minimum of 20.75mPD of net navigable height or charted vertical clearance of at least 17m would be provided, which could cater for the local marine traffic vessels using this area.

Southern Bridge at Eastern Channel

10. Southern Bridge is the proposed footbridge at the mouth of the Eastern Channel to the north of Junk Bay, and it will provide east to west pedestrian access across the channel (**Figure 2**). The Southern Bridge shall cater for existing and future marine activities of small local craft. The navigation channel is centred on the Eastern Channel and is proposed to be 72m wide. A charted vertical clearance of at least 5.57m over the central 25m of the navigation channel will be provided. It should be noted that the Southern Bridge has been designed to allow ease of access for disabled (wheelchair access) and elderly with a design gradient not exceeding 4% incline.

Assessment of Navigation Safety

11. The navigation safety with respect to the proposed span as outlined in the above paragraphs has been examined by simulations using a Full Mission Ship Simulator in the Marine Department (MD) Training Centre. The simulator comprises 3D computer model of the proposed

navigation bridge spans with a 210° angle of view and a virtual marine environment created with projection on a curved screen. The simulator has modelled the real situation very well. Experienced masters/operators of Rivertrade, Fast Ferry and FSD vessels have been responsible for steering the simulated vessels in the simulator to transit the proposed navigation spans. The key conclusions reached are as follows:

- It is identified from the simulations that the arrangement of bridge piers, bridge spans and marine navigation aids are suitable for masters to observe on-coming traffic and are adequately aligned for the bridge passage for safe transit.
- The span is considered wide enough for two vessels to transit simultaneously.

Marine Impact Assessment and Mitigation Measures

Construction Issues

12. Construction of the CBL will be largely a marine supported offshore operation with a large volume of off-site pre-fabrication. Impacts on the marine risk environment will arise with works barge traffic. As most of the marine construction activities occur in lightly trafficked areas, the marine impact is anticipated to be low. However, the future contractor will require close co-ordination to maintain safe passage for non-works vessels.

Ship Impact Protection Options

13. The ship protection system will be designed not only to protect the bridge structure, but also to protect the vessel and the environment against serious damage. The geometry of the protective structure will be developed to prevent overhang of the design vessel's bow from striking and causing damage to any exposed portion of the bridge. In principle two options are available: 1) The bridge elements can be designed to withstand the impact loads, or 2) A fender or protection system can be developed to prevent, redirect, or reduce the impact loads on bridge elements to non-destructive levels.

Further Assessments

14. Further analysis will be conducted at the next phase of the project to evaluate the need to introduce legislation to provide for a height restriction area in the vicinity of the CBL.

Advice

15. Members are invited to express their views on the project.

Figure 1 Junk Bay, Alignment of CBL and proposed Water Sports Facilities

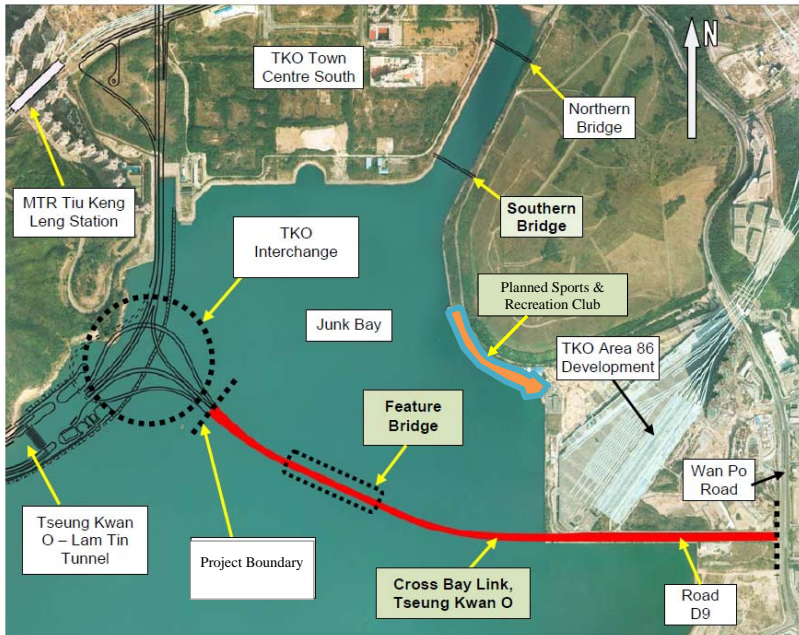


Figure 2 Leisure boating at Eastern Channel



Figure 3 Olympic Sailing Class – Laser Fleet, Star, 49er, Finn, 470, Elliot 6

