

# **Proposed Marine Park in the Brothers Islands**

## **PURPOSE**

This paper presents the preliminary plan of the proposed marine park in the Brothers Islands (BIMP) for protection and enhancement of Chinese White Dolphins habitats within the areas.

## **BACKGROUND**

2. On 12 October 2009, the Advisory Council on the Environment (ACE) considered and endorsed with conditions the following Environmental Impact Assessment (EIA) reports related to “Hong Kong – Zhuhai - Macao Bridge” (HZMB) submitted by the Highways Department (HyD)<sup>1</sup> –

- a) HZMB Hong Kong Link Road (HKLR);
- b) HZMB Hong Kong Boundary Crossing Facilities (HKBCF); and
- c) Tuen Mun-Chek Lap Kok Link (TM-CLKL).

3. The conditions set out for the HZMB HKBCF project consist of the following among others:-

- a) The project proponent should advance the preparation works for the designation of the BIMP, including a study on the details of the designation and consultation with stakeholders, on the understanding that designation of the marine park would immediately follow completion of the project;
- b) The project proponent should submit the proposal and detailed plan, including the proposed size and management plan, of the proposed BIMP, in consultation with the Agriculture, Fisheries and Conservation Department (AFCD), to the ACE for comments and advice before the commencement of construction works; and
- c) The project proponent should not use underwater percussive piling for the project.

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<sup>1</sup> ACE Paper 16/2009 on EIA Reports of HZMB projects was discussed at the Meeting of the Advisory Council on the Environment on 12 October 2009.

4. The Director of Environmental Protection subsequently approved the EIA report of the HKBCF project with the above conditions on 23 October 2009 and issued the Environmental Permit on 4 November 2009.

### **PRELIMINARY STUDY FOR THE BIMP**

5. HyD subsequently appointed the Consultants, AECOM Asia Company Ltd., to carry out an Assignment on Preliminary Study for Marine Park in the Brothers Islands to establish the proposal and detailed plan of the proposed BIMP. The findings of the assignment are presented in the following paragraphs.

### **Ecological Value of the Areas**

6. The Chinese White Dolphin (CWD) is the key species of ecological interest in North Lantau waters. The waters in the vicinity of the Brothers Islands is one of the heavily utilized dolphin habitats in Hong Kong according to the findings of the long-term dolphin monitoring programme undertaken by Agriculture, Fisheries and Conservation Department (AFCD).

7. Scattered colonies of hard corals and gorgonians of low coverage are recorded at the artificial and natural coastlines of North Lantau, including the Brothers Islands. Other species or habitats of ecological interest such as mudflat, seagrass, horseshoe crab etc, are also found at the natural shoreline alongside the Airport Channel as well as Tai Ho at the south of the Brothers Islands.

8. Moderate capture fisheries production was recorded around the Brothers Islands and the Sha Chau and Lung Kwu Chau Marine Park; whereas the waters between the Brothers Islands and Lung Kwu Chau were also identified as important spawning grounds of commercial fisheries resources.

### **Derivation of the Preliminary Boundary of the Marine Park using Dolphin Habitat Rating System**

9. The selection of Marine Protected Areas (MPAs) should be systematic and rigorous with scientific justifications. Since the designation of BIMP

aims to conserve the CWD in North Lantau, due consideration should be given to identify and include important dolphin habitats within the proposed marine park boundary. For CWD in Hong Kong, a dolphin habitat rating system has been established to locate their priority habitat and the same approach and methodology is followed to derive the preliminary boundary of the BIMP.

10. The general approach of establishing the dolphin habitat rating system is to score a number of selected criteria based on different aspects of dolphin usage. The total scores will then be used to identify areas of importance to the dolphins. A total of 10 criteria have been chosen for evaluating the relative importance of dolphin habitat, which cover the overall dolphin densities (areas with high overall SPSE/DPSE<sup>2</sup>), densities of feeding and socializing activities (areas with high SPSE values for feeding/socializing), densities of young calves (areas with high DPSE values of unspotted calf / unspotted juvenile), the frequency of dolphin usage (areas with dolphin usage in most months / years, and the intensity of usage by individual dolphins as their core areas (areas with most overlaps of 25%/50% of utilization distribution core areas). Each criterion has been assessed among each 1-km<sup>2</sup> grid within North Lantau waters, and a score of 1 (least important) to 5 (very important) is given for each criterion to develop the dolphin habitat rating of the grid. After summing the scores of the ten criteria, the habitat rating or index of each grid is then worked out based on the total overall score, with the maximum possible total score of 50. Those grids with total scores in the range of 41-50, 31-40 and 21-30 are rated as “critical”, “important” and “above average” habitats respectively, and they will be regarded as potential area for further review. Throughout the evaluation process, quantitative data on various aspects of dolphin habitat use collected during 2001 – 09 by AFCD were obtained and analysed.

11. Around the Brother Islands, twelve grids of 1 km<sup>2</sup> area were identified as “important” or “above average” dolphin habitats as derived by the habitat index. However, the southernmost two grids of “above average” habitat rating overlap with the area proposed for locating the Lantau Logistic Park (LLP) now under planning. Taking into account that the possibility for the future reclamation work of LLP which will permanently occupy part of the area of these two grids, they are therefore excluded for further consideration. The remaining 10 grids of “important” and “above average” habitats are then taken forward for delineation of the preliminary boundary of BIMP (see [Figure 1](#)).

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<sup>2</sup> SPSE - Number of On-effort Sightings per 100 Units of Survey Effort  
DPSE - Number of Dolphins per 100 Units of Survey Effort

## **Preliminary Boundary for the Proposed Marine Park**

12. There are frequent and busy marine activities surrounding the 10 grids of potential area. To determine the preliminary boundary of the proposed marine park, the potential area of the marine park was further reviewed taking into account the existing and committed uses of marine waters and marine traffic in the vicinity (see [Figure 2](#)). In this regard, it is considered necessary for the proposed marine park to avoid, from marine safety consideration, the navigation channel of Urmston Road<sup>3</sup>, and to exclude the waters to be reclaimed for the southern landfall of the TM-CLKL. The remaining area would then be the preliminary boundary of the proposed marine park at the Brothers Islands (see [Figure 3](#)). The size of the proposed marine park will be about 850 ha and it will include within its boundary the scattered coral colonies, area of moderate fisheries value and important spawning grounds for commercial fisheries resources (see also [Figure 3](#)). Hence, the proposed marine park would help protect marine ecology and also the fisheries resources in North Lantau waters.

13. It should be noted that the preliminary boundary of the proposed BIMP derived above is provisional at this early stage. The exact boundary of the marine park shall be subject to further investigation in the detailed study on the proposed BIMP scheduled to commence in around 2013/2014. Under the detailed study, consultation with the stakeholders will be conducted and their views will be solicited before finalizing the marine park boundary. Further refinement on the boundary of the BIMP may also be made taking into account the most up-to-date information on dolphin distribution, marine traffic, existing facilities and planned developments in the vicinity of the Brothers Islands available at that time.

14. As the southwestern corner of the proposed BIMP will be an essential corridor for vessels plying between Tung Chung and North West New Territories after the construction of HKBCF and TM-CLKL and those visiting the proposed LLP at Siu Ho Wan, this portion of the proposed BIMP will be subject to further review after consultation with stakeholders including the

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<sup>3</sup> The Urmston Road Navigation Channel is the major conduit for ocean-going vessel and rivertrade vessel transits east-west between Hong Kong waters and the PRD. To minimize the potential marine hazards, the potential area of the proposed BIMP would avoid the Urmston Road and its adjacent water at the north of the Brothers Islands.

marine industry during the detailed study.

## MANAGEMENT PLAN

15. To better achieve the objective of conserving and protecting CWD habitats in the vicinity of the Brothers Islands, a preliminary management plan for the proposed BIMP has also been worked out. Possible management measures identified in the preliminary study include:

- Designation of anchorage area - to designate the existing Sham Shui Kok Anchorages as designated anchoring area within the proposed BIMP;
- Establishment of core area - to further conserve important CWD habitat;
- Monitoring programme – to carry out collaborative scientific research and monitoring of CWD, fisheries resources and water quality within the proposed BIMP and adjacent waters;
- Fishing control - to control commercial fishing in marine parks for improving ecosystems in marine parks and offering better protection for marine organisms; and
- Education programme – to launch education campaign to enlighten the public on the importance and significance of the proposed BIMP.

16. Important spawning ground for the commercial fisheries resources is identified in North Lantau waters and it covers the waters in the vicinity of the Brothers Islands. To protect and enhance marine habitats and associated fish stocks, the following two enhancement measures will also be considered:

- **Deployment of Artificial Reefs (ARs)** - According to the HZMB HKBCF EIA Report (HyD, 2009), provision of 10,800 m<sup>3</sup> of ARs is recommended as ecological and fisheries compensation and enhancement measures. Part of the new ARs may be deployed within the proposed BIMP to enhance the ecological environment therein, with quantity to be worked out during detailed study stage upon consultation with relevant stakeholders.
- **Restocking of Fish Fry** - Restocking of fish fry at the new AR sites is another possible measure to enhance fish resources in North Lantau waters. The species and quantities of fish fry to be released and the suitable restocking time would be explored in the detailed study stage of the proposed BIMP.

17. In addition to protecting the spawning ground for commercial fisheries and enhancing fisheries resources, the enhancement measures proposed above may also bring benefits to CWD whose prey food species are dependent on sustainable and healthy fish stocks.

18. Similar to the marine park boundary, the management plan of BIMP including the proposed enhancement measures will be further reviewed and refined based on the findings obtained in the detailed study of the proposed BIMP and the outcomes of the consultation exercise with relevant stakeholders.

19. AFCD will be the key government department responsible for the operation, management and law enforcement of the marine park after its designation under the Marine Parks Ordinance (Cap. 476). Other departments, such as Marine Department and Marine Police will also be involved in the management and enforcement within the areas under their respective jurisdictions.

20. HyD will take the lead and work together with AFCD in the preparation works for the designation of the BIMP. It is expected that a detailed study to finalize the marine park boundary and management plan be initiated in around 2013/2014, followed by implementation of the necessary legislative procedure, such that the designation of the marine park will immediately follow the completion of the HZMB project in around 2016.

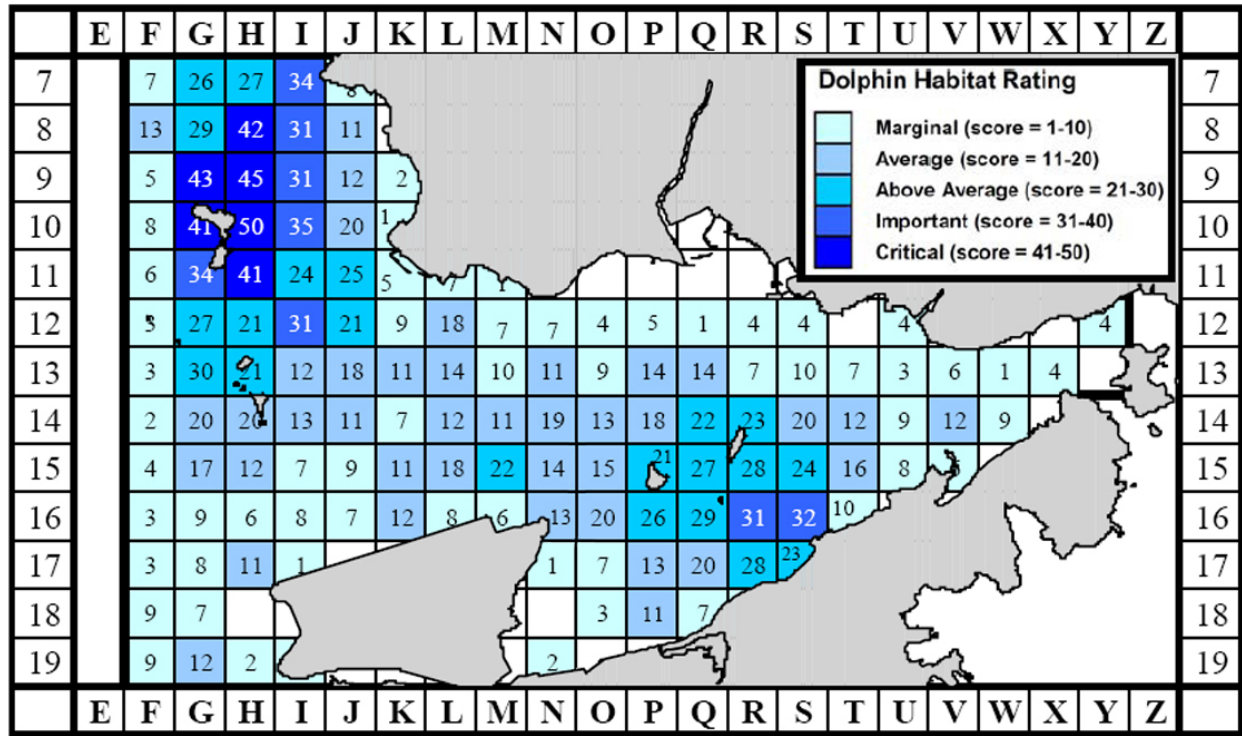


FIG. 1A HABITAT RATING OF CHINESE WHITE DOLPHINS IN NORTH LANTAU USING QUANTIATIVE HABITAT USE INFORMATION COLLECTED DURING 2001-09 (NUMBER WITHIN GRIDS REPRESENTS THE SUM OF SCORES TOTALED FROM 10 SELECTION CRITERIA)

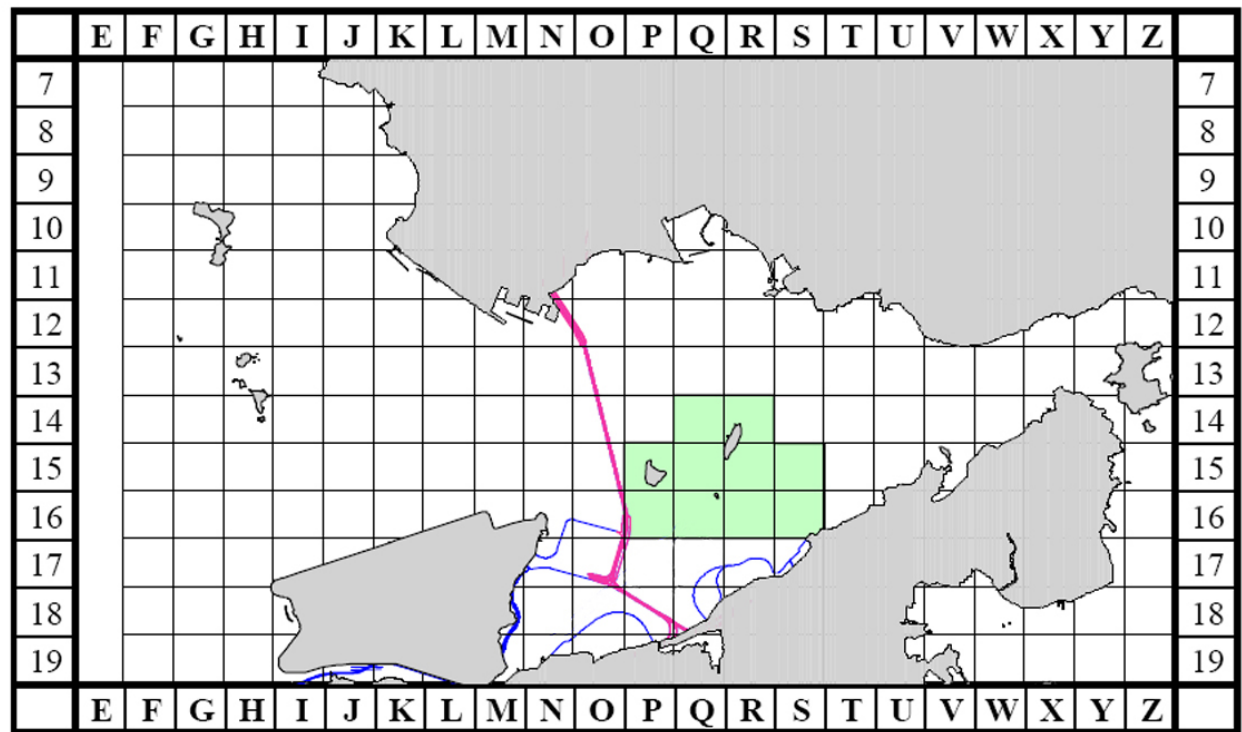

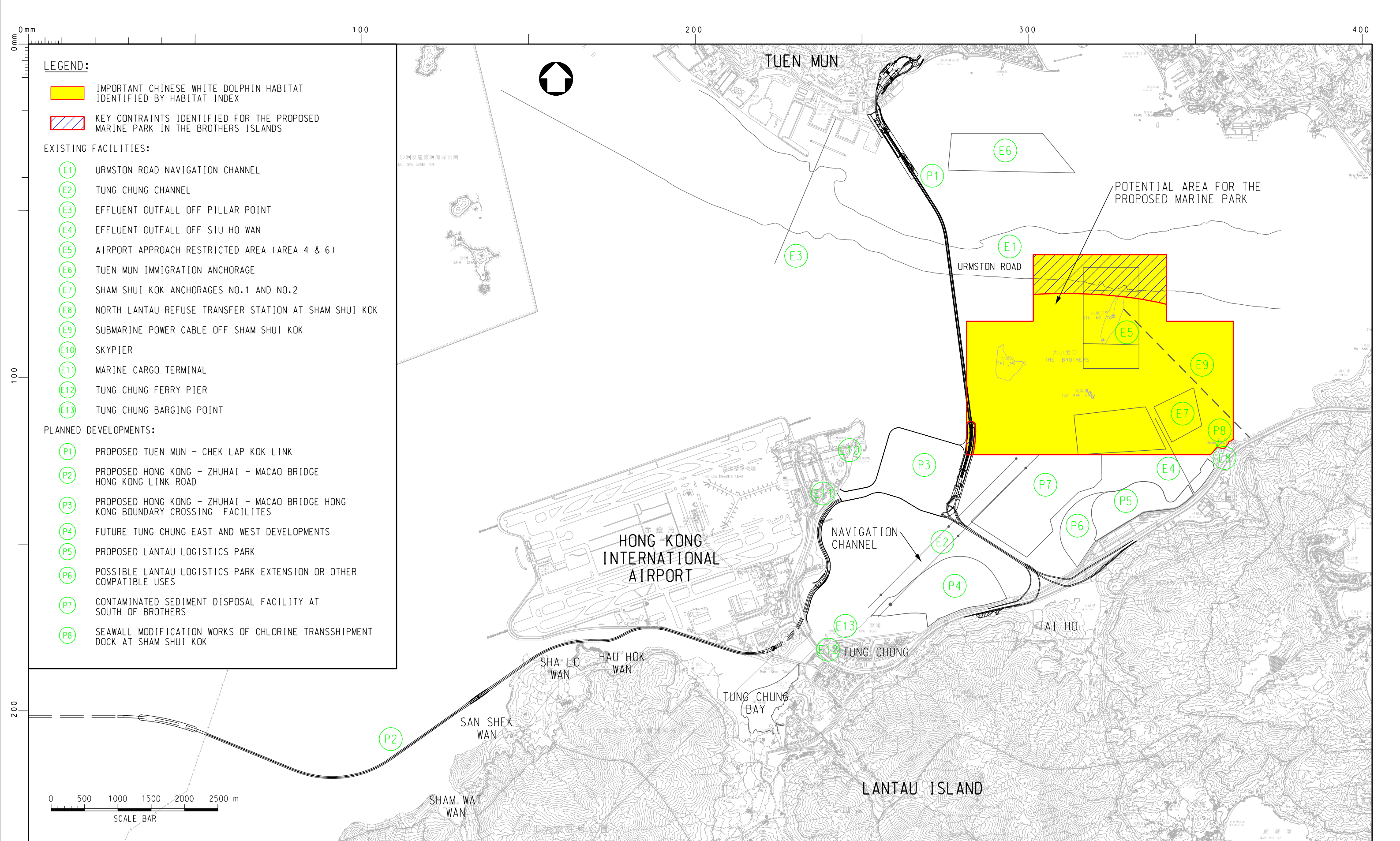


FIG. 1B TEN GRIDS (IN GREEN) OF POTENTIAL AREA FOR FURTHER DELINEATION OF PRELIMINARY BOUNDARY OF BROTHERS ISLANDS MARINE PARK

drawing title  DOLPHIN HABITAT RATING AND THE IDENTIFIED TEN GRIDS OF IMPORTANT DOLPHIN HABITAT IN NORTH LANTAU WATERS	designed W K LAM 24/11/11	drawn Y L SHIU 24/11/11	drawing no. FIGURE 1	scale N.T.S.
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**LEGEND:**

- IMPORTANT CHINESE WHITE DOLPHIN HABITAT IDENTIFIED BY HABITAT INDEX
- KEY CONSTRAINTS IDENTIFIED FOR THE PROPOSED MARINE PARK IN THE BROTHERS ISLANDS

**EXISTING FACILITIES:**

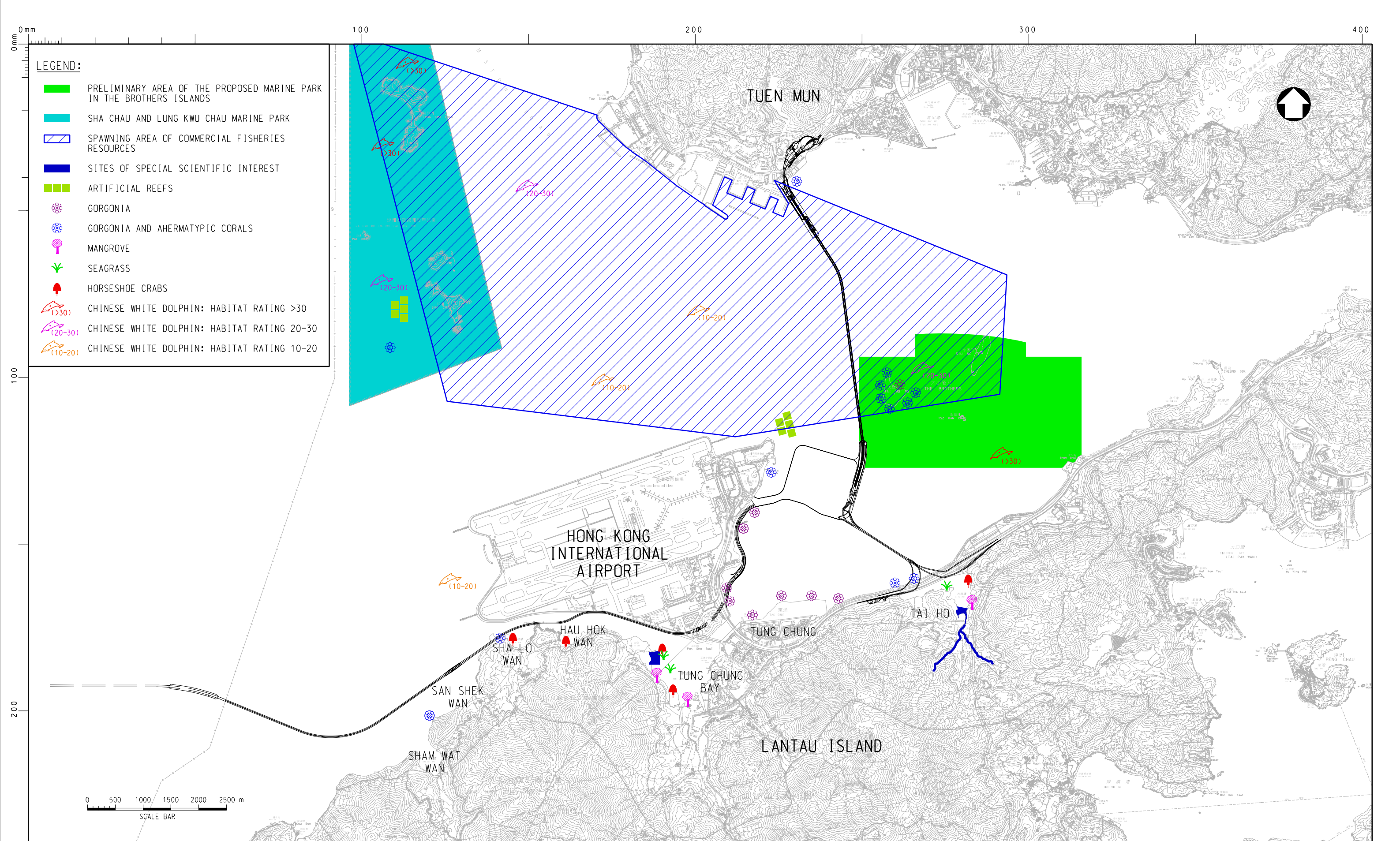
- E1 URMSTON ROAD NAVIGATION CHANNEL
- E2 TUNG CHUNG CHANNEL
- E3 EFFLUENT OUTFALL OFF PILLAR POINT
- E4 EFFLUENT OUTFALL OFF SIU HO WAN
- E5 AIRPORT APPROACH RESTRICTED AREA (AREA 4 & 6)
- E6 TUEN MUN IMMIGRATION ANCHORAGE
- E7 SHAM SHUI KOK ANCHORAGES NO.1 AND NO.2
- E8 NORTH LANTAU REFUSE TRANSFER STATION AT SHAM SHUI KOK
- E9 SUBMARINE POWER CABLE OFF SHAM SHUI KOK
- E10 SKYPIER
- E11 MARINE CARGO TERMINAL
- E12 TUNG CHUNG FERRY PIER
- E13 TUNG CHUNG BARGING POINT

**PLANNED DEVELOPMENTS:**

- P1 PROPOSED TUEN MUN - CHEK LAP KOK LINK
- P2 PROPOSED HONG KONG - ZHUHAI - MACAO BRIDGE HONG KONG LINK ROAD
- P3 PROPOSED HONG KONG - ZHUHAI - MACAO BRIDGE HONG KONG BOUNDARY CROSSING FACILITIES
- P4 FUTURE TUNG CHUNG EAST AND WEST DEVELOPMENTS
- P5 PROPOSED LANTAU LOGISTICS PARK
- P6 POSSIBLE LANTAU LOGISTICS PARK EXTENSION OR OTHER COMPATIBLE USES
- P7 CONTAMINATED SEDIMENT DISPOSAL FACILITY AT SOUTH OF BROTHERS
- P8 SEAWALL MODIFICATION WORKS OF CHLORINE TRANSSHIPMENT DOCK AT SHAM SHUI KOK

<p>drawing title</p> <p><b>HONG KONG-ZHUHAI-MACAO BRIDGE (HZMB) HONG KONG BOUNDARY CROSSING FACILITIES (HKBCF) PRELIMINARY STUDY FOR MARINE PARK IN THE BROTHERS ISLANDS - KEY CONSTRAINTS IDENTIFIED FOR THE PROPOSED MARINE PARK IN THE BROTHERS ISLANDS</b></p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="font-size: small;">designed</td> <td style="font-size: small;">W K LAM</td> <td style="font-size: small;">24/11/11</td> </tr> <tr> <td style="font-size: small;">checked</td> <td style="font-size: small;">C H CHAN</td> <td></td> </tr> </table>	designed	W K LAM	24/11/11	checked	C H CHAN		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="font-size: small;">drawn</td> <td style="font-size: small;">K L LEUNG</td> <td style="font-size: small;">24/11/11</td> </tr> <tr> <td style="font-size: small;">approved</td> <td style="font-size: small;">K M BOK</td> <td></td> </tr> </table>	drawn	K L LEUNG	24/11/11	approved	K M BOK		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="font-size: small;">drawing no.</td> <td style="font-size: small;">FIGURE 2</td> </tr> <tr> <td colspan="2" style="font-size: x-small; text-align: center;">© COPYRIGHT RESERVED</td> </tr> <tr> <td colspan="2" style="text-align: center;"> <b>HIGHWAYS DEPARTMENT HONG KONG</b> </td> </tr> </table>	drawing no.	FIGURE 2	© COPYRIGHT RESERVED		<b>HIGHWAYS DEPARTMENT HONG KONG</b>	
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- LEGEND:**
- PRELIMINARY AREA OF THE PROPOSED MARINE PARK IN THE BROTHERS ISLANDS
  - SHA CHAU AND LUNG KWU CHAU MARINE PARK
  - SPAWNING AREA OF COMMERCIAL FISHERIES RESOURCES
  - SITES OF SPECIAL SCIENTIFIC INTEREST
  - ARTIFICIAL REEFS
  - GORGONIA
  - GORGONIA AND AHERMATYPIC CORALS
  - MANGROVE
  - SEAGRASS
  - HORSESHOE CRABS
  - CHINESE WHITE DOLPHIN: HABITAT RATING >30
  - CHINESE WHITE DOLPHIN: HABITAT RATING 20-30
  - CHINESE WHITE DOLPHIN: HABITAT RATING 10-20

drawing title

**HONG KONG-ZHUHAI-MACAO BRIDGE (HZMB) HONG KONG BOUNDARY CROSSING FACILITIES (HKBCF)  
PRELIMINARY STUDY FOR MARINE PARK IN THE BROTHERS ISLANDS -  
PRELIMINARY AREA OF THE PROPOSED MARINE PARK IN THE BROTHERS ISLANDS**

designed	drawn
W K LAM 24/11/11	K L LEUNG 24/11/11
checked	approved
C H CHAN	K M BOK

drawing no. **FIGURE 3**  
scale **1:60000**

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