

Provisional Local Vessel Advisory Committee

Route 9 between Tsing Yi and Cheung Sha Wan – Stonecutters Bridge

Purpose

1. The purpose of this paper is to advise members of the initial alignment and form of the Stonecutters Bridge which will comprise part of Route 9 between Tsing Yi and Cheung Sha Wan. A Marine Impact Assessment (MIA) is presently being conducted to provide an evaluation of the marine issues associated with the construction of the bridge which will span between Container Terminal (CT) 9, and CT8, Figure 1. The scope of the MIA study, and initial findings will be presented, and views sought from the committee.

Background

2. The Stonecutters Bridge will span the 900m shipping channel between CT8 and CT9 with a navigation clearance to 73.5 m P.D. This height will allow the safe transit of current, and projected container vessels arriving or departing at Kwai Chung.

a) **Route 9 Impacts**

Route 9 construction will impose impacts on the marine risk environment by the addition of barge traffic and marine wharves for the support of viaduct construction and tunnelling operations which will form part of the works. However, the critical areas of marine risk and conflict with existing parties will be the bridge deck lifting operations from barges positioned within the entrance to Kwai Chung. Attention has been focussed on these operations and the traffic control measures which will be required to safe-guard the barges and passing traffic. These operations are provisionally scheduled for 2006/7.

b) **Stonecutters Bridge Construction**

The Stonecutters Bridge will be of either suspension or cable-stayed design, Figure 2. The impact of the construction works required for the lifting of bridge decks from barges has been initially examined for both options. Available traffic data has been reviewed, new data collected and traffic “conflict” models validated against existing baselines.

Barge operations and restrictions within the channel are expected to be of 6 – 8 hour duration. 30 – 45 lift operations will be required, and these operations will occur at a frequency of up to one lift every 2 days for the suspension option, or once every 6 – 8 days for the cable stayed option. Initial proposals for the diversion of marine traffic flows and the requirements for one-way or two-way navigation control have been developed, Figure 3.

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These proposals presently envisage the maintenance of regulated two-way traffic flows during barge operations at the edge or within the centre of the channel; one-way flow may be required when the barge is located approximately 1/3 across the channel. Therefore, any restrictions to port operations may be imposed during only 10-15 days of the bridge construction duration.

c) Marine Traffic Control

During barge deck lifting operations a 30m wide self-propelled barge will be located under the bridge alignment, guard vessels will establish local control. The level of delays presented by the establishment on one-way flow has been provisionally tested. The benefits of conducting operations during the generally quieter afternoon period from midday onwards has been identified. The impact assessment has been based on the holding of the departure of a vessel for 10 minutes should an incoming ocean-going vessel be passing the work site.

For the periods where one-way flow is required it is expected that, on average, this will impact the departure of up to 10 vessels, during an 8 hour operation, based on traffic levels 25% in excess of current activity.

The new CT8 Local Marine Traffic Control Station will play a central role in the co-ordination of operations between Marine Department, contractors, port operators and pilots.

d) Marine Impact Mitigation

A series of measures have been made to limit the duration of marine impact:

- Recommendations have been made with regard to the use of dynamic positioning barges, guard ships, and hydraulic actuated seafastenings to limit the duration, and hence risk, associated with bridge deck lifting operations. The total lift operations equates to between approximately 250 – 300 hours of barge operation and traffic control for installation of the complete central deck area;
- A risk assessment has highlighted the requirement for a secondary temporary support systems for deck units during construction of a cable stayed bridge. Such a secondary system will free the waterspace beneath the deck assembly area for the passage of vessels;
- It is recommended to minimise any incursion by temporary support stays into the navigation air draft reserve. This is due to the unacceptable narrowing of the channel for ocean-going vessels and the risk of impact from derrick lighter barges. The temporary works which will be used during the erection stages will be further investigated in the detailed design stage of the project, and any major findings presented to the committee when such information becomes available; and

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- The bridge pier impact case has been reviewed and the necessity of the 50m separation between pier centre line and seawall confirmed.

e) Ongoing Assessment

Ongoing analysis is being conducted to establish operational requirements for the traffic control system and conduct risk assessment of the marine traffic environment. This is using the following techniques:

- Numerical delay assessment;
- Fast time and real time simulation of vessel transits;
- Digital acquisition of Marine Department radar data to track the present passage of all vessels; and
- Dynamic traffic simulation to test the future traffic regime.

Advice Sought

3. Members are invited to express their views on the Stonecutters Bridge, the scope of MIA and any potential impacts it will have on marine operations.

Presentation

4. Officers of Highway Department, the Consultant responsible for the Route 9 (between Tsing Yi and Cheung Sha Wan) Design and Construction Consultancy Assignment, Ove Arup, together with marine specialist BMT Asia Pacific and accompanied by Mr. K.C. CHAN of the Marine Department, will present the paper.

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July 1999