

Hong Kong Government
Environmental Protection Department

Agreement No. CE 14/94

Executive Summary

Site Selection Report for Low Level Radioactive Waste Storage Facility

June 1995

Maunsell Consultants Asia Ltd.
in association with
Consultants in Environmental Sciences (Asia) Ltd.
Taylor Woodrow Management & Engineering Ltd.

LOW LEVEL RADIOACTIVE WASTE STORAGE FACILITY

EXECUTIVE SUMMARY

Background

The Government has decided that storage of low-level radioactive waste in Hong Kong requires a dedicated, purpose-designed facility. Two rounds of site search were carried out, and several inland and island potential sites were proposed and compared. Following a feasibility study and a site screening process undertaken by Government, two islands to the south of Lantau were finally chosen to provide candidate sites.

A consultancy study to select a suitable site for the low-level radioactive waste storage facility, to assess the feasibility of such a facility and to specify a Design, Build and Operate (DBO) contract, is being carried out on behalf of EPD by Maunsell Consultants Asia Ltd. in association with Consultants in Environmental Sciences (Asia) Ltd. and Taylor Woodrow Management and Engineering Ltd.

Site Selection Study

The objective of the first phase of the project was to identify suitable alternative sites on both shortlisted islands and to carry out a site selection process. The candidate sites were chosen on the basis of the feasibility of developing and operating a facility. Two sites (named A and B) were selected on the island of Shek Kwu Chau (see Figure 1) and two sites (named C and D) were selected on the island of Siu A Chau (see Figure 2).

The site selection criteria used in the evaluation and assessment of the four candidate sites were designed by the consultants and took into account the views of the Client Department (EPD), as well as the Department of Health (the final operator of the facility). The aim was to filter out and reject any unacceptable sites at an early stage. The objective of the assessment was to identify an optimal site based upon defined criteria such that the preferred site would be a safe, secure and cost-effective site for a storage facility.

The Candidate Sites

Sites A and B are on the island of Shek Kwu Chau, which currently also houses the facilities of the Society for the Aid and Rehabilitation of Drug Abusers (SARDA). Site A is situated in a small valley immediately above the island's jetty and to the side of the SARDA access road (see Figure 3). Site B is almost at the summit of one of the island's hills, in the vicinity of a Marine Department radar installation and is currently used as a helicopter landing pad to facilitate servicing the radar installation (see Figure 4).

Sites C and D are on the island of Siu A Chau in the northern Soko islands. This island is currently uninhabited. Site C is situated above a small bay with a rocky shoreline (Figure 5), whilst site D is at the back of the main beach (Figure 6). There are proposals to construct a Liquefied Natural Gas (LNG) terminal on the island, the site of which is in conflict with site D. Site C lies outside the safety exclusion zone (the 'Sterile' zone) as indicated on Figure 7.

Type of Facility Required

At the time of Site Selection, no final figure for waste storage requirements had been determined, but it is envisaged that up to 260 drums of waste will require storage. The storage area forms the principal element of the facility but additional space is required for waste unloading, characterisation, processing and packaging, record keeping office, changing rooms and toilets, and ventilation equipment.

The building will be a rectangular single storey building with floor area of up to 1000 m², actual size depending on finally agreed waste arisings, and height up to 6.5 metres if an overhead crane is required. A buffer area surrounding the building will be provided for security. Water, electricity, telephone, and sewerage services will be provided. Special provisions will be made for control of air and water effluent from the site to prevent contamination.

Site access will be by road from a marine jetty capable of taking small vessels. There is an existing jetty at Shek Kwu Chau which would require upgrading to take self propelled vehicles. A new jetty and construction would be required in Sum Wan at Siu A Chau, the length depending on results of site investigations being carried out. A heliport or helipad would be provided for emergency access

Site Selection Process

All four candidate sites are to some extent limited (that is, no site is perfectly well suited); however, none of the four sites have any overwhelming disadvantages such that it would be impossible or unwise to build a storage facility at that site.

The sites were ranked for each of the adopted site selection criteria, according to a weighted scoring system. Under this system, a positive weighting factor was applied to features which are desirable for a low-level radioactive waste storage facility. Thus more important criteria scored more marks in the assessment. The results of this comparison are shown in Table 1, which indicate that site C is the most favoured site, with site B as a close alternative. The overall ranking of the sites would not be affected if the planned LNG terminal on Siu A Chau were to be built, even though it has been assumed that site D would not be used.

The difference in the marginal costs of construction of the facility at each of the four sites was examined (not including the capital costs of the facility itself), which indicated that the following additional costs, excluding capital costs (identical for each site) may be anticipated.

Site A: HK\$2.1M

Site B: HK\$2.0M

Site C: HK\$3.2M

Site D: HK\$3.8M

Table 1. Ranking of Shortlisted Sites - Technical Considerations										
Selection criteria	Level of desirability	No LNG Facility Site				With LNG Facility Site				
		A	B	C	D	A	B	C	D	
Adequate site area	E	✓	✓	✓	✓	✓	✓	✓	X	
Geologically stable	E	✓	✓	✓	✓	✓	✓	✓	✓	
Not prone to flooding	HD	6	10	10	8	6	10	10	n/a	
Distant from hazardous facilities	HD	6	8	10	10	6	8	2	n/a	
Distant from residential areas	HD	6	8	10	10	6	8	10	n/a	
Risk of polluting water supplies	HD	10	6	10	10	10	6	10	n/a	
Potential environmental impact	HD	4	6	7	5	4	6	8	n/a	
Geotechnical considerations	HD	4	7	8	6	4	7	8	n/a	
Minimal radiological risk	HD	6	7	9	9	6	7	9	n/a	
No operating constraints	HD	9	8	6	6	9	8	6	n/a	
Site suitable for extension	HD	2	6	9	9	2	6	9	n/a	
Not on main transport routes	D	10	10	10	10	10	10	10	n/a	
Capable of a high security	D	9	10	7	6	9	10	7	n/a	
Existing transport infrastructure	D	9	5	0	0	9	5	0	n/a	
No conflict with existing use	D	7	5	10	9	7	5	10	n/a	
Minimal visual impact	D	10	7	2	2	10	7	8	n/a	
Dispersion of aerial discharges	D	1	9	6	5	1	9	6	n/a	
Connection to existing services	D	9	8	4	4	9	8	4	n/a	
Sheltered from high winds	O	10	0	4	6	10	0	4	n/a	
No contractual difficulty	O	5	5	10	2	5	5	10	n/a	
Low construction costs	O	9	9	5	2	9	9	5	n/a	
Totals		132	134	137	119	132	134	136	n/a	
Weighted totals		212.5	227	235.5	210	212.5	227	230.5	n/a	
Site Ranking		3	2	1	4	3	2	1		
NOTE:		E= Essential								
		HD= Highly Desirable								
		D= Desirable								
		O= Optional								
		All are scored from 1 to 10; weightings are applied as HD=2; D=1.5; O=1								

Recommendation

Site C on Siu A Chau is recommended as the preferred site. Its advantages over the other three sites are that:

- The site is at the eastern end of the island, which is not inhabited.
- This site has no existing land issues and there are no conflicts with existing uses.

With careful attention to details including design, site management during construction, landscaping and planting, potential environmental impacts at site C could be readily minimised and should not be a significant concern.

As part of the second phase of this project, an outline design for the facility will be produced and an environmental impact and safety assessment study will be conducted.

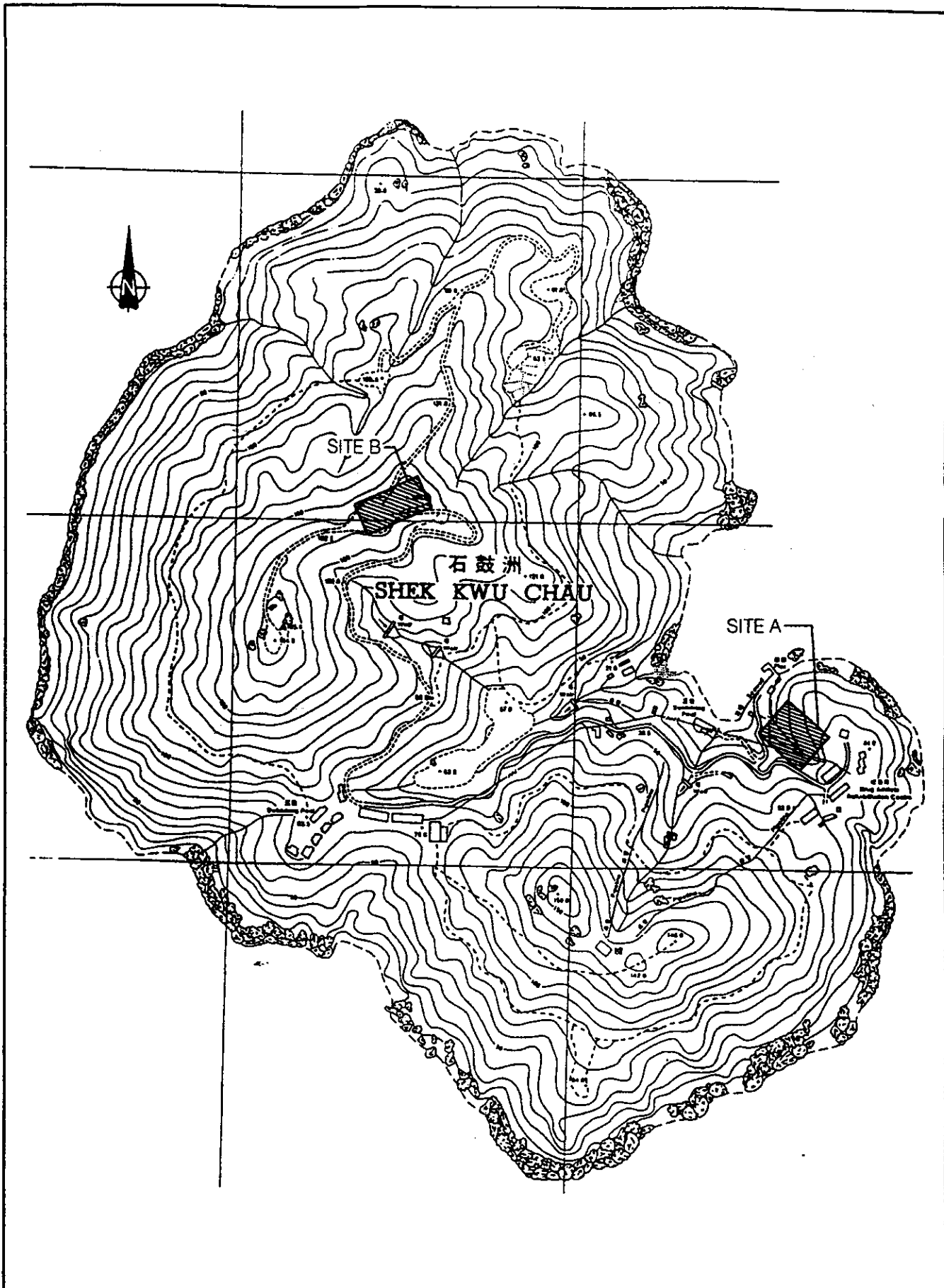


Figure 1 Shek Kwu Chau Site Location Plan

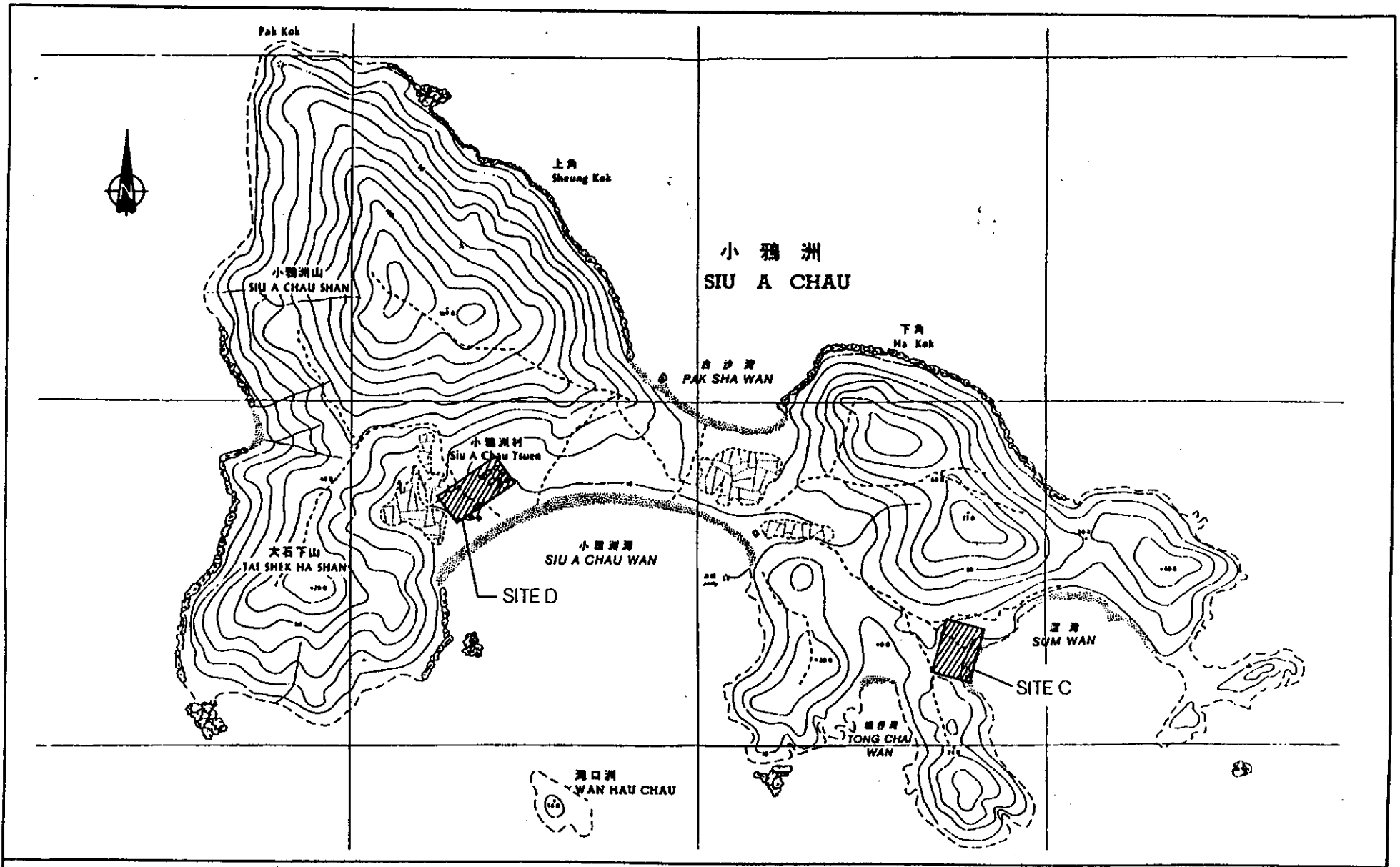


Figure 2 Siu A Chau Site Location Plan

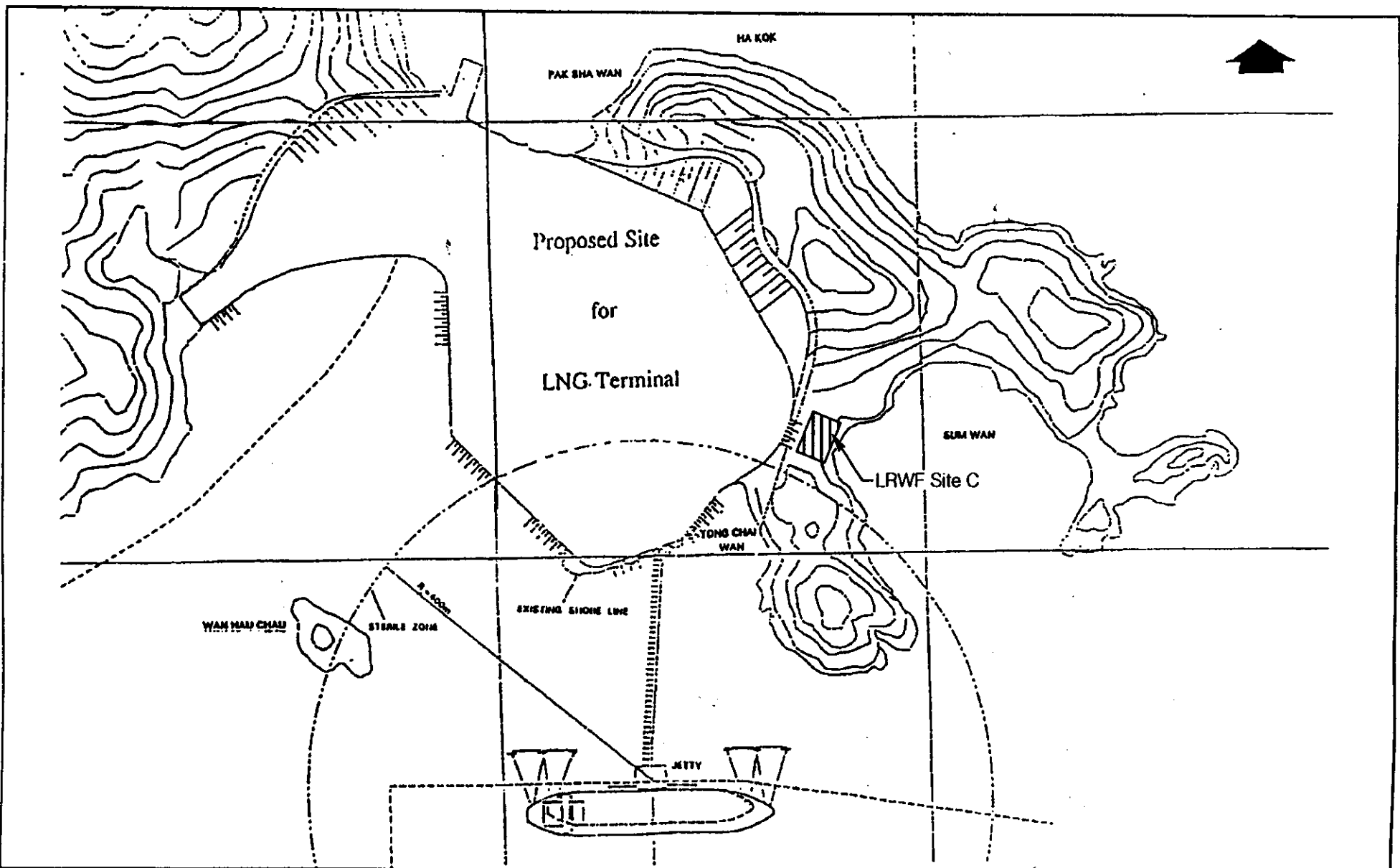
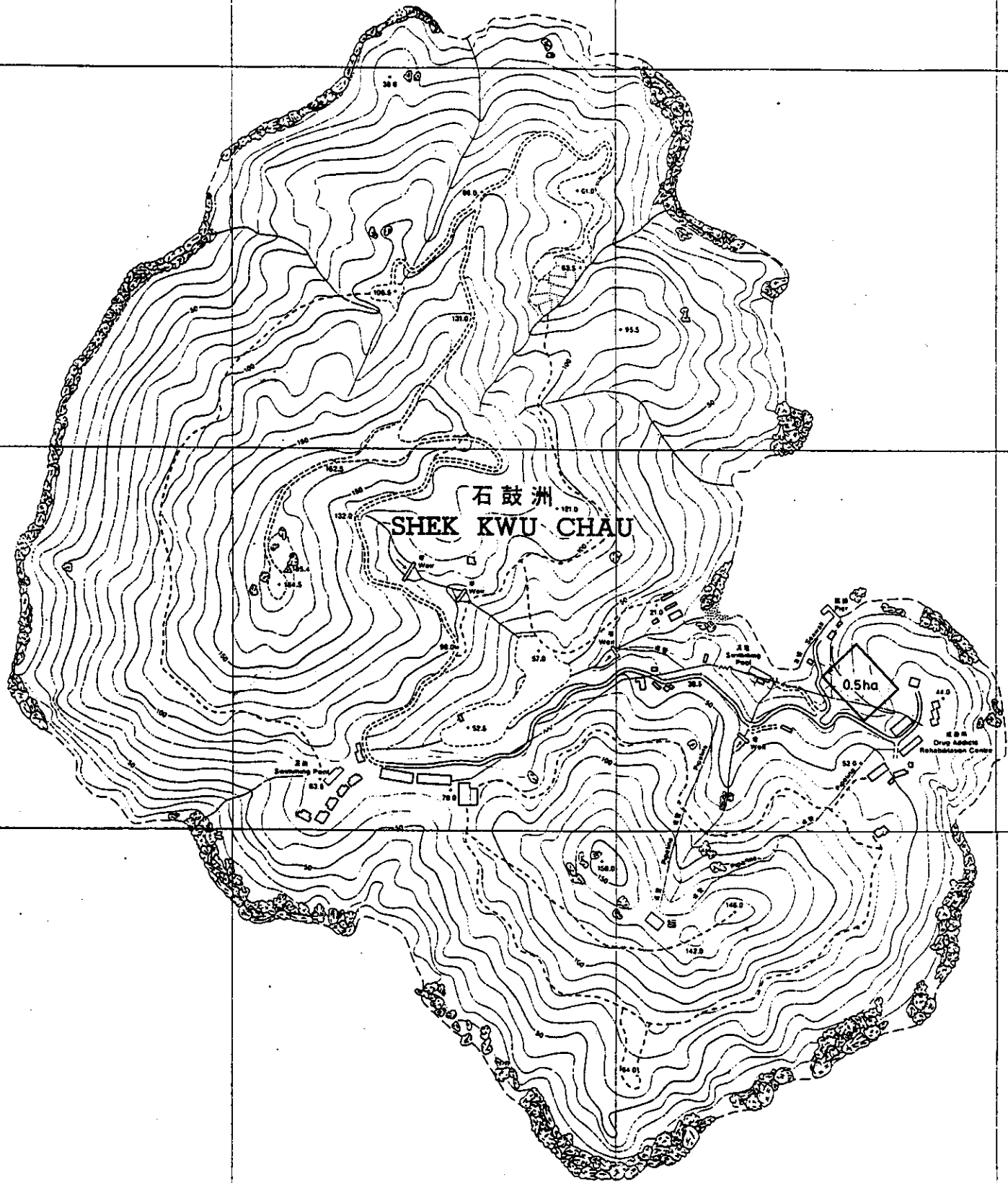


Figure 7 Plan of Proposed LNG Terminal Site and Loading Facility, Indicating the Proposed Sterile Zone



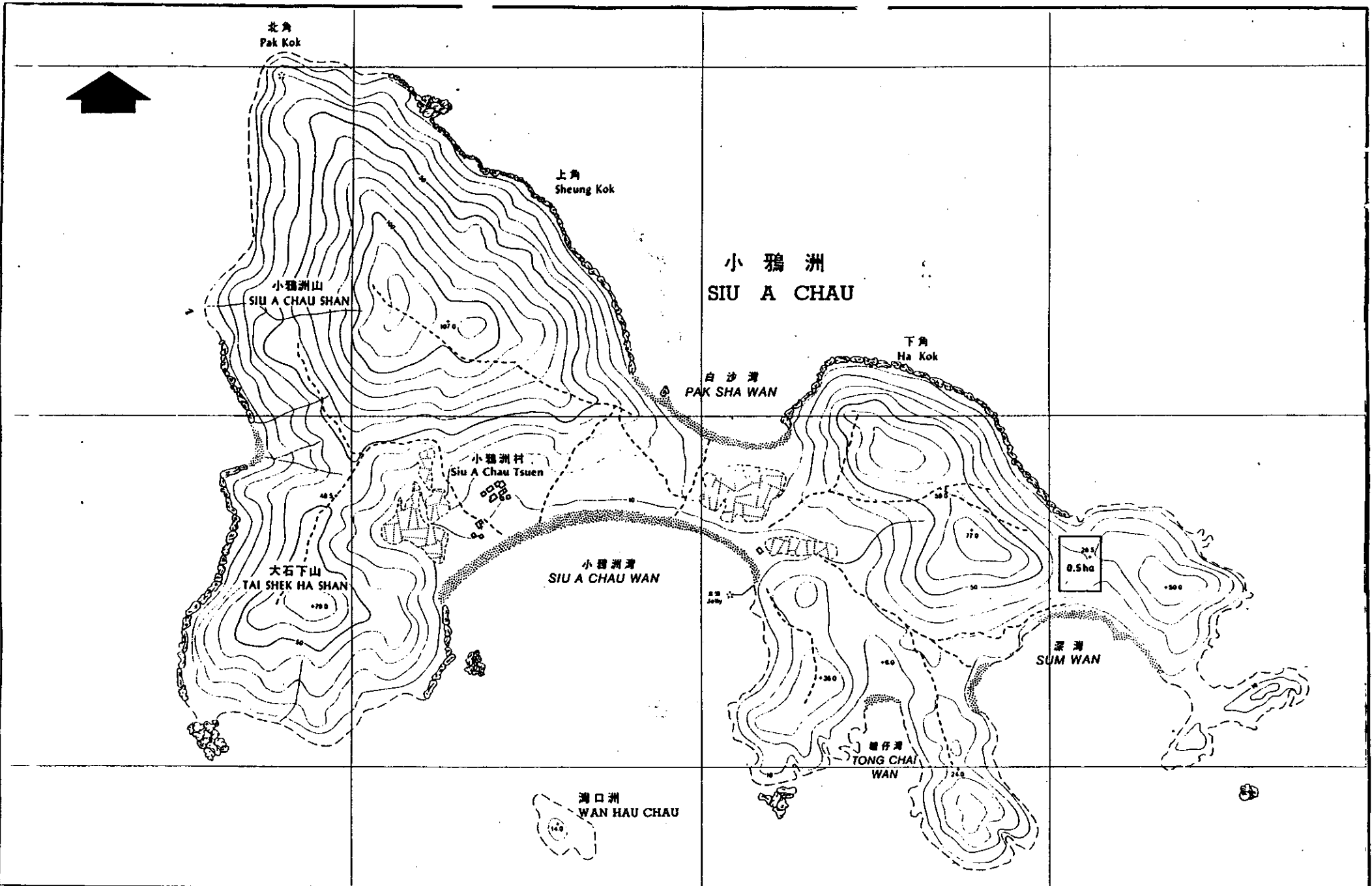
Reference
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 Extracted from 14-NW-C

**SHORTLISTED SITE
 FOR LOW LEVEL RADIOACTIVE WASTE STORAGE FACILITY,
 SHEK KWU CHAU**

SCALE 1 : 7 000

PLANNING DEPARTMENT

PLAN REF. No.: SRHK - OT93/67 PLAN
 FILE REF. No. 1
 DATE JAN 1994



SOURCES

Extracted from 13-SE-A

SHORTLISTED SITE FOR LOW LEVEL RADIOACTIVE WASTE STORAGE FACILITY, SIU A CHAU

SCALE 1 : 7 000

PLANNING DEPARTMENT



PLAN REF NO SPW-K - 0193/88

FILE REF NO

PLAN

1