

**Detailed Site Selection Study  
for a Proposed Contaminated Mud  
Disposal Facility within the Airport  
East/East of Sha Chau Area  
Agreement No. CE 12/2002(EP)**

*Environmental Impact Assessment (EIA)  
and Final Site Selection Report*

23<sup>rd</sup> May 2005

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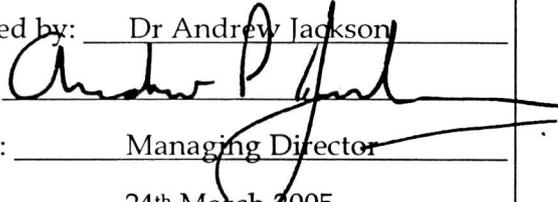
Civil Engineering and Development  
Department

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Disposal Facility within the Airport  
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24<sup>th</sup> March 2005

Reference C2693

For and on behalf of
Environmental Resources Management
Approved by: <u>Dr Andrew Jackson</u>
Signed: 
Position: <u>Managing Director</u>
Date: <u>24<sup>th</sup> March 2005</u>

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**DETAILED SITE SELECTION STUDY FOR A PROPOSED CONTAMINATED MUD  
DISPOSAL FACILITY WITHIN THE AIRPORT EAST/EAST OF SHA CHAU AREA  
AGREEMENT NO. CE 12/2002 (EP)**

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA)  
AND FINAL SITE SELECTION REPORT**

**- Executive Summary -**

**BACKGROUND TO THE STUDY**

Capacity to dispose of contaminated mud is currently predicted to be exhausted by early 2009 with the completion of backfilling of the Contaminated Mud Pit (CMP) IV at East of Sha Chau. These recently revised predictions have indicated that there has been a reduction in the forecasted amounts of contaminated mud requiring disposal, primarily as a result of a decrease in marine dredging operations in Hong Kong. Several factors may still act to affect the arisings of contaminated mud including:

- reprioritization and reprogramming of works projects;
- increasing control of land-based contaminant sources; and,
- continued implementation of *ETWBTCW No. 34/2002*.

When CMP IV is full, a replacement environmentally acceptable disposal facility for arisings of contaminated mud will be required. A minimum capacity of 8 Mm<sup>3</sup> has been identified to provide disposal capacity up to 2015. The assignment *Strategic Assessment and Site Selection Study for Contaminated Mud Disposal (Agreement CE 105/98)* recommended a Contained Aquatic Disposal facility (CAD) at Airport East, such as those already used at East of Sha Chau) at <sup>(1)</sup>. The results and recommendations of *CE 105/98* were presented to the Advisory Council on the Environment (ACE) on 23<sup>rd</sup> July 2001 (*ACE Paper 4/2001*).

Although members of ACE had no objection to proceeding with the recommended EIA, they considered that all sites; in particular, remaining portions of East of Sha Chau, and other disposal options, in particular a confined disposal facility (CDF – material confined within an artificial island) should still be considered. To meet these requirements this study identified suitable sites and disposal options at the South Brothers and East of Sha Chau areas and, secondly it evaluated the environmental acceptability of impacts associated with their construction and operation, through an Environmental Impact Assessment (EIA), and thirdly, based on a comparison of the outcomes of the two EIAs, a preferred disposal facility was recommended.

(1) ERM - Hong Kong, Ltd (1999) Strategic Assessment and Site Selection Study for Contaminated Mud Disposal. Final Report. For the Civil Engineering Department, Hong Kong SAR Government.

This Executive Summary provides a précis of the *Environmental Impact Assessment and Final Site Selection Report (EIA FSS)* and presents the recommended disposal facility.

## **PURPOSE AND SCOPE OF THE EIA**

The Project is classified as a Designated Project by virtue of Item C (Reclamation, Hydraulic and Marine Facilities, Dredging and Dumping), Item C.10 (A Marine Dumping Area) and C.12 (A Dredging Operation Exceeding 500,000 m<sup>3</sup>) of Part I of Schedule 2 under the *Environmental Impact Assessment Ordinance (Cap. 499) (EIAO)*.

In order to identify the preferred alternative in both the East of Sha Chau and the Airport East areas a list of potential alternatives was first compiled. In each area, three potential sites were identified following a constraint mapping process, and for each of the total of six sites, two disposal options were considered, CAD and CDF.

To assess which alternatives of the twelve alternatives should be taken forward to the detailed EIA stage, an evaluation of each of the twelve alternatives based on environmental, engineering and planning considerations has been conducted. A ranking system was applied to reflect the degree of suitability or unsuitability of the alternative. The outcome indicates that CAD facilities located South of the Brothers and adjacent to the existing facility in East of Sha Chau ranked the highest and were therefore considered to be most suitable.

A thorough evaluation of both the South Brothers and East of Sha Chau Facilities was undertaken to determine the acceptability of predicted impacts to water quality from dredging, backfilling and capping of the pits and other concurrent activities. The study will also contribute to decisions on the overall environmental acceptability of the Project, after the implementation of environmental mitigation measures.

The EIA provides a detailed assessment of the potential environmental impacts associated with the Project, in relation to the issues specified in the *EIA Study Brief* (No. ESB-095/2001), including water quality, marine ecology, fisheries, hazard to health, noise and cultural heritage.

## **PROJECT DESCRIPTION**

### **Location and Scale of the Project**

The Study Area is located within the waters off the coast of North Lantau (*Figure 1.1*).

#### *East of Sha Chau Facility*

A preliminary layout for the proposed facility is shown in *Figure 1.2*, along with indicative dimensions. The Project involves the sequential disposal of contaminated mud into a series of dredged pits (Pits A, B, C and D). The sequential construction and operation of the pits has been used to develop scenarios for sediment transport modelling, assess marine traffic issues and identify key environmental issues for water quality, ecology, fisheries, human health, noise and heritage assessments.

#### *South Brothers Facility*

A preliminary layout for the proposed facility is shown in *Figure 1.3*, along with indicative dimensions. As with the East of Sha Chau Facility, the Project involves the sequential disposal of contaminated mud into a series of dredged pits (Pits A, B and C). The sequential construction and operation of the pits has been used to develop scenarios for sediment transport modelling, assess marine traffic issues and identify key environmental issues for the water quality, ecology, fisheries, human health, noise and heritage assessments.

### **Construction and Operational Activities**

The works that are the subject of the EIA Study include the construction and operation phases of the Project. The key components of the Project include the following:

1. Dredging of a series of seabed pits within either the East of Sha Chau Facility or South Brothers Boundaries;
2. Backfilling each dredged pit with contaminated mud that has been classified as requiring Type 2 disposal in accordance with *ETWBTC 34/2002* <sup>(1)</sup>; and,
3. Capping each backfilled pit with uncontaminated mud effectively isolating the contaminated mud from the surrounding marine environment.

<sup>(1)</sup> ETWBTC (2002). Management of Dredged/Excavated Sediment. Environment, Transport and Works Bureau Technical Circular 34/2002.

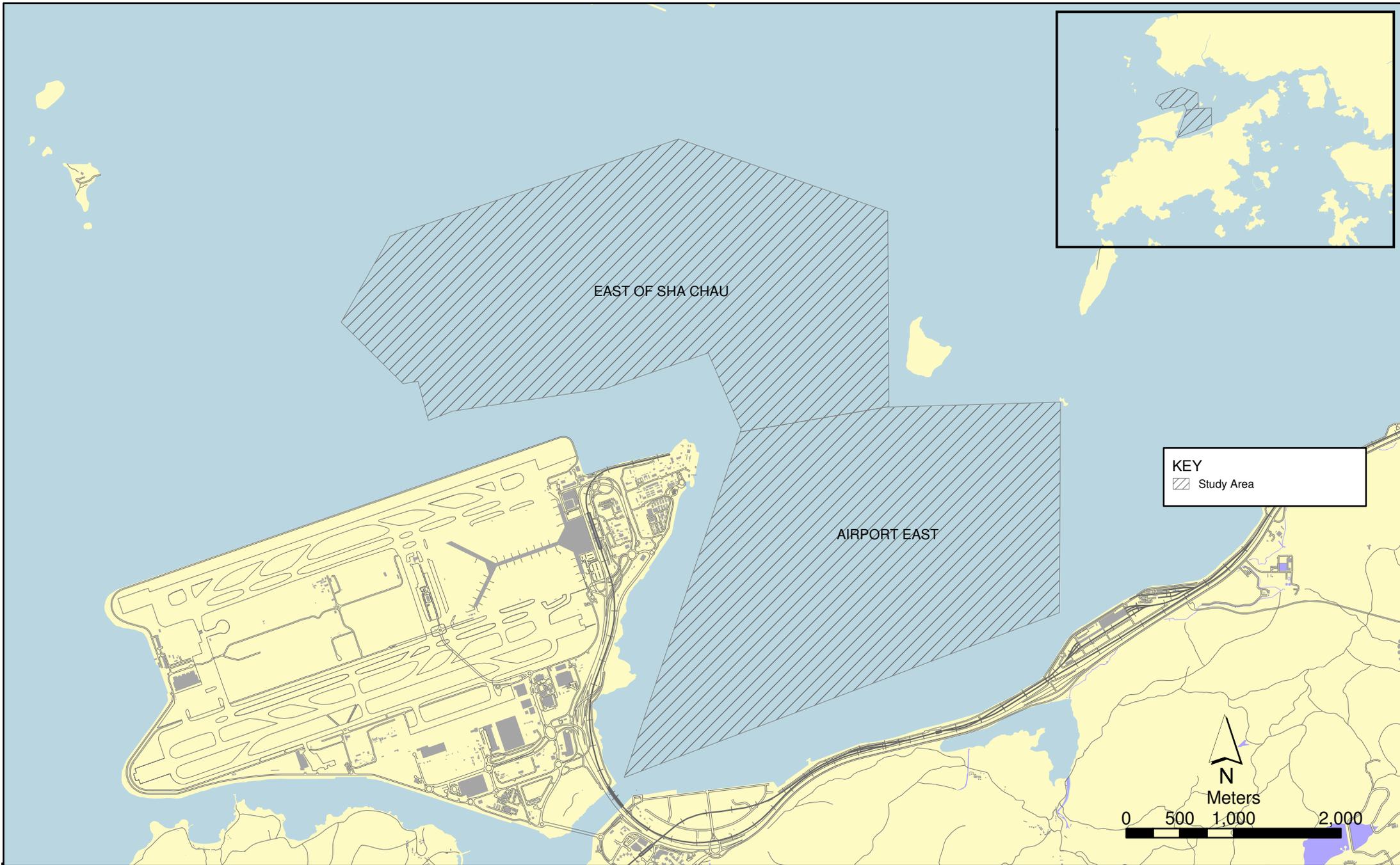


FIGURE 1.1

LOCATION OF THE AIRPORT EAST AND EAST OF SHA CHAU STUDY AREAS

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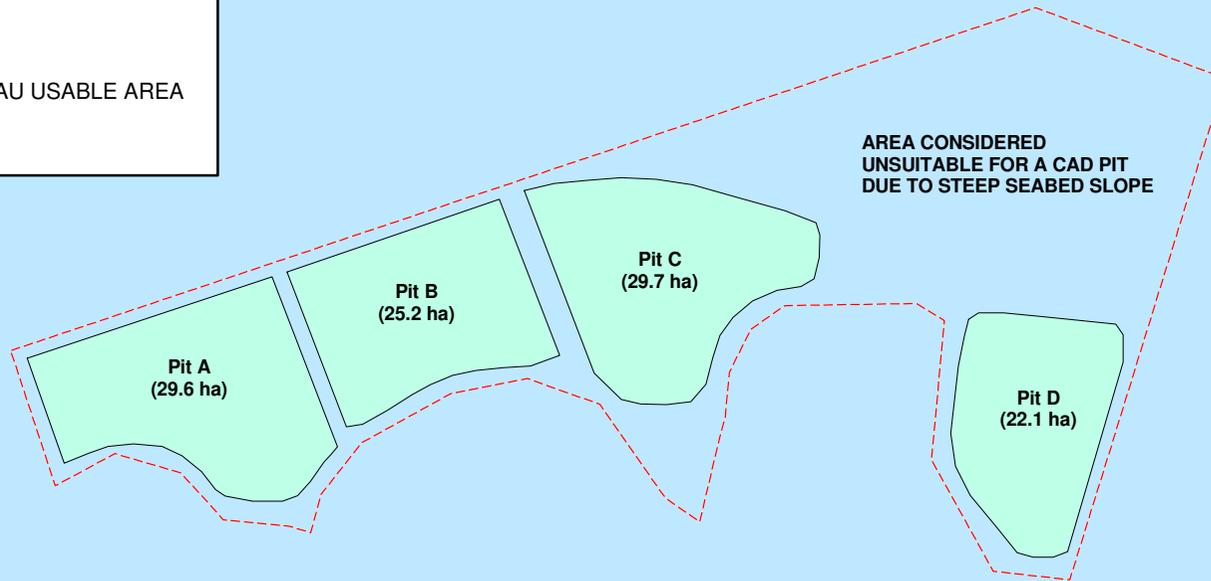
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**KEY**

- EAST OF SHA CHAU USABLE AREA
- CAD PIT



NOTE: THIS LAYOUT SHOULD BE REGARDED AS PRELIMINARY AND CAN BE EXPECTED TO CHANGE

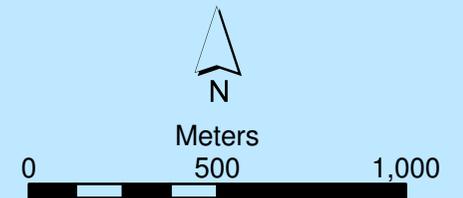


FIGURE 1.2

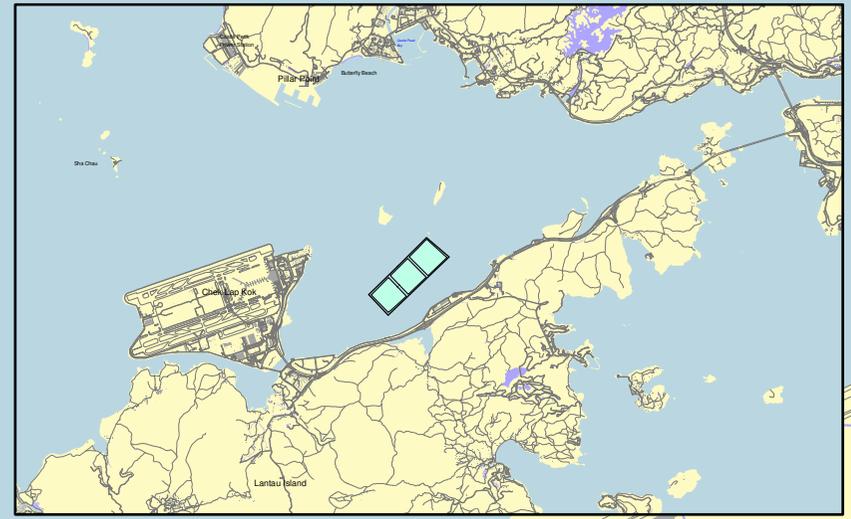
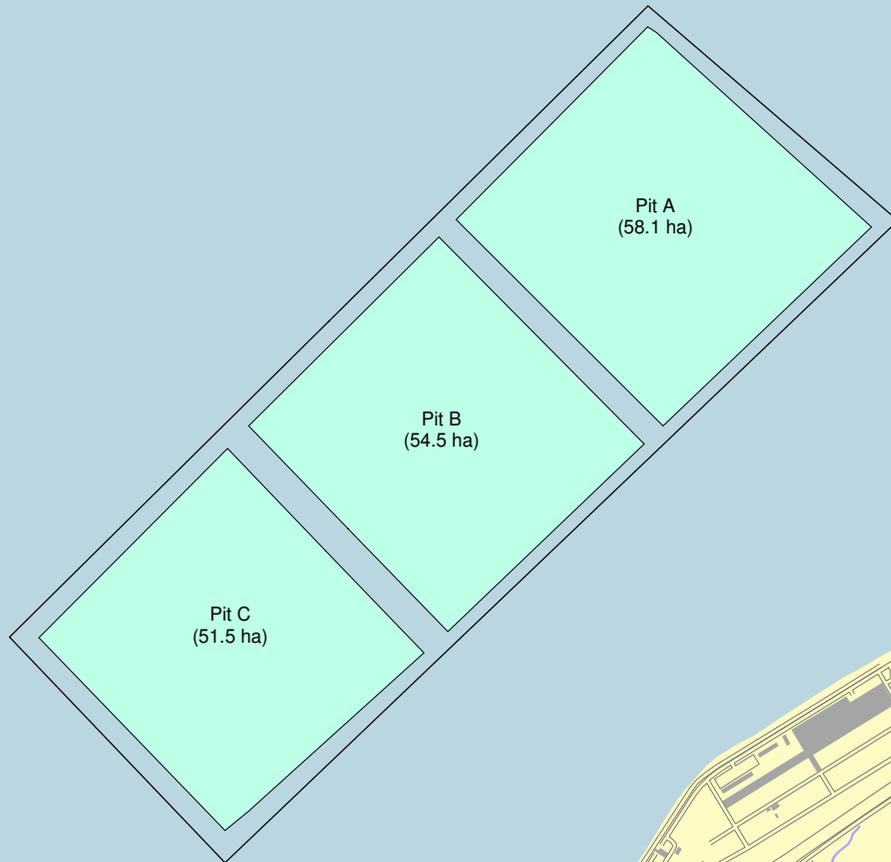
PRELIMINARY LAYOUT FOR A MULTI-PIT CONTAINED AQUATIC DISPOSAL (CAD) FACILITY IN THE EAST OF SHA CHAU AREA

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**KEY**  
 CAD PIT  
 SOUTH BROTHERS USABLE AREA



NOTE: THIS LAYOUT SHOULD BE REGARDED AS PRELIMINARY AND CAN BE EXPECTED TO CHANGE

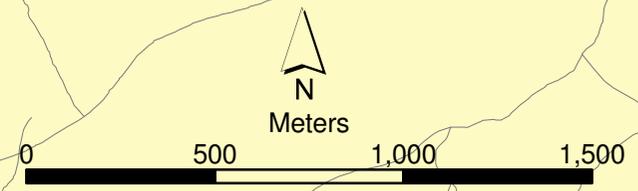


FIGURE 1.3

PRELIMINARY LAYOUT FOR A MULTI-PIT CONTAINED AQUATIC DISPOSAL (CAD) FACILITY AT THE SOUTH BROTHERS

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## **ENVIRONMENTAL IMPACTS**

### **Comparison of Facilities**

In the comparison of facilities it is important to note that under the *Strategic Assessment and Site Selection Study for Contaminated Mud Disposal (Agreement CE 105/98)*, a detailed SAR-wide review of potential sites for a new contaminated mud disposal facility was undertaken. This study recommended that East of Sha Chau be taken forward as the preferred site.

Although members of ACE had no objection to proceeding with this site, they considered that the remaining portions of East of Sha Chau should be reviewed. As such, this study has investigated the potential of both the South Brothers and East of Sha Chau areas to accommodate a new contaminated mud disposal facility.

The purpose of the assessment was to thoroughly evaluate both the South Brothers and East of Sha Chau Facilities in terms of the acceptability of predicted impacts to water quality, marine ecology, fisheries, hazard to health, noise and cultural heritage from dredging, backfilling and capping of the pits, as well as the residual impacts and those from concurrent activities. Through this assessment, differences in the potential environmental performance of each facility have become apparent.

Through the adoption of currently acceptable dredging, backfilling and capping rates, the construction and operation of either the East of Sha Chau or the South Brothers Facilities will not result in exceedances of the Water Quality Objectives at specific sensitive receivers (*Figures 1.4 and 1.5*).

### **Recommended Facility**

A detailed environmental assessment of both the East of Sha Chau and South Brothers Facilities has been undertaken to determine their relative suitability for the development of a contaminated mud disposal facility. The results of this study indicate that East of Sha Chau area should be used in preference to the South Brothers site due to less uncertainties related to concurrent projects on the North Lantau coastline between 2008-2010. The South Brothers pits may however still be required post 2010, should capacity be reached earlier than expected at East of Sha Chau or one or more of the East of Sha Chau pits not being available due to planning constraints. If this is the case then the EIA of the South Brothers shall be reviewed and assessed for its relevance to ensure that the information contained in the current study (*Agreement No. CE12/2002 (EP)*) is not outdated. Following the precautionary principle and due to the proximity of Tai Ho Bay and the uncertainties in the final plans for projects on the North Lantau coastline, operations at South Brothers Pit C should be avoided. It should be noted that Pit B at South Brothers will only be used if Pit A is proven to be environmentally acceptable through Environmental Monitoring and Audit works.

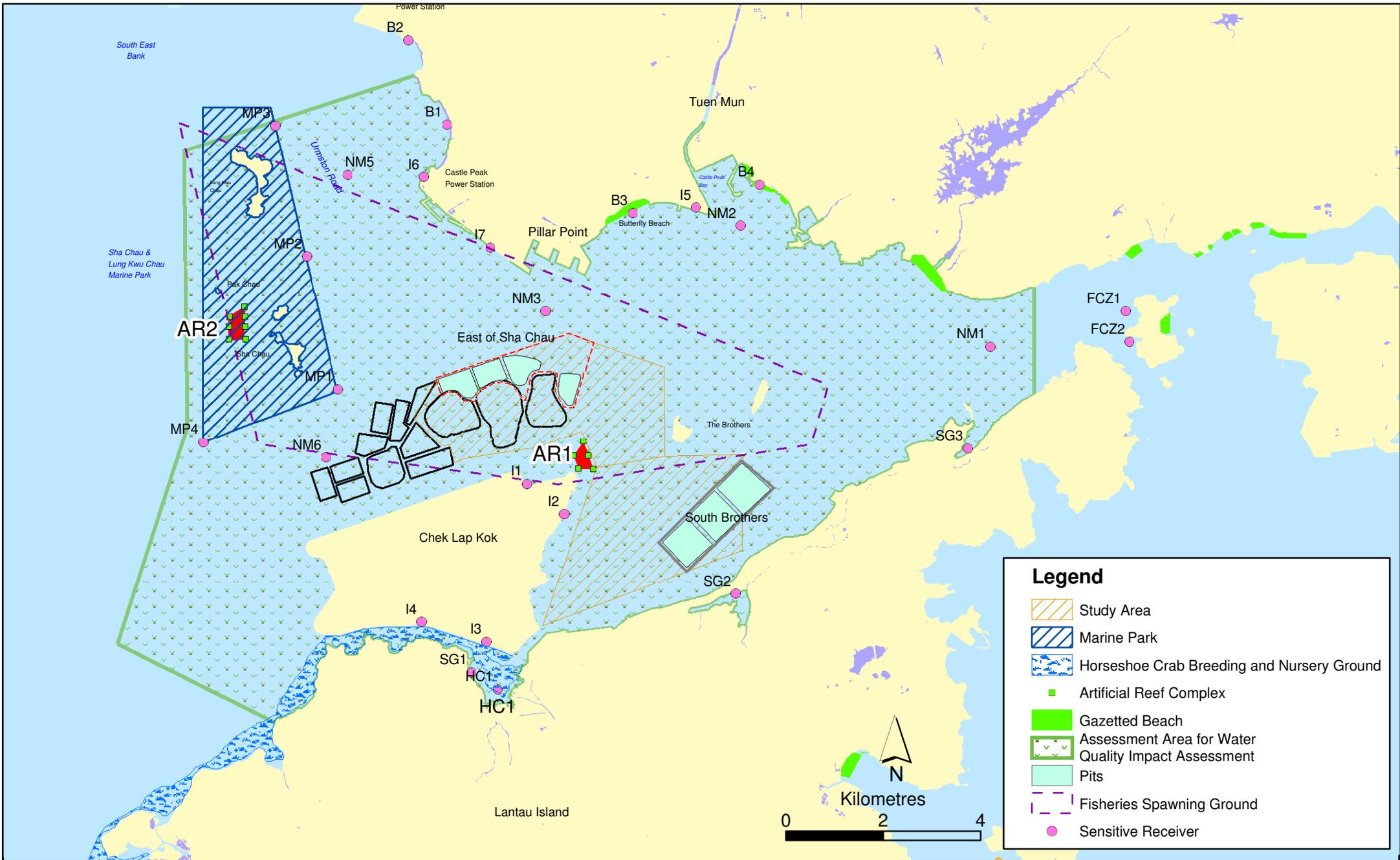


FIGURE 1.4

WATER QUALITY SENSITIVE RECEIVERS WITHIN THE ASSESSMENT AREA FOR WATER QUALITY IMPACT ASSESMENT

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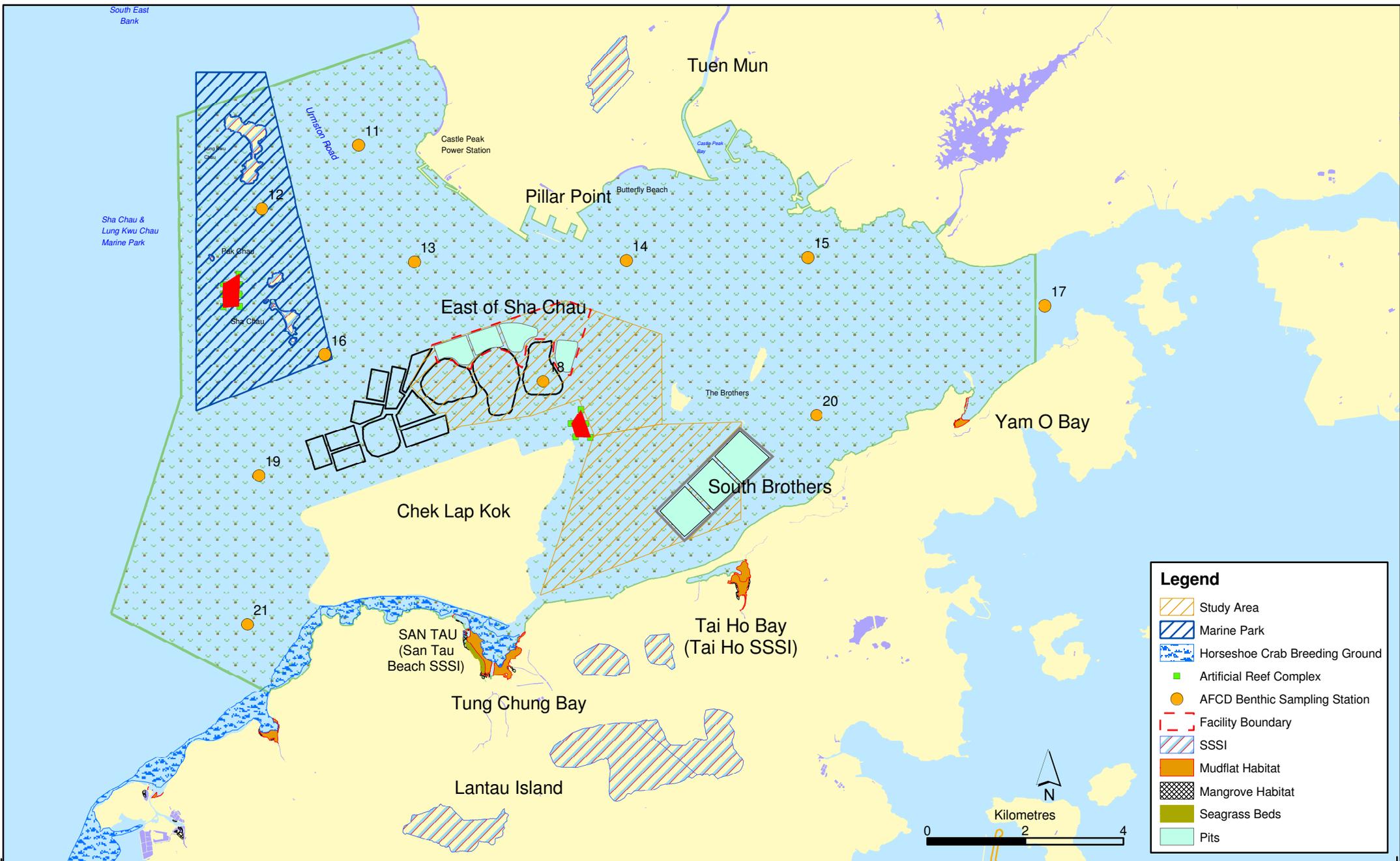


FIGURE 1.5

KEY MARINE ECOLOGICAL HABITATS WITHIN THE ASSESSMENT AREA

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Based on the above, the multi-pit purpose-dredged Contained Aquatic Disposal facility (CAD) at East of Sha Chau is recommended for detailed design and implementation.

It is important to note, however, that in terms of overall impacts, both facilities are considered to be acceptable on the grounds that both meet the relevant assessment criteria. Thus, should the area currently selected for the East of Sha Chau Facility not be available when required, there are no insurmountable problems associated with proceeding sequentially with the South Brothers Facility, if considered necessary.

Should arisings increase beyond the levels in the current forecast, then it may well be possible to proceed with facilities within both the East of Sha Chau and the South Brothers Area.

### **Project Programme**

The construction of the first pit at the East of Sha Chau Facility is expected to be dredged during 2007/2008 in order to be ready to receive contaminated mud in early 2009. According to the arisings estimates the last pit at the facility will be backfilled and capped during the first half of 2015. The South Brothers pits may however still be required post 2010, should capacity be reached earlier than expected at East of Sha Chau or one or more of the East of Sha Chau pits not being available due to planning constraints.

### **OVERALL CONCLUSION**

This *Environmental Impact Assessment and Final Site Selection Report* has critically assessed the overall acceptability of the environmental impacts likely to arise as a result of the construction and operation of the proposed contaminated mud disposal facility at East of Sha Chau. Where necessary and practicable, the EIA has specified the conditions and requirements for the detailed design, construction and operation of the Project in order to mitigate environmental impacts to acceptable levels.

This EIA Study has predicted that the Project will comply with all environmental standards and legislation following the implementation of the recommended mitigation measures. The EIA has thus demonstrated the acceptability of any residual impacts from the Project and the protection of the population and environmentally sensitive resources. Where appropriate, EM&A mechanisms have been recommended to verify the accuracy of the EIA predictions to ensure the effectiveness of the recommended mitigation measures.

In conclusion, it is considered that the EIA provides a suitable basis for the Director of Environmental Protection to consider granting the Environmental Permit to allow the construction and operation of the Project.